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# Career and Technical Education: Developing a Well-Equipped Workforce

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# CAREER AND TECHNICAL EDUCATION: DEVELOPING A WELL-EQUIPPED WORKFORCE

By
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## Approval Page

This dissertation was submitted by Grant E Tharpe under the direction of the persons listed below. It was submitted to the Gardner-Webb University College of Education and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Gardner-Webb University.

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## Abstract

CAREER AND TECHNICAL EDUCATION: DEVELOPING A WELL-EQUIPPED WORKFORCE. Tharpe, Grant E., 2022: Dissertation, Gardner-Webb University. Evidence today shows that there is a skills gap among employable young adults. This study was based on a Career and Technical Education (CTE) program evaluation that was conducted in a rural school district in northwest North Carolina. The study examined the perceptions of the program by CTE high school teachers, CTE community college instructors, CTE local employers, and CTE program graduates. The focus was the overall functioning of the program and its ability to form students who are college and career ready through attainment of important future ready attributes. The study was conducted through a mixed methods approach. Data were collected from two instruments. First, quantitative data were collected by the completion of a survey. Next, qualitative data were collected from focus group interviews. The questions used to guide the interviews were created based on analyzed survey data. Collecting the quantitative data first, and then further explaining the responses through qualitative data, formed an explanatory sequential design. The design was successful in further exploring the effectiveness of the CTE program. Two important resources that were used to determine components of effectiveness included the 12 elements from the National Assessment of Career and Technical Education framework and the 17 attributes of a North Carolina future ready graduate. Together, these resources aligned with categories connected to college and career readiness.



*Keywords:* career and technical education (CTE), ill-prepared workforce, college and career ready (CCR), skills gap

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## Chapter 1: Introduction

"Educators and parents seem to agree that there is value in emphasizing both academic knowledge and career preparation in schools" (Ferguson, 2018, p. 64). To further emphasize the importance of this educational investment, legislation continues to be passed at the state and federal levels to support the success of future graduates. The Strengthening Career and Technical Education for the 21st Century Act, also known as Perkins V, is a federal bill that was signed into law in 2018 to provide increased financial support and a reduced federal role towards career and technical education (CTE) governing. The reduced federal role has allowed states and individual districts to embrace CTE as an integral part of college and career readiness (CCR). "Career and Technical Education is a priority to nearly every governor, and many state policymakers recognize that it is a critical strategy to expand access to opportunity and train the workforce of the future" (The State of Career and Technical Education: Improving Data Quality and Effectiveness, 2019, p. 2).

In 2018, North Carolina Governor Roy Cooper announced a North Carolina Job Ready initiative that was built on the core principles of skills and educational attainment, employer leadership, and local innovation. The core principle of skills and educational attainment is connected to the adaption of rapidly changing skill requirements. With everchanging skills, employee leadership encompasses an investment by North Carolina employers. These employers know the desired skills of their profession and also those important to workforce development. Another core principle is local innovation. Local innovation expands upon employer leadership to form community models of workforce development that can be replicated and built upon (Porter, 2018).

In 2015, the Hunt Institute defined a CCR North Carolina high school graduate as one who has "knowledge and academic preparation needed to enroll and succeed, without the need for remediation, in introductory college credit-bearing courses in English language arts and mathematics within an associate or baccalaureate degree program" (p. 1). Such skill and academic proficiency is critical in the development of a prepared workforce. A well-prepared workforce is critical towards the establishment and progression of any state economy. Progressively, states are aligning their CCR and workforce development to CTE programs that offer postsecondary credit (The Aspen Institute, 2018). North Carolina uses its Workforce Development Board to oversee its training programs aimed at providing employees the skills to complete tasks and be competitive in the global market (NCWorks Commission, 2018).

**Problem**

> The United States faces three challenges related to education and the labor market. The first is a need to remain economically competitive in a world where companies are hungry for skilled talent. The second is the competition American workers face from workers abroad for well-paying jobs, And the third is an education system that has failed to prepare all students equitably to succeed in college or other postsecondary education, and to be ready to meet the demands of the labor market. (Beal et al., 2018, p. 1)

All three of these current challenges stem from a problem connected to workforce development and CCR among graduating seniors. Current employment trends are often said to be due to a "skills gap," meaning workers lack skills that employers deem necessary for success in a given career. This information comes after a growing concern

towards traditional high schools being ill-equipped to assist students in the development of skills to be successful in the transition towards postsecondary education and the building of sustainable careers (Beal et al., 2018).

The current United States economy has a well-documented need for workers who are trained in technical fields. According to the numbers, there are nearly 30 million middle-class jobs within the U.S. economy with salaries ranging between $35,000 and $95,000 per year. To obtain one of these jobs, the need to acquire a degree beyond a high school diploma is steadily increasing (Beal et al., 2018). In 2016, there were more than six million open positions in the labor market. Of these positions, "35% of employers said that they had trouble hiring because they had trouble finding people with the right experience or skills" (Beal et al., 2018, p. 2).

"Graduates must be prepared for an employment market that is ever evolving, one that demands flexibility and adaptability just to keep up, let alone thrive" (Bourbon, 2017, p. 4). The value of a college degree is turning out to be not enough. Increasingly, employers are also looking for a set of skills outside of the standard curriculum. These skills include adaptability, problem-solving, collaboration, and communication, all of which are intertwined into important CCR skill development.

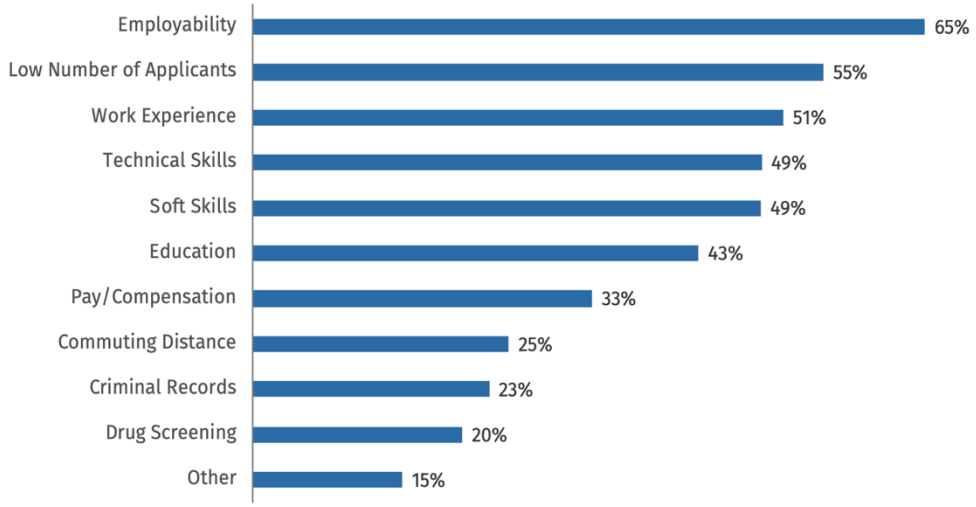
Emphasis on postsecondary preparation, access, and success has caused awareness of CCR to recently be raised. Conley (2012) identified four categories of essential CCR skills. The categories include content knowledge, learning skills and techniques, transition knowledge and skills, and cognitive strategies. In the area of content knowledge, a student's retention of vocabulary, factual information, and conceptual organization are based on core educational standards (Conley, 2012). Often,

these standards are assessed through state testing. Most commonly used is the ACT. The ACT assesses student proficiency in the major subject areas of English, mathematics, reading, and science. Learning skills and techniques focus on managing time, study habits, goal setting, self-awareness, perseverance, cooperative learning that promotes student ownership, technology expertise, and retention of facts (Villares & Brigman, 2019). Many of these skills are learned through discipline and self-motivation. Next, transition knowledge and skills focus on postsecondary selection. A student's chosen pathway, the financial requirements, affordability, and cultural perspectives are considered. Studies show that transition knowledge is supported through experiences. Experiences support a transition from a fixed mindset to a growth mindset that promotes higher achievement. Lastly, cognitive strategies refer to problem interpretation and communication (Villares & Brigman, 2019).

Figure 1 illustrates a section of the 2018 Employer Needs Survey carried out by the North Carolina Department of Commerce. This specific figure illustrates responses that were collected from employers based on their rationale for hiring difficulties.

**Figure 1**

*Reasons for Hiring Difficulty*




*Note.* Provided percentages represent reasoning for hiring difficulties across the state of North Carolina.

Hiring difficulties are often referred to as evidence of a skills gap. Among the highest percentages were employability, number of applicants, work experience, technical skills, soft skills, and education. These same areas were also most frequently reported in the 2014 and 2016 surveys (NCWorks Commission, 2018). Each of these identified reasons connects back to workforce development and CCR. A lack of employability can also be described as a lack of work ethic, professionalism, reliability, and motivation (NCWorks Commission, 2018). In CCR terms, employability is directly aligned to the student ownership component found in the learning skills and techniques category (Villares & Brigman, 2019). Likewise, the low number of applicants is connected to the CCR categories of learning skills and techniques and transition knowledge. Students must have a transition knowledge based on learned skills with a focus towards a chosen pathway to be confident applicants. Work experience is also

related to the CCR categories of learning skills and techniques and transition knowledge. Learning skills provide the necessary knowledge for success in the workplace, while transition knowledge provides the necessary experience and practice for onsite success (Villares & Brigman, 2019). Furthermore, technical skills involve the capabilities and knowledge to perform a given task, and soft skills focus more on the capabilities of people to interact and effectively communicate with others. There are components of these skills found within each of the CCR categories. The final greatest reason for hiring difficulty included education (NCWorks Commission, 2018). Undoubtedly, education falls under the CCR category of content knowledge (Villares & Brigman, 2019). Student academic retention must be thorough and extensive to ensure competency is possible within a given occupation. "Other reasons, such as a criminal record, low pay, and drug screening issues, were less frequently chosen by employers" (NCWorks Commission, 2018, p. 3).

"Previous research has explored the question of whether there is a mismatch between the jobs available and the skills and interests of the labor force" (NCWorks Commission, 2018, p. 6). Employers within North Carolina have reported that the labor pool does not correlate with the increasing demand for jobs that require strong skills, proper training, proper certification, educational attainment, and past work experience.

**Purpose**

It is "more important than ever that high school career and technical education programs mesh with real-world opportunities" (Northern & Petrilli, 2019, p. 4). A recent report by ExcelinEd warned states to phase out CTE programs that do not reflect current labor market demand and form new programs that address the skill gaps among youth

today (Northern & Petrilli, 2019).

"CTE's recent history reflects tensions that have been around for over a century, when formal vocational education became a differentiated track" (Malkus, 2019, p. 4). Looking back at the first federal legislation that connected to vocational education, you will find the Smith-Hughes Act of 1917. This legislation provided federal funds for state programs that were focused on the teaching of agriculture, trades, industries, and home economics. Programs in these areas were explicitly proposed to provide a labor force among semiskilled workers (Malkus, 2019). "In the late 1980s and into the 1990s, vocational education came under increased scrutiny for the populations it 'served' and whether it actually served them" (Malkus, 2019, p. 4). The vocational programs became known as an inferior track that often diverted the disadvantaged student population away from high functioning academic programs and scholarly degrees.

With this growing stigma, vocational education rebranded itself as CTE. The rebranding began with Perkins II legislation that increased the focus and alignment of the program towards a pairing of academic and business needs. Perkins IV legislation developed an even greater focus towards academics and career and technical skill development. The range of CTE programs has expanded, and the overall framework of the program has developed a greater appeal to the student population without being targeted as a destiny for the disadvantaged community. The most recent legislation, Perkins V, was reauthorized in the summer of 2018 to marginally decentralize CTE by allowing individual states and localities to help shape the programs (Malkus, 2019). Requirements now include "state oversight of CTE programs, alignment with industry needs, dollar-for-dollar matching, and a focus on producing a capable labor force"

(Malkus, 2019, p. 6).

Today, effective CTE programs have a more defined role towards workforce development and forming CCR graduates. Three mechanisms by which CTE can positively affect high graduates include skill building, engagement, and real-world relevance (Gottfried & Plasman, 2018). Skill building is stressed through CTE courses that practice the "development of critical thinking, reasoning, logic, collaboration, research and development, and problem solving" (Gottfried & Plasman, 2018, p. 328) skills. Next, the mechanism of engagement is represented by CTE's link between traditional course content and its career-based applications. Such engagement tends to decrease dropout rates and link CTE to both college and career opportunities. The final mechanism of real-world relevance connects traditional content and application (Gottfried & Plasman, 2018). "Taking CTE courses has the potential for students to develop an understanding of the importance of high school content as it links to opportunities immediately afterward" (Gottfried & Plasman, 2018, p. 329).

This specific study is purposefully aimed to collect and analyze current student, educator, and employer perspectives regarding the impact of high school CTE on CCR skills in a rural high school setting. In North Carolina, "The mission of CTE is to empower students to be successful citizens, workers, and leaders in a global economy" (North Carolina Department of Public Instruction [NCDPI], 2019, p. 1). Within NCDPI, the CTE department is responsible for managing courses in the essential standards. Each course is aligned to career clusters that are based on a set of skills and knowledge development that is common to all careers within a specific cluster. North Carolina has 16 career clusters that are used as organizing tools for the design of curriculum, district

guidance, and a framework for unified transitions to both college and career. The North Carolina Public School System identifies its 16 career clusters as

- Agriculture, Food, and Natural resources
- Architecture and Construction
- Arts, A/V Technology, and Communications
- Business Management and Administration
- Education and Training
- Finance
- Government and Public Administration
- Health Science
- Hospitality and Tourism
- Human Services
- Information Technology
- Law, Public Safety, Corrections, and Security
- Manufacturing
- Marketing
- Science, Technology, Engineering, and Mathematics
- Transportation, Distribution, and Logistics (NCDPI, 2019)

In accordance with Federal law, all schools receiving Perkins funding are required to offer at least one program of study. A program of study "provides a clear pathway for students to reach their career goals through secondary CTE courses, opportunities for postsecondary credit while in high school, and academic coursework, combined with a smooth transition to postsecondary education and advanced training" (NCDPI, 2019, p.

2). To support a smooth transition, students have a career development plan that outlines courses to be taken with alignment to both high school graduation and proposed career objectives (NCDPI, 2019).

CTE courses within North Carolina also require student work-based learning opportunities. The nine specific opportunities within North Carolina CTE courses include apprenticeships, business and industry field trips, cooperative education, entrepreneurial experiences, internships, job shadowing, mentorships, school-based enterprise, and service learning (NCDPI, 2019). “Work-Based Learning is an integral part of all Career and Technical Courses in North Carolina to show curricular relevance to industry trends” (NCDPI, 2019, p. 4). As students progress from middle school to high school and then to postsecondary education, their work-based learning experiences should be transitioning as well. The transition of learning should include career awareness, career exploration, and then career preparation.

**Specific Research Questions**

To further explore the purpose of this study, three research questions were developed to further conduct a CTE program evaluation in rural northwest North Carolina. Student, educator, and employer perspectives are reflected.

1. What specific qualities are CTE programs expected to address during program completion?
2. What strategies are in place within the district to ensure that program objectives align with workforce needs?
3. How are specific CCR skills exhibited during and after CTE classes?
4. How effective is the studied rural CTE program in preparing students to be

CCR?

**Significance**

It is 2022, and the shortage of qualified workers is vastly rising in the United States. Some economists believe that the shortage is attributed to a skills gap, while other economists feel that the shortage is a result of skill polarization (Beal et al., 2018); however, all economists can agree that specific employee traits, characteristics, and skill development will be the key in neutralizing the current labor market struggle.

During the 2015-2016 school year, graduation rates reached a national high; 84% of high school seniors graduated. However, "many high school graduates, particularly those from lower-income families, still fail to make successful transitions to a postsecondary education of the workforce" (Beal et al., 2018, p. 2). Such statistics have led policies, education, employment, and philanthropic communities "to coalesce around the idea that students need clear pathways from high school, to postsecondary education and training, to the labor market, and help making the transitions from each to the next" (Beal et al., 2018, p. 3). The idea being referenced is CTE.

CTE aims to solve the skill gap for employability. "Today's CTE programs take many forms, depending on the institutions that design and deliver them, the population they serve, and the numbers and types of components they incorporate" (Beal et al., 2018, p. 5). Studies show that CTE course-taking aligns with a lessened percentage of dropouts and a higher percentage of on-time graduation (Gottfried & Plasman, 2018). Aside from just graduating, CTE has presumed the responsibility of bridging the gap to form a successful CCR graduate. These graduates are proficient in content knowledge, learning skills, learning techniques, transition knowledge, transition skills, and cognitive

strategies; all of which are skills employers are hungry for obtaining when hiring new individuals to fill their growing vacancies (Bourbon, 2017).

**Setting**

The setting of this study took place in a rural county within North Carolina. The area is considered a micropolitan labor market. Data suggest that 88% of employers within this area tried to hire at least one position in the last year. Of this percentage, 49% experienced difficulty in their hiring attempts, as the reasons for hiring difficulty matched overall North Carolina findings associated with employability, number of applicants, work experience, technical skills, soft skills, and education (NCWorks Commission, 2018).

The local school district offers CTE programs that include job shadowing, paid internships, unpaid internships, and apprenticeships. Job shadowing is "a short-term educational experience that introduces a student to a particular job or career by pairing the student with an employee of a business, industry, or agency" (NCDPI, 2019, p. 3). Paid and unpaid internships provide work-based learning experiences for the student to participate directly with a supervisor in the operations of a specific trade. An apprenticeship is considered a coordination of skilled occupational training that relates concrete experiences with academic and technical instruction (NCDPI, 2019). During the 2019-2020 school year, the school district had six students in apprenticeships. Although the students are participating in a variety of CTE learning opportunities, the goal remains consistent in providing every individual with a work-based learning experience that bridges the gap between having capabilities and being able to do.

## Overview of Methodology

This study represented a program evaluation that focused on assessing the effectiveness of a rural school district's CTE programs. The program evaluation was conducted through the Context, Input, Process, and Product (CIPP) model that was introduced by Stufflebeam (2003). Each of the four individual concepts provided a separate evaluation focus. The context component examined objectives through the specific qualities CTE programs are expected to address. The input component was centered on content, as it ensured that strategies were in place within the district to align program objectives and workforce needs. The process component accentuated how CCR skills are exhibited during class and after CTE program completion. The final product component was associated with results, as perceptions were collected from students, educators, and employers on the CTE programs preparing students to be CCR.

A strong focus was placed on the program's ability to prepare its students with the ability and skills that align with being CCR. The research method encompassed a mixed methods approach. Qualitative data were collected through interviews and quantitative data were collected through surveys. Both data types involved collection through interactions with participants that include high school CTE teachers, CTE high school graduates, community college CTE instructors, and local business employers.

The information from this study was significant because of its ability to assess the effectiveness of a program that has great responsibility in preparing our future workforce. The CIPP program evaluation model provided a focused evaluation and the mixed methods data collection provided needed information. The end results represented an identification of both strengths and possible limitations that currently face a rural school

district's CTE program.

## Definition of Terms

The following terms are commonly used within this study.

### *CTE*

An educational program that focuses on developing CCR skills through mechanisms of engagement and career-based applications (Gottfried & Plasman, 2018).

### *Vocational Education*

An educational program that provides instruction in areas of agriculture, trades, industries, and home economics. The programs are considered to develop semiskilled workers on separate tracks from their general academic peers (Malkus, 2019).

### *Smith Hughes Act of 1917*

The first federal legislation that provides funding for vocational education in the areas of agriculture, trades, industries, and home economics (Malkus, 2019).

### *Perkins V*

A reauthorization of the Strengthening Career and Technical Education for the 21st Century Act that occurred in July 2018. The federal legislation provides $1.3 billion for CTE program funding (Malkus, 2019).

### *Skills Gap*

An identified difference between the employer's needs to fill open positions and the skill of the current workforce (Beal et al., 2018).

### *Workforce Development*

An idea that aims to provide future employees with the specific skills to conquer tasks at a competitive level in the global labor market (NCWorks Commission, 2018).

***Ill-Prepared Workforce***

A belief among economists that relates to new employees lacking experience and adequate skills (Beal et al., 2018).

***Ill-Prepared Student***

Graduating seniors who struggle to transition from high school into postsecondary schooling or the workforce (Beal et al., 2018).

***Labor Market***

A demand between employers and employees that relates to desired traits, characteristics, and skills within a specific job (Beal et al., 2018).

***Transition Knowledge***

The transfer of learned classroom material to skills that promote success for an employee in the workplace (Villares & Brigman, 2019).

***Career Cluster***

An organized set of jobs that relate in skills and knowledge development (NCDPI, 2019).

***Work-Based Learning***

An important part of CTE courses that allows students to practice and connect curricular relevance to industry trends (NCDPI, 2019).

***CCR***

A set of indicators used to predict and improve student postsecondary outcomes (Hunt Institute, 2015).

**Summary**

"Career and technical education is enjoying renewed attention from policymakers

and practitioners as part of the shift from ‘college for all’ to readiness for college and career” (Northern & Petrilli, 2019, p. 12). This attention comes after the increased competition within the global economy has left graduating students underprepared and employers unable to adequately fill their needed positions (Beal et al., 2018). The recent surge in CTE expects to produce graduates who possess CCR skills; such skills that can be grouped into the categories of personal knowledge, skills, and characteristics (Villares & Brigman, 2019).

# Chapter 2: Literature Review

## CTE History

Public education is charged with being in continuous evolution to support ever-changing labor markets and economic demands. Most often, modifications must be made in the areas of academic instruction and real-world relevance (Dougherty & Lombardi, 2016). Just as during the start of the 20th century, generalized knowledge versus labor market demand continues to be debated as being the greatest intent of public education. Grubb and Lazerson (2005) focused their belief of the American education system around equal access and economic results. In other words, "an educational system whose purposes are dominated by preparation for occupational roles, one where there is sufficient access so that many individuals have a reasonable hope of more schooling, and one that is responsive to external demands" (Grubb & Lazerson, 2005, p. 300). This type of educational practice was first identified as vocationalism (Grubb & Lazerson, 2005).

Across America, a "vocationalized" system of education has emerged in various stages. Changes within the high school setting and the establishment of university-based schooling were among the first emergences of a vocationalized system at the end of the 19th century in America. Growth of this educational idea accelerated in the 20th century; an acceleration that led many economists to coin it as the century of human capital (Grubb & Lazerson, 2005). One of CTE's first legislation involved the passing of the Smith-Hughes Act. "The Smith-Hughes Act's ideal formulation for secondary education was for students to learn theory and practice in vocations within comprehensive programs that prepared them for meaningful employment" (Lauzon, 2018, p. 15). The vision of this act never materialized. Instead, legacies of the legislation include the formation of

curricular tracks, focusing academic advancement on college-bound students, and defining those college-bound students as being the educational definition of success. The end product was coursework completion that prepared its students for low-skilled labor. Through the Great Depression, war times, and changes in society, legislation has placed its fiscal and practical emphasis on a variety of priorities; however, the efforts of improving vocational needs seemed to only parallel those of the Smith-Hughes Act (Lauzon, 2018).

In 2006, the Carl D. Perkins Vocational and Technical Act, Perkins IV, was reauthorized and became branded as a significant effort to reunite an academic and career-focused education. These legislation efforts also transitioned the vocational education title into the CTE title. By interchanging the title of vocational education with CTE, Perkins IV intended to eschew vocational education's persona of easy coursework that produces minimal efficiency in skills, status, and jobs (Lauzon, 2018).

The integration of Perkins IV was successful in its development of course pathways. It also highlighted some crucial challenges still facing the program. These challenges included the alignment of instructor expectations and credit agreements, insufficient resources, and a lack of equitable student access to course enrollment (Lauzon, 2018). Many of these challenges stem from funding issues. Recent legislation signed into law by President Donald Trump aimed to further support the financial concerns. In 2018, the Strengthening Career and Technical Education for the 21st Century Act, Perkins V, committed to providing $1.3 billion annually to individual state CTE programs across the country (Ferguson, 2018).

**Ill-Prepared Workforce**

Increased funding has been provided by the federal government to individual states to further support the educational role of developing a workforce that is able to fill positions within the emerging labor market and industry (Dougherty & Lombardi, 2016). Economists agree that there are shortages and problems among employment trends in today's workforce. Employees with experience and adequate skills are becoming scarce. Concerns have led many employer communities to seek workers with strong career-readiness skills (Beal et al., 2018). Such skills are known as 21st century skills, soft skills, employability skills, and general habits of being able to show up to work and cooperate with peers.

High schools and community colleges play a vital role in workforce training programs. Shifts in both economic and societal trends have caused a change in the role of higher education. Higher education now serves as a source of acceleration for students entering the workplace and a location for employers to find individuals with specific skill sets to fill positions. Courses connected to CTE and science, technology, engineering, and math (STEM) have recently displayed the greatest economic impact in the United States; therefore, educational organizations across the country continue to develop and maintain STEM and CTE systems that connect high school, community college, and university educational pathways with successful career opportunities (Lowry & Thomas-Anderson, 2017).

**Ill-Prepared Student**

The 2015-2016 national high school graduation rate of 84% marked a historic record high; however, many of these graduates, predominantly the products of lower-

income families, still struggle in the transition to postsecondary schooling or the workforce (Beal et al., 2018). These data have led to questioning and concern related to traditional high schools being equipped to develop the skills of their students in order to make successful transitions. Looking specifically at college enrollment, an average of 83% of high-income students and 63% of middle and low-income students enroll in either a 2- or 4-year college after high school. The vast majority of these students fail to complete their degrees (Beal et al., 2018). “In community colleges in particular, just under 30 percent of first-time, full-time students complete associate’s degrees within three years” (Beal et al., 2018, p. 3). The increasing amount of time it is taking students to complete their program degrees or certificates is due in part to their likelihood of having to take developmental or remedial courses. These types of courses have to be implemented as a scaffold for the increasing number of struggling students.

Researchers have placed a detailed focus on the development of high school graduates. According to Allensworth et al. (2018), “Increasing students’ educational attainment has become a top priority for high schools across the country. Policymakers and school districts have set the ambitious goal of getting all students to graduate from high school ready to succeed in college” (p. 1). Educators have long used specific indicators to help track and better support their students towards graduation and college readiness. What policymakers and school practitioners continue to struggle with is how to use the indicators to better the educational attainment of students. Specific indicators used include coursework, grades, disciplinary review, standardized testing, and grade point averages; however, multiple studies have shown that success in higher education goes beyond academic preparation (Allensworth et al., 2018). Conley (2012) developed a

model of skills and knowledge needed for success beyond high school. The four keys Conley identified include key content knowledge, key learning skills, key transition knowledge, and key cognitive strategies.

## Conceptual Framework

The process of conducting a program evaluation of CTE produced the basis of the conceptual framework for this study. Evaluations can be traced back to the dawn of civilization. Specific evaluations connected to educational programs began in the late 19th century. Joseph Rice worked during this time to identify the deficiencies among American schools (Graham, 1966). American education continues to be the focus of this specific study. As stated earlier, there has been an evolution of CTE. From federally funded state programs in the areas of agriculture, trade, industry, and home economics, to a redefined program with a broader range of career pathways that align to postsecondary success, CTE has been cited as improving its participants' outcomes. Research among CCR identifiers was used to identify the quality of a rural school district's CTE program.

## Program Theory-Driven Evaluation

Program theory can be defined as clear or implied stakeholder assumptions towards actions required to solve an identified problem (Chen, 2015). The problem within this study is connected to workforce development and the CCR among graduating seniors. The theory-driven evaluation will assess whether an implemented intervention is working and how and why it is being successful (Chen, 2015). The intervention within this study is CTE.

There are different versions of program theory. The version that fits Chen's (2015) definition is called the action model/change model schema. "The action

model/change model schema is defined as a systematic configuration of stakeholders' prescriptive and descriptive assumptions underlying programs, whether they are explicit or implicit" (Chen, 2015, p. 66). Descriptive assumptions focus on the causal process within a problem that a program is aimed at addressing (Chen, 2015). According to descriptive assumptions, a failing labor market is much in part related to the lack of skill and workforce development among graduating seniors. In relation to these descriptive assumptions, high school objectives must reinforce the skills necessary for success in both workforce and postsecondary events. On the other hand, the prescriptive assumptions propose the components of a program that are necessary for its success (Chen, 2015). Based on the assumption that CTE courses are linked to success in workforce development, districts must be equipped with CTE programs that are proficient in forming North Carolina future ready graduates.

**Evaluation of CTE**

There are many components of a CTE program. This study focused on three specific areas: Perkins accountability, the National Assessment of Career and Technical Education (NACTE) framework, and the attributes of a North Carolina future ready graduate. Each area is important in the development of a program that is able to positively impact its students.

**Perkins Accountability**

Current federal CTE legislation is identified as Perkins V, also known as the Strengthening Career and Technical Education for the 21st Century Act. Much has changed between 2006 and 2018, when the new legislation was formed. Unemployment reached 3.9%, skilled occupations identified a 13% skills gap, health care totaled

approximately 1.1 million unfilled positions, and manufacturing was estimated to have over 2 million unfilled positions by 2025 (Stump, 2018). Perkins V was identified as an opportunity to "Rethink CTE," and "expand opportunities for every student to explore, choose, and follow vertically-integrated career pathways to earn credentials of value" (Stump, 2018, p. 7).

The rethinking of CTE involved funding, the quality of programs, teacher employment, state commitments, and the role of employers. As stated earlier, Perkins V is committed to providing nearly $1.3 billion annually to CTE programs throughout the country. The new legislation allows states to allocate up to 15% of their funding into a reserve fund. The reserve fund is expected to be focused on specific needs within the state and is required to foster innovation and further program promotion within rural areas, areas of high CTE participant percentages, and areas with well-defined performance gaps (U.S. Department of Education, n.d.). To enhance the quality of CTE programs, Perkins V placed focus on collaboration between workforce boards and educational communities at the state and local levels. Effective collaboration between these units is essential for opportunities to collaborate on Workforce Innovation and Opportunity Act plans, local needs assessments, and a focused usage of reserve funds. Other Perkins V legislation focused on program quality includes a public reporting of data, the usage of program improvement plans, and program quality indicators (Stump, 2018).

Aside from specific program protocols, Perkins V illustrates the importance of teacher development. Section 122 of the legislation says that states should include a description of how the agency will support, recruit, and prepare its school personnel to

provide CTE instruction. Preparation includes specific professional development. Furthermore, Section 134 includes a requirement of state and local applications to present a component of coordination with eligible agencies and institutions of higher education when supporting the recruitment, preparation, retention, and training of personnel (U.S. Department of Education, n.d.). This is crucial when considering the transition component of high school graduates attending local community college CTE programs. Coordination and alignment should allow for successful transitions.

Lastly, Perkins V requires commitment from the state and employers. Much of the state's commitment is related to collaboration. Collaboration with local school districts and workforce boards has already been mentioned. The legislation also requires involvement from the Governor's office, industry or sector partnerships, and consultation with the adult education agency. The widespread collaboration is essential to the development of a strong state CTE plan. On the other hand, employer commitment is related to collaboration and opportunities. Collaboration is necessary to ensure that workforce needs are being addressed, while opportunities may include work-based learning experiences or apprenticeships within the workplace.

**NACTE Framework**

As referenced in Perkins V legislation, CTE programs are expected to identify their levels of performance based on indicators of a quality program. The Association for Career and Technical Education set out to clarify what a high-quality CTE program should encompass. It created an evidence-based framework that is based on 12 specific elements and can be used as a program's self-evaluation tool for improvement and increased collaboration. The framework's 12 elements include standards-aligned and

integrated curriculum; sequencing and articulation; student assessment; prepared and effective program staff; engaging instruction; access and equity; facilities, equipment, technology, and materials; business and community partnerships; student career development; career and technical student organizations; work-based learning; and data and program improvement (Imperatore & Hyslop, 2018).

Standards-aligned and integrated curriculum "addresses the development, implementation, and revision of the program of study curriculum, including the relevant knowledge and skills taught in the program and the standards on which they are based" (Imperatore & Hyslop, 2018, p. 1). There are many components of curriculum within CTE programs. These curriculums are expected to address industry-validated technical standards with alignment to the core subject areas of math, reading, and science. Beyond the academic content, CTE curriculum must integrate employability skills. Employer input is important, as businesses are able to provide input and opportunities for students to apply learned knowledge and skills (Imperatore & Hyslop, 2018).

Sequencing and articulation are the defining measures of a program. They represent coordination and collaboration towards a program branded by learning and career opportunities. CTE programs should include a sequence of courses across secondary and postsecondary education. More specifically, these courses should begin with the formation of foundational knowledge and progress towards the building of specific skills. Vertical alignment is essential. CTE students transition through courses to reach their next level of education. Students may also enter and exit the program at various points as they are able to earn credentials, certifications, licenses, and degrees; therefore, the final sequence should be coordinated towards career pathways (Imperatore

& Hyslop, 2018).

The element of student assessment addresses the types and quality of assessments that are used throughout a program to evaluate knowledge and skills and potentially earn postsecondary credits. Students should be completing formative and summative assessments throughout their program that are aligned to specific standards; standards that are connected to curriculum and employability. These assessments validate the learning of objectives (Imperatore & Hyslop, 2018).

The fourth element relates to the qualifications of the CTE staff and professional development opportunities being provided. Just as other educators in various content areas, CTE teachers must meet appropriate certification and licensure requirements. Furthermore, CTE staff should be receiving professional development that provides up-to-date knowledge in both skills and pedagogical knowledge. This type of training must be occurring at both the secondary and postsecondary levels to ensure that the programs are coordinated and fully support the learning of students (Imperatore & Hyslop, 2018).

Next, engaging instruction "addresses instructional strategies within a student-centered learning environment that support student attainment of relevant knowledge and skills" (Imperatore & Hyslop, 2018, p. 3). Instruction takes many forms throughout a CTE program. Instructional approaches may include problem-based, inquiry-based, challenge-based, or project-based learning. All of these forms of learning represent a component of flexibility. CTE must meet the needs of a diverse student population; therefore, it is important that the instruction is relevant to both standards and learning objectives. Many times, CTE instruction is contextualized in authentic scenarios to ensure that students are able to connect academic and employability knowledge

(Imperatore & Hyslop, 2018).

Access and equity address the program's recruitment measures. It has been mentioned often that CTE is no longer an alternative route for any specific population of students. Instead, strategies should be in place to serve and provide equity among varying demographics, such as gender, race, ethnicity, economic status, and disabilities. Recruitment of underrepresented populations may need to occur. Once in the program, all students should be offered the facilities, equipment, and materials to be successful. This includes meeting Title IX and other accessibility requirements.

The seventh element involves facilities, equipment, technology, and materials. As all CTE students have access to these items, this element involves the alignment, appropriateness, and safety of each. The faculties, equipment, technology, and materials used throughout CTE programs should replicate workplace practices and requirements. This includes meeting federal, state, and local standards that occur through regular inspections (Imperatore & Hyslop, 2018).

In order for any program to be successful, there must be commitment from both business and community partnerships. This is especially true with CTE where collaboration and portions of instruction need to be completed on various sites. Element 8 focuses on the structure of these partnerships and their engagements towards supporting the program of study and workforce needs. CTE programs should have representatives who seek supportive partnerships with small, medium, and large businesses. One role of the business partner involves reviewing curriculum, understanding assessment measures, and showing consistency among all industry standards. A strong focus in each of these areas allows for CTE students to be provided work-based learning experiences that

further prepare them for educational and career opportunities. Another role of the business partner includes support through funding and advocating to promote the program (Imperatore & Hyslop, 2018).

Element 9 focuses on student career development. Strategies addressed "help students gain career knowledge and engage in education and career planning and decision-making" (Imperatore & Hyslop, 2018, p. 4). Promotion and support of these ideas should begin prior to enrollment into the program. CTE students should have a personalized education and career plan that extends over a span of years. These plans contain student interests, preferences and abilities, course selection confirmation, and career planning. Also, throughout the process, students and their guardians should be updated with educational and career information. As program completion nears, shared information should transition towards job searches and potential career placements (Imperatore & Hyslop, 2018).

The 10th element within the framework is career and technical student organizations. These organizations are for students enrolled within CTE programs and are important because of their ability to engage the student population and further promote skill and leadership development. It is important that the organization is integrated into the program with CTE teacher supervision to ensure all students are able to participate. Interaction with business professionals, competitive events, and service projects are all potential activities to further grow CTE program skills (Imperatore & Hyslop, 2018).

The 11th element is work-based learning. "This element addresses the delivery of a continuum of work-based learning involving sustained, meaningful interactions with industry or community professionals that foster in-depth, first-hand engagement with the

tasks required in a given career field" (Imperatore & Hyslop, 2018, p. 5). Such academic and skill-aligned experiences may occur in the workplace, within the community, virtually, or within school facilities. The experience should be aligned with student goals and progress in intensity as the program endures. Although interactions with business professionals are happening, CTE teachers must still supervise and ensure regulations are being followed. At the conclusion of work-based learning, students need to engage in a reflection of the experience. This may involve the creation of a portfolio or presentations (Imperatore & Hyslop, 2018).

The final element of the Association for Career and Technical Education framework is data and program improvement. This addresses the collection, usage, and reporting of data to ensure program evaluation continues. Time and accuracy are important. Labor market information and student data are both sets of data that are readily available. Student data should be disaggregated for comparison purposes. Access and performance comparisons between subpopulations and the general education population will help identify any equity gaps. It is imperative that such data are shared with students, guardians, business partners, and other stakeholders (Imperatore & Hyslop, 2018).

**Attributes of a North Carolina Future Ready Graduate**

Aside from CTE program expectations, the North Carolina State Board of Education adopted a set of attributes that define a future ready high school graduate. These 17 attributes are believed to be linked to 21st century skills that define graduates as being CCR. "A student who is ready for college and career can qualify for, and succeed in entry-level, credit-bearing college courses leading to a baccalaureate or certificate, or

career pathway-oriented training programs without the need for remedial or developmental coursework" (Conley, 2012, p. 1). It is important to understand that not all students will obtain equivalent proficiency in all attribute areas. Student interests and postsecondary aspirations influence the specific depth of knowledge and skills necessary for their individual success beyond high school. It is important for there to be programs in place that link knowledge, skills, and aspirations; therefore, Conley (2012) created a more specialized and adaptive assessment to measure student success. These are known as the four keys to CCR. Key cognitive strategies, key content knowledge, key learning skills and techniques, and key transition knowledge and skills are all individual assessment areas that incorporate the 17 North Carolina graduate attributes. This study used Conley's assessment strategy and the 17 attributes to determine if CTE programs are doing their part to ensure "that graduates are leaving schools ready for a job that is ready for them" (Malkus, 2019, p. 26).

**Key Cognitive Strategies**

Key cognitive strategies are tied specifically to ways of thinking. Conley (2012) connected thinking to the formulation of hypotheses, effectively solving problems, collecting information, effectively communicating, and understanding both precision and accuracy. Similarly, the attributes of a North Carolina graduate that fall under this category include critical thinker, creative and innovative thinker, and literate consumer of media (English et al., 2018).

Critical thinking has long been linked to a higher order of reasoning that forces individuals to look beyond their individual perspectives and begin to comprehend and analyze the information for potential issues. Critical thinking is more than a skill. It is

actually a trait students must develop and be able to self-identify with. Self-identity is defined as the degree to which individuals perceive themselves to be fulfilling a role related specifically to a behavioral domain (Black et al., 2009). Educational experiences are expected to improve the critical thinking skills of students. Piergiovanni's (2014) research found that the process of critical thinking occurred in two stages. First, a student must have knowledge of the subject being discussed. Next, the student must have the capacity to reflect and begin to question the new knowledge. A passive understanding of a topic will not translate into a strong reflection capacity.

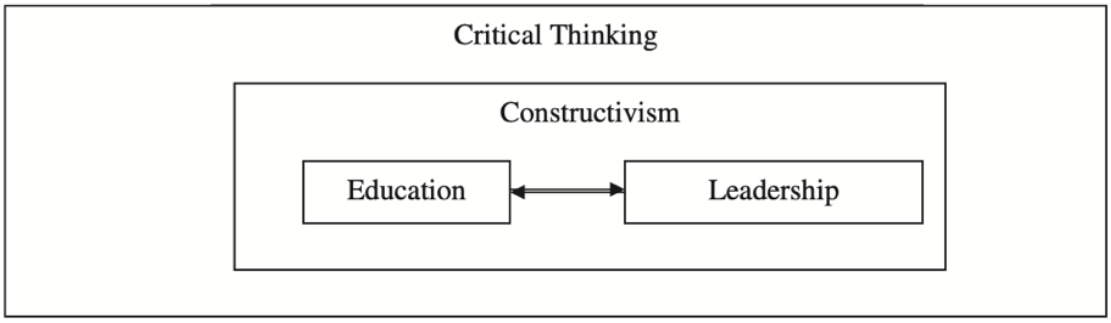
There are many outlets for teachers to consider when forming classroom structures and teaching practices that support critical thinking development. The idea of hands-on activities is important. Multiple research sources conclude that critical thinking skills are much improved when students are involved with hands-on experiences during classroom instruction. Reflection should accompany all hands-on experiences. Reflection may occur through classroom activities such as conducting peer reviews, classroom presentations, or small group discussions. Many of these activities include audible discussions among students (Piergiovanni, 2014). Writing is another strong element of critical thinking. Bean (2011) identified a problem-based writing assignment as an intensive tool for producing sustained critical thought. This does not include simple writing tasks. Intensive writing assignments are strategically designed, differentiated, and structured. Through writing, teachers may support reflection by having their students "question their observations and draw reasonable conclusions based on what they are learning" (Piergiovanni, 2014, p. 86).

Education alone does not inevitably lead to better thinkers; however, strong

critical thinking emphasis is necessary to form better-educated students (Flores et al., 2012). The ability to critically think enables one "to take knowledge and transform it into uses that benefit not only the individual but more importantly, society as a whole" (Flores et al., 2012, p. 213). Students need to know how to think instead of being taught what to think. Figure 2 provides an illustration of a correlation between critical thinking, constructivism, leadership, and education, all of which are essential to the success of students.

**Figure 2**

*Relationship of Critical Thinking, Constructivism, Education, and Leadership*




*Note.* This figure depicts the relationship of critical thinking to constructivism, education, and leadership (Flores et al., 2012).

Critical thinking is the overarching framework of Figure 2. Education and leadership are encapsulated within the constructivism frame, as both of these components should be closely examined together during early adult development. Constructivism is an approach to learning based on personal knowledge and experiences. It helps to support how learning takes place in an educational setting and an individual's performance in a type of leadership position. Through all the interrelationships, a critical thinking lens must be established to transition from a theoretical understanding (Flores et al., 2012).

"Organizations are continually seeking well-trained individuals that possess not only the technical skills to fulfill their roles, but more importantly, the thinking skills to be effective in a constant changing environment" (Flores et al., 2012, p. 223). When critical thinking skills are underdeveloped in the educational system, students struggle in the workforce. Being good at a specific job is no longer considered being proficient. Instead, attributes beyond surface skills are what is expected to be an effective employee and potential global market leader, and one important attribute is critical thinking.

Recognized as a necessary complement to critical thinking, another key cognitive strategy for a future ready graduate is the ability to think creatively (English et al., 2018). Both critical and creative thinking skills are required to make full usage of one's mental capacity. Many individuals argue that they lack the trait of creativity; however, with focused confidence, attention, and concentration, researchers have found that a creative habit can be better developed (DiYanni, 2015). "Creative thinking is imaginative thinking directed towards innovation" (DiYanni, 2015, p. 40). This type of thinking is built around possible alternatives and questions such as "what if," "why," and "how." Much like an ever-changing global workforce, the goal of creative thinking is to form new ideas, innovative advances, and renewed perspectives. A key factor of creativity is the ability to overcome challenges. This can also be considered perseverance (DiYanni, 2015). Examples could include an employee filling a new position due to a shortage of available workers or a plumber able to temporarily stop a leaking pipe that requires currently unavailable materials.

Creativity is often facilitated in a classroom by a group of students who are able to trust one another and connect socially and cognitively. Specific classroom practices

may include reversing relationships, cross-fertilizing, shifting attention, and denying the negative. Reversing relationships is essentially a strategy that involves the consideration of another person's point of view (DiYanni, 2015). In a school setting, this may include the student considering the perspective of their instructor who assigned a project. In the workplace, an example may include the consideration of a product's value from a consumer's standpoint. The process of these two examples has the capabilities of forming more reasonable thinkers and deeper insights into specific topics. Similarly, the strategy of cross-fertilization forces one to apply analogical thinking or to consider relationships between unrelated topics. For example, students may be asked to use basketball vocabulary to discuss the success or failure of a business. These activities transform conventional thoughts into a more imaginative notion. Shifting attention is yet another classroom application of creative thinking. This strategy looks at a specific situation and shifts its focus from one problem to another (DiYanni, 2015). A task connected to the strategy may include students writing about the effect of school attendance on grades and teacher effectiveness. This task forces the students to shift from student-centered effects to teacher-centered effects. One other potential creative thinking activity is known as denying the negative. Unlike critical thinking which looks to eliminate ideas through evaluation, this activity allows students to reject no ideas. Poor ideas can lead to better. It is about pursuing possibilities and evaluating your options (DiYanni, 2015).

Studies show that creativity and innovation skills formed in the educational process are the keys to increased wealth within the nation in the 21st century, and it is people who are key in sustaining this opportunity. Data from Indonesia show that the creative sector of its economy has annually increased its overall economy over the last 4

years (Jewell, 2019). These data alone showcase the progressive potential of creativity on future development. Growing economies are driven by the creativity of businesses at the human resource level, and creativity drives a competitive advantage, yet a growing difficulty exists with the recruitment of highly creative human resources. The Internet and technological advances have been key in the continued development of creative thinking (Aisha et al., 2019). Schools must continue their focus on developing their students' creative attributes through focused confidence, attention, and concentration (DiYanni, 2015).

Continuing with key cognitive strategies, forming literate consumers of media is an important attribute with which future ready graduates should be equipped (English et al., 2018). Media can include news programs, newspapers, magazines, websites, social media portals, commercials, billboards, and so much more. Some media are based on facts, while others are based on opinions. Factual or opinionated, the truth is that students spend a large portion of their day navigating through the many media outlets. "The aim of media literacy is to help students become competent, critical and literate in media forms because they need to interpret what they see or hear and prevent the interpretation from controlling them" (Akcayoglu & Daggol, 2019, p. 416).

Classrooms must be preparing students for personal interpretation and production of media. Literate consumption of media promotes critical thinking. Similarly, both ideas focus on the strengthening of thought process rather than content knowledge. The key to an increased competency in media literacy is exposure within the classroom. The youth population most often gather their media consumption from social media; therefore, varying sources of media exposure need to occur within and outside of the classroom

environment (Vraga & Tully, 2015). Potential learning outcomes should further develop the student's ability to interact with varying content, connect with peers, and construct new information (Jose, 2016).

Current workforce demands focus on a digital component of media consumption. Skills within today's workforce should include the ability to create, embody, and distribute meaning through a variety of formats; the ability to collaborate and communicate with others in the effective usage of digital tools; and the ability to interact with technology in a manner that develops personal knowledge and skills through civic, economic, and personal matters. These skills go beyond former computer literacy. Knowing how to use a computer is not sufficient. Digital media literacy is showing proficiency among the vast scope of the literacies offered by technology. These new literacies fall under the areas of language, information, connection, and design. Language involves texts and understanding the implication of short message systems. Information engages the retrieval, storing, and usage of information. Connection consists of the methods of interaction that may include email, social networks, or video. Lastly, design is the overall construction of a site through redesigning and possible multimedia inclusion (Jose, 2016).

**Key Content Knowledge**

Key content knowledge is the second key to Conley's (2012) identification of CCR. Content knowledge is the foundational content students obtain from their core subject areas. Technical knowledge and skills are also included in this section. Depending on career aspirations, students are going to better interact with content knowledge in which they find value (Conley, 2012). At the same time, educators have developed a

"silo" concept to describe their protection against integration with other subject area content. Integration of content knowledge is essential to the creation of learning experiences and even more essential to programs that claim to be preparing their students for successful transitions into postsecondary education or the workforce. CTE is in a position to significantly help increase the attainment of state educational standards and objectives. The reason for this claim can be traced to CTE's ability to create learning experiences and engaging instruction through real-world, authentic contexts. Studies continue to show that academic achievement has the potential for substantial growth when being taught in the context of CTE coursework. There are three possible actions that school districts may incorporate to better integrate CTE into their main content areas. These first two actions are connected and include bringing CTE into regular academic work and fostering a community of practice between CTE and academic teachers. CTE instructors understand the real-world application of literacy, math, and science. Allowing these individuals to collaborate with specific academic area teachers will admit the opportunity to increase rigor and relevance among students. Another action includes equipping both academic and CTE teachers with evidence-based instructional strategies. Standards alone do not improve teacher efficacy. Professional development must target evidence-based teaching and learning methods (Pearson, 2015). The attributes of a North Carolina graduate that fall under the content knowledge category include proficient reader, skilled mathematician, science-savvy, health-focused lifelong learner, and multilingual (English et al., 2018).

"Reading is the primary means of knowledge acquisition in many domains" (Freed et al., 2017, p. 135). It is a developed educational skill. Becoming a proficient

reader through comprehensive understanding has long been related to meaningful academic performance, occupational success, and physical well-being. Reading requires domain-general skills and language abilities and is a complex skill in which students find varying success (Freed et al., 2017). In 2019, a study found that only 25% to 38% of high school graduates in the U.S. exhibited proficiency in reading. This leaves the majority of students having to take postsecondary developmental courses to improve these basic skills (Perin & Holschuh, 2019).

A strong foundation in literacy skills continues to constitute one of the main goals of education. Skills obtained through reading instruction allow students to continue self-education and become lifelong learners. After research conducted by Stahl et al. (2020), findings concluded specific alignment to CTE reading expectations, understanding of literacy practices, text types, and textual rigor. As for reading expectations, CTE faculty reported an expectation of their students being able to "navigate and comprehend text independently at the outset of their specific course or for college reading demands in general" (Stahl et al., 2020, p. 4). In a recent study, CTE faculty found that their students were not prepared for college literacy practices. The lack of proficiency in these areas compelled teachers to adjust instruction to PowerPoint slides, class lectures, and sometimes digital media. When readings were assigned, the teachers in this study felt that their students would present negative attitudes due to their lack of readiness. The teachers were found to be basing their assumption on specific student characteristics of age, economic status, and overall career goals. Student survey responses actually showed that 75% of the population completed the required readings. In the area of understanding literacy, studies find connected CTE faculty to more traditional notions of literacy

instruction. The faculty placed importance on the attainment of content knowledge for the purpose of skill application; however, it was made clear that there was less importance placed on how the information was obtained. As for text type and textual rigor, the CTE faculty were found to implement a single traditional textbook, whose primary use was for resource or reference (Stahl et al., 2020).

It is important that students in all educational programs are receiving reading instruction. Some examples of teaching literacy within secondary education programs such as CTE may involve themes such as strategic instruction, disciplinary and contextualized approaches, or the use of digital technology. Strategic instruction involves the explicit and structured teaching of comprehending a text. Teacher modeling is key as students should be gradually released to perform desired tasks. Strategic instruction is important to the development of students comprehending unfamiliar topics. The transfer of prior knowledge and comprehension may need to be supported with graphic organizers. The idea of disciplinary and contextualized approaches refers to the ability to develop literacy skills through material students find useful (Perin & Holschuh, 2019). Improving the likelihood of a successful future in the workforce should be able to increase motivation within students. CTE offers instruction that aligns directly with post-graduation aspirations; therefore, CTE teachers should be using this alignment to provide opportunities for students to read and interact with literature within the discipline. Interaction may include main idea identification, vocabulary improvement, or simply operational reading (Perin & Holschuh, 2019). Furthermore, the component of digital technology is very important in the 21st century. Increasing the motivation to read may be accompanied by digital resources that are able to offer a large variety of literature

options. Digital technology is also capable of providing students the opportunity to interact with peer literature through discussion boards and online chats (Perin & Holschuh, 2019).

The next area of content knowledge that North Carolina identifies as an attribute of a future ready graduate is skilled mathematician (English et al., 2018). “The conceptual embodiment of shape and space, and the operational symbolism of arithmetic, with ubiquitous forms of measurement (formal and informal), are the most easily visible forms of practical mathematics at work and elsewhere” (FitzSimons & Björklund Boistrup, 2017, p. 330). As students mature, their practical, theoretical, and formal mathematical skills should be further developed to ensure that content intensity may also be increased (FitzSimons & Björklund Boistrup, 2017).

The complex relationship between formal mathematics education and mathematical implementation within the workplace has been extensively studied. Professional and skilled workers should be able to integrate mathematical domain knowledge that was developed through formal and informal classroom learning experiences. Accumulated research into vocational mathematics has revealed a renewal of teaching and assessment materials that support work-related knowledge, skills, and dispositions; however, the problem remains connected to classrooms that are unable to create the replication of workplace complexity in both curricula and assessment. One of the most identified limitations to mathematical workplace skill integration is teacher and student inability to recognize mathematical activities that go beyond simple numbers or measurement. Mathematics in the classroom and the workplace may often have a much different appearance; therefore, it takes a trained educator to observe, identify, and make

connections between their curricular teaching and possibly formed learning experiences (FitzSimons & Björklund Boistrup, 2017). “Not only are the concepts found in a typical school mathematics curriculum difficult to recognize in most occupational activities, but the idea of education itself is generally considered as being limited to institutions of school and university” (FitzSimons & Björklund Boistrup, 2017, p. 332). It is crucial that students are learning the skills of recontextualization of mathematics during their formal educational experiences. This is important for individual success and the ability to communicate with other stakeholders they will be working with in the future (FitzSimons & Björklund Boistrup, 2017).

The rapidly changing nature of work in both a globally driven and technology-driven world paired with ongoing upskilling and reskilling is forcing vocational students to need a coherent conceptual development in mathematics (FitzSimons & Björklund Boistrup, 2017). Conceptual development is a mathematical focus on the product and the process. The product involves the ability to solve math problems, while the process involves the reasoning of procedures. Conceptual reasoning lays a strong foundation for student understanding. Rittle-Johnson et al. (2015) stated, “students should initially develop a foundation of conceptual understanding and that procedural knowledge should not be developed prior to the extended development of conceptual knowledge” (p. 588). In a CTE classroom setting, teachers should evaluate their curriculum and identify what occupational skills are connected to mathematics. A focus can then be placed on preparing instruction that allows for conceptual understanding of mathematical practice.

Another area of content knowledge that North Carolina identifies as an attribute of a future ready graduate is the idea of being science-savvy (English et al., 2018). The

educational community has recently brought attention to the importance of engaging students in scientific practice. Science allows for the engagement of inquiry and the processing of knowledge. Students should experience scientific questions that are driven by curiosity and formed by learned models or theory (Jaber & Hammer, 2016). "Anticipating the pleasure of a new understanding, feeling driven by a question or compelled to reconcile inconsistencies, and persisting in the face of intellectual challenges are all aspects of scientists' disciplinary dispositions and experiences" (Jaber & Hammer, 2016, p. 197).

Just as in the content area of mathematics, there is growing consensus among science teachers focusing on conceptual understanding rather than facts. Science teachers have also agreed upon an expansion of inquiry-oriented teaching. Specifically, strategies that should be implemented within their classrooms may include cooperative learning, metacognitive strategy instruction, or project-based learning. Cooperative learning allows students to collaborate through working together. Metacognitive strategies relate to students understanding their own learning. That leaves project-based learning to involve extended assignments that require possible research and deeper understandings. Next, looking at the technological aspect of science, classrooms should provide some type of digital tools. Technology can be used to stimulate instruction or help facilitate understanding through experiments. It is important that experiments and other experiences be well-structured and hands-on. This enables students to learn by doing and to increase thinking and acting; however, you cannot overlook the textbook implementation within science classrooms. Textbooks provide specific standards-based content. Instruction from a textbook may be necessary for exposing content and can be

presented in innovative ways (Cheung et al., 2017).

Proficiency in science is necessary for students who will pursue careers in the global economy. This is especially true for those interested in the technology, health, environment, and engineering fields. Even those individuals not taking jobs in science-related fields are able to benefit from a scientific understanding and the ability to make inquiries (Cheung et al., 2017). CTE content may not allow specific scientific content integration; however, all classes should have opportunities for inquiry and inquiry-oriented teaching that is related to specific strategies within classroom practices. Cooperative learning, metacognitive strategy instruction, and project-based learning are all strategies that mediate the continued development of student inquiry skills (Cheung et al., 2017).

Aside from the content areas of reading, math, and science, secondary language identifies with the multi-lingual attribute of a North Carolina future ready graduate (English et al., 2018). You are often reminded of the increasingly global society and the demand for citizens to keep in pace. Proficiency in language outside of English represents one of those needs (O'Rourke et al., 2016). "Increasing opportunities for students to learn a world language represents the key vehicle to meet this need" (O'Rourke, 2016, p. 790); however, K-12 world language instruction and enrollment have been on a decline. This decline within the United States is consequently not providing its students with critical language skills that are necessary for success (O'Rourke et al., 2016).

Most K-12 world language education in the United States is taking place at the high school level. "High school graduation requirements provide an important indicator of the level of priority given to world language education in each state" (O'Rourke et al.,

2016, p. 791). In North Carolina, world language is provided as a possible elective credit in the area of fine arts or professional studies. World language courses can be taken in pairs to fulfill the two elective requirements, or world language can be paired with an art or CTE class to fulfill the requirement. North Carolina has also adopted the Seal of Biliteracy. This is an award that graduating students can earn in regard to their achievement in world language classroom proficiency (O'Rourke et al., 2016). "The Seal of Biliteracy may represent an increasingly important and powerful tool that can motivate students to study world languages and also provide them with a state-recognized qualification for use with university admissions and prospective employers" (O'Rourke et al., 2016, p. 798). Biliteracy provides an economic competitive edge for those individuals who participated in world languages (O'Rourke et al., 2016).

The pairing of world language to the modern workforce is critical, as there is a growing need for multilingual individuals; however, with its elective course pairing with fine arts and CTE, there is a concern with prioritization (O'Rourke et al., 2016). Just as CTE, world language is a preparer for the workforce. Tension and competition between such programs must be replaced with enrollment opportunities that further support the future workforce efficiency of high school graduates (O'Rourke et al., 2016).

In the final area of content knowledge, a health-focused lifelong learner is the attribute of a North Carolina future ready graduate that focuses on the well-being of the student (English et al., 2018). School-based health education should be based on the improvement of student knowledge, attitudes, and behaviors in regard to their physical and mental health. Proficiency of this knowledge at a young age is related to better health behaviors and an overall better outcome over the duration of a student's life (Eriksen et

al., 2020).

Despite there being overwhelming evidence of broad benefits towards healthy living, worldwide studies show there to be few people engaging in these practices. Some reports even show less than 25% of males and less than 20% of females are participating in the minimum amount of recommended exercise (Eriksen et al., 2020). Physical exercise may include going for a walk, swimming, playing sports, or going to the gym. The key to effective physical exercise is a schedule with adequate intensity and consistency. These actions alone are aligned with the prevention of cardiovascular disease, type 2 diabetes, obesity, and much more. Aside from physical benefits, mental health has been shown to benefit from physical activity. Mental health is associated with many negative results which produce subsequent educational, social, and economic outcomes. Depression, anxiety, and stress have been identified as common mental health conditions facing the current student population (Eriksen et al., 2020).

Research has shown that transitions can have adverse effects on health. Commonly, a student's transition after secondary education has been a trigger for unhealthy trends (Koehn et al., 2016). Students fail to realize that lifestyle changes that occur after graduation like eating habits, physical activity, and energy intake are components of life that are affected when the decision of either workforce or higher education is chosen. This is closely connected to the idea that "young people do not perceive their health through diet and exercise potentially as threats to health seem too far in the future to make health-related behaviors a priority" (Koehn et al., 2016, p. 1092); however, transitions can also represent great potential to adapt and form positive habits (Koehn et al., 2016). That must be the focus of high school programs. On top of all the

decisions students are going to face after graduation, they must be aware of healthy living and their motivation to create a lifestyle that is healthy to both the body and mind. Research shows that the key to this is the presence of structure and a formed competence towards students understanding that they are the authors of their own lifestyles. CTE may also benefit greatly from having its students explore their future career aspirations and their potential for support during the school-to-work transition (Koehn et al., 2016).

**Learning Skills and Techniques**

The third key Conley (2012) relates to CCR is key learning skills and techniques. This idea references student action and consists of two broad categories that involve student ownership of learning and specific learning techniques (Conley, 2012). A North Carolina future ready graduate's attributes that fall within these categories include effective communicator, effective problem solver, curious researcher, capable technology user, and self-directed responsible worker (English et al., 2018).

"Communication is the art of conveying ideas, and like all skills, communication comes from observation, clear intent, and a sense of openness" (Sakai-Miller, 2015, p. 63). Most humans are born with the capabilities to be vocal. What they must develop is the knowledge, positions, and skills to define communication competence; therefore, communication education is fundamental to student development. From early childhood to graduation, the attainment of both vocal and written communication skills should be a priority of all educational institutes.

Technology in the 1990s allowed for a successful Information Age. Teachers began to implement word processing, slide presentations, and video implementation with their student populations. The communication was one-way and presentational. The

Innovation Age focused on more cooperative communication between the presenter and audience. Student presentations are still an important part of classroom practices today; however, students are still found to be presentational in their nature. They are able to implement correct words, data, multimedia, and graphics, but the expectation for engagement and responses has been omitted. If students will be successful in their communication to broad audiences and various markets, they need to balance the different aspects of multidimensional communication and be successful in reaching all their audiences. Students must understand that who they are communicating with is the determining factor of their approach; however, student assignments are often unclear, and it appears that the audience is always the teacher. Therefore, it is important to identify opportunities for alternative audiences to be introduced (Sakai-Miller, 2015). This is especially important in workforce development classes that are preparing students to communicate with stakeholders successfully. A classroom translation of real-world business involves students recognizing their audience, identifying their needs, understanding a solution, knowing how to communicate, and comprehending if the message was successfully conveyed (Sakai-Miller, 2015). As students develop this ability, they will be able to apply its components to all types of conversations they may encounter.

Just as oral communication, written communication is a highly desired skill and a requisite for the workplace. From sentence structure, spelling, and punctuation to professional essays, research papers, and journals, students should have exposure to writing practices that will be acceptable in a student's postsecondary setting. Workplace preparation programs like CTE should focus their writing assignments on brevity and

concision (Moore & Morton, 2017). The tendency to be wordy has been traced to academic writing focused on specific content being taught or researched (Moore & Morton, 2017). “In the world of professional practice, the pressure of time and the need for action require different communicative norms” (Moore, & Morton, 2017, p. 598). Research from specific workplaces has identified scaffolding, proofreading, and review of basic grammar skills. Scaffolding allows for the development of specific communication tasks that are completed with support from the teacher. Scaffolding can be increased or decreased depending on specific students. Proofreading involves the reviewing of documents. Students must understand that documents written to external stakeholders reflect the organization; therefore, the editing process is crucial to the quality of communication being distributed. The final idea of basic grammar review can be implemented as individual practices or individual assignments (Moore & Morton, 2017). Grammar mini lessons can occur in a variety of ways. Their main purpose is to keep students aware and competent.

Communication is the key to improving critical thinking, media literacy, and relationship development (Morreale et al., 2000). “Employers identify communication as one of the basic competencies every graduate should have, asserting that the ability to communicate is valuable for obtaining employment and maintaining successful job performance” (Morreale et al., 2000, p. 2). Workforce conversations may include both business and customer exchanges. They also may include both verbal and written interactions (Morreale, 2000). It is vital that students are equipped to communicate appropriately and efficiently.

Solving complex problems requires more than learned content knowledge; “it

requires the motivation and personal resourcefulness to undertake the challenge and persist until a solution is reached" (Zimmerman & Campillo, 2003, p. 233). In other words, it takes effective problem-solving skills, which is another component of a CCR graduate. The ability to solve problems is an essential skill for home, school, and work (Elvira et al., 2015). From the classroom teacher's perspective, a high level of problem-solving skills should be observed through the ability of students to dissect questions, analyze problems, exhibit various approaches in attaining a solution, and form logical solutions (Ruder et al., 2018). Similar behaviors can then be transitioned into the home workplace setting.

Ruder et al. (2018) defined problem-solving as finding a resolution to a situation, question, or problem after being faced with uncertainty on how to resolve the issue directly. The production of problem-solving skills has been a focal point in both academic domain learning and developmental research. The United States is not alone in its strong focus on domain-specific problem-solving skills and its shift to a skills-oriented education. Many view problem-solving as being a major part of expertise development in secondary education (Elvira et al., 2015). Expertise is connected to self-efficacy and problem-solving. It is driven by continual productivity from both student and teacher. To develop expertise attributes, students must exhibit high levels of motivation. Students should never feel a sense of being "finished." Instead, their focus must be on extending both knowledge and skill (El-Abd, 2019). Self-efficacy and properly developed problem-solving skills promote student personal beliefs in their ability and motivation to continue their pursuit of learning.

Students often encounter well-developed problems within the classroom setting.

A model classroom that defines the problem-solving process components must include a focus on their problem creation and providing sufficient resources. The most often shortfall of classroom problems is their lack of real-world contextualization (McNeill et al., 2017). “Common classroom problems are those at the end of the textbook chapters which are designed to test knowledge of important concepts but are limited in scope” (McNeill et al., 2017, p. 39). Students are aware of the distinctions between classroom-based problems and workplace-based problems. Making connections between workplace and content allows for experience and better learning (McNeill et al., 2017). “Students need to encounter early in their education problems that allow them to grapple with competing constraints, assumptions, and multiple solutions” (McNeill et al., 2017, p. 39). This is especially true in career-focused educational programs; and just with other classroom skill development, scaffolding may be necessary to ensure frustration levels remain constructive. Another important classroom aspect that is connected to problem-solving relates to the availability of resources. These resources may include textbooks, software, the Internet, peers, other individuals within the profession, and hands-on materials. Research shows that having such resources available in the educational environment builds student confidence and their ability to problem-solve effectively. After all, problems encountered in the real world will have a range of varying resources and can be solved from varying approaches (McNeill et al., 2017).

The next North Carolina CCR graduate focus skill to be examined is the idea of a curious researcher (English et al., 2018). Human survival has been filled with the drive to make sense of the environment, inquire, and uncover the unknowns. Curiosity is the driving force behind the engagement of information-seeking behavior. Such behavior is

crucial to educational success. When students find benefit in the resolution of curiosity, they are more likely to engage in behaviors that will lead to necessary information (Shin & Kim, 2019).

Undoubtedly, students are more curious in their pursuit to fill an information gap that is relevant and important to them. For example, consider conducting a scientific study on the solar system. If a particular student within the classroom aspires to be an astronomer, their curiosity for the solar system unit may surpass their peers; however, it is important that teachers are able to instill curiosity within all of their students (Shin & Kim, 2019). “Learning without curiosity is like eating without an appetite” (Shin & Kim, 2019, p. 866). The promotion of content curiosity in any content area classroom has first been connected to the realization of a knowledge gap. Some students are aware of their information gap, while others are not. Aware or not, students will not become curious unless presented with how the specific information is valuable to them. The value may need to be discussed or displayed in real-world applications. It is also important that the value persists throughout lessons. Allowing the curiosity to diminish allows students to become “satisfied” and not reach cognitive satisfaction. Another promotion of curiosity within classrooms is related to purposeful feedback. The continuous pursuit of curiosity must be matched with student enjoyment (Shin & Kim, 2019). “Feedback from teachers and classroom assessment can inspire students to view curiosity as an enjoyable and helpful experience for their learning and reinforce the processes of generating and maintaining curiosity” (Shin & Kim, 2019, p. 867). Saxe and Stollak (1971) accredited the development of positive student attitudes towards engaging in curiosity when they were complimented by teachers for their actions. Other than compliments, feedback may

include short statements or questions that promote further curiosity. Feedback can be issued to both formative and summative assignments, and it is important to ensure that it is not intimidating. Intimidation or criticism does not foster curiosity-related behavior (Shin & Kim, 2019).

Curiosity drives an individual's complete education and scientific abilities. Learning and educational attainment change how we think. Individuals with increased levels of curiosity find thrill in learning new tasks. It is something in which they find reward (Saunderson, 2018). "Such individuals also like to gather information from varied sources" (Saunderson, 2018, p. 124). This exemplifies the connection between curiosity and researcher. Curiosity leads to fascination through the gathering of information from varying resources. These are the types of employees who are needed in the workforce today. Effective collaboration and the ability to innovate new ideas and inventions are workforce products of continued curiosity (Saunderson, 2018). CTE must take advantage of fostering the development of this skill within their programs to ensure our workforce can benefit from its adult learners.

Important to all learning skills and techniques in the 21st century, a capable technology user is the next important attribute of a North Carolina future ready graduate (English et al., 2018). Today's graduates have never known a world that lacks digital technologies. This defines them as being native to the digital world. It can be intimidating to teachers who feel their technological abilities are inferior to their students; however, teachers must understand that not all students are as technically competent as their peers. It is also important to understand that knowing how to use technology effectively and appropriately is important when acting as citizens in the established digital society

(Ribble, 2015). “This digital society has forged new opportunities for education, employment, and social interaction” (Ribble, 2015, p. 1).

School systems focus a lot of time and energy on the idea of digital citizenship. Ribble (2015) compiled nine elements of digital citizenship that relate to the ideas of respect, being educated, and protection. The nine elements include digital access, digital commerce, digital communication, digital literacy, digital etiquette, digital law, digital rights and responsibilities, digital health and wellness, and digital security. These elements focus digital citizenship not only on a set of specific rules but also on intellectualizing the challenges all technology users face (Ribble, 2015).

Digital access incorporates the electronic participation of individuals within a society. Socioeconomic elements, disabilities, and physical location are barriers to technological opportunity; therefore, schools must provide adequate technology access to their students across all ability levels, including those in special education classes who may require specific tools to be proficient in technology usage. The next element of digital commerce includes consuming and selling goods through technology. Online transactions continue to increase. Students must be informed about the importance of being careful consumers and sellers within the digital economy. The element of digital communication is straightforward with its focus on electronic information exchange. Digital communication is a valuable resource with its ability to provide instant access to those worldwide. Although very important to society, students must be informed about the record-keeping features connected and the application of appropriate digital communication tools. Next, digital literacy is the development of understanding how technology should work. Most students know how to operate technology; however, what

is important in this element is if students understand how to use digital technology to advance their academic understanding. Digital literacy in the classroom should go beyond the typing of essays and the formation of PowerPoint presentations. Instead, it should be used to stimulate student learning by presenting information more engagingly. Connected to other elements, digital etiquette involves responsible behavior and a strong ethical behavior within technology usage. The observation of poor digital etiquette behavior sends a message to students that they can also act in the same manner; therefore, teachers must model strong character and empathy while using and instructing digital components within their classrooms (Ribble, 2015). "Good digital citizens respect others and learn ways to use technology courteously and effectively" (Ribble, 2015, p. 40). Element 6 is digital law. Digital law relates to student responsibility for actions and deeds. As mentioned earlier, digital technology allows for the quick and easy distribution of information and materials. Students must be informed of the legal ramifications associated with online activities. Activities may include the downloading of illegal content, the downloading of files, and copyright infringement. Behaviors related to any of these activities can be threatening to a strong moral reputation. Next, digital rights and responsibilities are the rights and freedoms of all individuals within the digital world. As with any membership, students within the digital society are provided rights and expected to act according to governing rules and procedures. Schools should be providing a structure for technology usage. This may include an understanding of their own publications and the publications of others as it relates to rights and responsibilities. Element 8 incorporates the digital health and wellness of members within the digital society. This element focuses on students being educated on how they can physically be

affected or injured by technology. Eye strain and muscle pain are the two most common physical risks associated with digital technology. Another danger is identified as “internet addiction.” Addiction to the Internet is common and can be associated with both physical and psychological problems. Teachers need to be aware of the type of technology and the time students are spending on it. The final element is digital security, and it is based on the precautions that assure safety. Just as doors are locked to keep intruders out, students need to be educated on their electronic devices' types of protective data. Along with protecting network and device security, the idea of personal security cannot be ignored. Teachers must take time to educate their students about hackers and phishing attempts that will pose threats to sensitive material (Ribble, 2015).

Being able to utilize technology effectively is a skill that is necessary for all current labor markets. “As the pace of change increases and new technological innovations disrupt and evolve the workplace, it is clear that the fundamental ways schools approach student learning must change” (Malyn-Smith et al., 2020, p. 37). CTE focuses heavily on keeping pace with preparing students to strive in their technological endeavors, and not just current endeavors, but those that may occur 3, 5, or 10 years from now. A couple of strategies linked to effective technology instruction within the CTE community include feedback and lifelong learning (Malyn-Smith et al., 2020). Feedback relates to the educator assessing the modeled technological behavior of students within the classroom. Modeling and feedback should be an endless cycle within the educational environment. Specific feedback should be centered on the nine elements discussed earlier (Ribble, 2015). As for lifelong learners, teachers should focus on flexibility and adaptability in the technological field. Teachers must instill in their students the idea of

technological innovation and changes not stopping after completing their program or degree. Instead, being a lifelong learner will allow for continued adaptability as new situations and problems arise (Malyn-Smith et al., 2020).

The final attribute that falls under the category of key learning skills and techniques involves a self-directed and responsible worker (English et al., 2018). The act of ownership within any type of learning must involve an aspect of self-direction and responsibility (Conley, 2012). Self-direction embodies the idea of taking initiative, setting goals, and finding value through given tasks. Responsibility involves taking ownership of the process of planning, implementing, and evaluating one's thoughts and actions (Loeng, 2020).

In the school setting, self-direction and responsibility entail students taking initiative in their learning (Loeng, 2020). More specifically, it "is a process in which a learner assumes responsibility to control their learning objectives and means to meet their personal goals or the perceived demands of their individual context" (Morris, 2019, p. 634). The learner's role is no longer fully dependent on the classroom teacher's transfer of information. With self-direction and responsibility, student experience is important, and their educational attainment is more individualized. Students can freely set goals and find worth in their education; however, teachers should remain facilitators of learning and collaborators during educational decisions (Loeng, 2020). Learners in a formal educational setting have access to an "expert" within each subject area. This resource should never be discounted during the creation of a learning process. CTE has been recognized for its strong focus on facilitating and fostering self-directed learning. This is especially true in those situations that pertain to workplace simulations. High levels of

curiosity, interest, and desire for self-improvement have all been identified as factors within classroom objectives that drive self-directed behaviors. The challenge lies in the teacher's facilitation of lessons. Too much or too little support can be the difference between the successful growth of self-direction and responsibility traits among students. At the same time, if teachers begin to see their students not adequately progressing in the content, they will often drop back into the traditional teacher-directed model of instruction (Morris, 2019).

In developing responsible and self-directed learners, the primary underpinning relates to the students taking the ultimate responsibility for their learning (Robinson & Persky, 2020). "Developing self-directed learners requires a scaffolded approach in which more self-paced or teacher-directed activities are introduced early on, during didactic instruction, to help students become more self-regulated in their 'self-directedness'" (Robinson & Persky, 2020, p. 293). Students then move to the experimental setting, which transfers more control of the learning environment to the student. Strategies to implement within a classroom to support the ideas of responsibility and self-direction include a flipped classroom, individual learning plans, and learning contracts. A flipped classroom involves students coming to class each day prepared with a pre-understanding of foundational material. The teacher is then able to assist in the application and expansion of the material. An individual learning plan involves the process of six steps. The steps include developing goals for study, outlining assessment, identifying a structure and sequence of activities, forming a timeline, identifying needed resources, and gaining instructor feedback. Such plans can guide students through the steps of self-directed learning. The final idea of a learning contract is simply an

agreement between the teacher and student (Robinson & Persky, 2020). “Learning contracts can be used to keep individuals organized, normalize expectations, and increase communication between the learner and instructor” (Robinson & Persky, 2020, p. 295). These contracts have been shown to be both empowering and motivational to students. It also targets areas to be further assessed in the workforce (Robinson & Persky, 2020).

Educational programs that foster the development of self-direction and responsibility are shown to be beneficial for all those involved. Opportunities for self-directed learning in the classroom can be conceptualized as means of empowerment. Working in the modern world is all about adaptability and change (Morris, 2019). Dating back to research conducted in 2008, studies found that 80% of workplace learning occurred informally and was self-directed in nature. In other words, there is a responsibility that lies on each individual to stay educated in their practices (Yeo, 2008). The complexity of a career or changing economic conditions are just a couple of situations today’s students may face after graduation.

**Transition Knowledge and Skills**

When the time comes to transition towards postsecondary events, Conley (2012) identified key transition knowledge and skills as necessary measures to promote a successful future. Such knowledge and skills include knowing specific norm expectations within the workplace, understanding the options of financial assistance, self-advocating for oneself, and having a pathway planned out. In considering the attributes of a North Carolina future ready graduate, relatable attributes have been identified as being a relationship builder, a strong team contributor, a financially literate citizen, and a knowledgeable global citizen (English et al., 2018).

The process of building strong relationships has long revolved around the practices of kindness, respect, and helpfulness. Strong relationships are one of the main components of knowing someone cares. Students connect and build strong relationships with those teachers who make deposits into their relationship bank. This includes the teacher making a daily effort to talk with their students, listen to what they deem important, and be available to help when being called upon (Trottier, 2016).

Communities of strong relationships should always be present in the classroom setting. Just as learning the development of academic skills, true student success is not capable without developing social skills like relationship building. Classrooms should allow students to be active participants who connect with classmates and teachers in meaningful and real-life situations (Trottier, 2016). It all begins with the teacher. Teachers must "model respect, fairness, kindness, empathy, and tolerance" (Trottier, 2016, p. 10). An environment of community can then be created that students can view as safe and secure to learn about themselves and their further development of knowledge and skills. Focusing specifically on developing strong relationships, placing students in group situations has been deemed an effective class practice. These situations allow students to work cooperatively with peers to accomplish a given task. Teachers may need to provide scaffolding to students at the beginning of group exercises to focus on the steps of collaboration and assignment of roles. Group roles may include a leader, recorder, work monitor, and presenter (Trottier, 2016). Schools may also support the building of relationships through advisory groups. Advisory groups allow students to form a close relationship with at least one adult in the school building. Both teachers and non-certified staff may serve as advisors to a small group of students to help provide

further support and advice (Stipek, 2006).

The attribute of strong relationships is critical to programs like CTE. These types of programs have an opportunity for interaction to occur between students and future employers. CTE offers such opportunities through apprenticeships, business and industry field trips, cooperative education, entrepreneurial experiences, internships, job shadowing, mentorships, school-based enterprise, and service-learning (NCDPI, 2019). Furthermore, these CTE experiences are the building blocks of network creations that encompass mentors, resources, and lifelong connections (Kantrov, 2015). After all, forming strong relationships at the workplace is important and is growing to be even more significant. Today, mobility among workers is at an all-time high. Short-term contracts, promotions, and moving businesses are among the main causes of individuals coming and going within the workplace (Roffey, 2016); therefore, it is especially important that students are equipped with the ability to form new relationships throughout their career. "The quality of our relationships at work matters not only for our ability to flourish personally, but is also likely to enhance our sense of achievement" (Roffey, 2016, p. 171). These feelings are what drive individuals in their field of work.

Closely related to the idea of strong relationships, another important attribute that falls under the umbrella of key transition knowledge and skills is a strong team contributor. Think of a rowing team. A competition cannot be won unless every member contributes to paddling the boat, which is a great example of teamwork (Scarnati, 2001). "Teamwork is described as a co-operative process that allows ordinary people to achieve extraordinary results" (Scarnati, 2001, p. 1). Fapohunda (2013) identified five important requirements for effective teamwork. Those requirements included the selection of team

members, empowering team members, being trained in relevant skills and knowledge, developing shared goals, and a facilitation of team functioning; therefore, all members of the team must be effective in their role. When implemented properly, true teamwork reaffirms the greatness of each individual. Power, status, and learning are primary benefits that derive from teamwork (Scarnati, 2001).

Students have been provided teamwork opportunities throughout their entire educational careers. Studies continue to show that collaboration among students yields strong academic advantages. Due to these findings, a business-driven idea known as team-based learning is finding its way into many educational programs. Team-based learning is a method of student learning that incorporates the usage of small teams. These teams have individual components that require students to self-study before coming together to complete assignments and peer assess each other's performances (Rezaee et al., 2016). Teachers must be aware of the four main elements that make team-based learning successful: feedback, achievement, motivation, and expertise. Feedback is necessary during the good and bad, and it should be given to both individuals and the team as a whole. Students do not know what they are doing well or what needs improvement without feedback being expressed to them. Also, continuous feedback allows the learner to become more acclimated and receptive to the specific guidance. Next, achievement takes into consideration the feeling of pride. If the team learns something new, all members should feel achievement. This only occurs if the team can share rewards and job satisfaction. Furthermore, students are looking to learn something new. This may include a new skill or concept. The idea of motivation complements achievement. Motivation is the driving factor behind learning. There must be a sense of

drive and motivation to push students out of their comfort zones and be committed to learning with the team. Lastly, expertise is an individual who can exemplify success at a given task. In the classroom setting, this is the teacher. Their instruction should be available as a guide (Hills, 2001).

Implementing team-based learning within the educational setting is a crucial key to improving our society and workforce. All organizations indeed implement teams of people to get things done (Hills, 2001); therefore, students must be given ample opportunity to practice and become proficient in their abilities to contribute and work collaboratively to complete tasks within a given team. Students find that they can gain satisfaction in their workplace when they can form contributing relationships with the individuals with whom they work (Hills, 2001).

Another key to successful transition lies in the area of finances. A North Carolina future ready graduate is described by the attribute of being a financially literate citizen (English et al., 2018). Several decades of change have led individuals to be faced with stagnant wages, increased expenses, and a complicated financial market (Hicks, 2013). "Within this environment, the impact of not possessing the skills and knowledge necessary to make prudent financial decisions has the potential to be even more damaging than before" (Hicks, 2013, p. 1). The United States Department of the Treasury refers to financial literacy as an individual's ability to effectively use both learned knowledge and skills to manage financial resources over a lifetime. The most noted financial illiterate decisions among adults are related to high-cost borrowing, credit cards, stock market investments, and retirement plans. These illiterate decisions have been found to be the result of unaware and non-understanding individuals. It is imperative that

some measure of financial education is being embedded into the K-12 educational framework. High school graduates represent our future financial decision makers. Their presence in the market will continue to grow (Hicks, 2013).

> Thus, the need to educate our youth on the importance of budgeting, investing, saving, choosing financial products, establishing good credit, and dealing with negative financial events such as the loss of a job or sudden decrease in income, so they can make prudent financial decisions as their wealth increases. (Hicks, 2013, p. 1)

Educating students to have a strong understanding of each of these areas is essential to maintaining a globally competitive economy. Teachers also understand its importance (Hicks, 2013).

All educators have a primary goal associated with the preparation and success of students. Specific courses aligned with only a financial curriculum are rarely taken throughout a student's educational career. Rakow (2019) explained an opportunity for classrooms to make financial learning a quick and daily part of their instruction. The idea is based on Grime's (2017) book, *Five Minute Finances: The Daily Habit That Can Change Your Life*, and is focused on the idea of providing students with a quick 5-minute focus on a component of finances at the beginning of each class. Components to be discussed may include credit scores, credit reports, credit cards, buying homes or cars, investing, or retirement plans. These types of topics can be read about, presented on, calculated, or researched to increase student understanding and build other skills (Rakow, 2019), specifically other skills connected to both mathematical and reading standards. "It is important to note that the goal is not to turn each student into a personal finance expert,

but rather, provide them with a solid foundation of financial literacy" (Rakow, 2019, p. 388). To measure the effectiveness of these mini lessons, pre- and post-surveys may be administered. Students can then self-assess their progress and maybe even take the initiative on furthering their understandings (Rakow, 2019).

As a program that promotes workforce development, CTE instruction should incorporate a component of financial literacy. This is much in part to over 50% of employers saying that finding qualified, financially literate individuals was challenging. Aside from numbers, today's workforce leaders connect finance literacy with effective strategy. A workforce vested in their financial application is likely to enjoy a much larger degree of success (Bergman & Williams, 2008). Aside from just workforce success, becoming a financially literate citizen makes for better overall well-being for individuals as they invest in themselves and prepare for life after retirement (Hicks, 2013).

The final attribute of a North Carolina future ready graduate that is connected to key transition knowledge and skills is a knowledgeable global citizen (English et al., 2018). The dictionary defines knowledgeable as being intelligent and well informed, while a global citizen is seen to have a sense of interconnectedness between the world, structural inequalities, history, languages, and other knowledge (DiCicco, 2016). Truly being knowledgeable goes beyond the memorizing of facts to reach proficiency on high-stakes testing; therefore, being a knowledgeable global citizen is the ability to apply skills and learned content that can contribute to both social and economic growth.

As we all know, students are the future of leadership. They must safeguard sustainability and embrace their connectedness to a global community. History shows that economic and social consequences are connected to failure in obtaining global

citizenship (Sterri, 2014); however, “through technological development and means of communication and transportation, we can choose to interact with any part of the world” (Sterri, 2014, p. 2). In the classroom, the North Carolina Teacher Evaluation Process references the word global many times. School administrators look specifically at a teacher’s ability to display global awareness. Students are expected to graduate from high school globally competitive, globally aware, and being capable of attaining success in the new global economy; therefore, teachers are expected to prepare their students with skills to both understand and address global issues. Collaboration opportunities should be occurring between students with varying cultures, religions, and lifestyles. Mutual respect should be observed as students engage in open dialogue that is related to personal, work, community, or other varying contexts.

Classrooms must support the rapid economic, technological, and social changes that are transforming the world in which we currently live. Recent statistics show that one in 10 Americans are foreign-born (Monthey et al., 2015). It is therefore imperative that students are being prepared “to compete, connect, and cooperate on an international scale” (Monthey et al., 2015, p. 2). CTE has been identified as a promising pathway to global competence. As CTE is aligned with preparing students for a chosen career, a natural platform is created to support global understanding. A CTE program that is successfully aligned with a global focus should offer opportunities for participation in the current economy, partnerships with international companies, connections to classrooms abroad, and world language incorporation. Each of these components is important to student skill development and the formation of knowledgeable global citizens.

## Summary and Conclusion

The chapter began with a recap of CTE history. A focus was placed on the transformation of CTE from a destination for low-skilled students to an educational opportunity that offers a broad range of career paths through the attainment of necessary skills and an alignment with postsecondary opportunities (Malkus, 2019). To ensure that CTE programs are being successful, I have focused on three areas that include Perkins accountability, a national CTE framework, and attributes of a North Carolina future ready graduate. These components of the program will conclude if the program is meeting guidelines set by legislation and if its instruction addresses the demands of today's workforce.

# Chapter 3: Methodology

This study was purposefully formed to introduce the research methodology for a mixed methods study aimed to assess the effectiveness of a rural school district's CTE program in preparing its students with skills that align with CCR. A total of 17 specific attributes were reflected upon. Strengths and weaknesses of the CTE program were obtained.

## Research Methodology

The research method design used to collect data for this study involved a mixed methods approach. "Mixed methods involve combining or integration of qualitative and quantitative research and data in a research study. Qualitative data tends to be open-ended without predetermined responses while quantitative data usually includes close-ended responses" (Creswell & Creswell, 2018, p. 14). The study's qualitative data were collected through focus group interviews, and its quantitative data were collected through surveys completed by participants. It was expected that both sets of data would work together to ensure the validity of all responses. This is also known as a convergent form of mixed methods. Qualitative and quantitative data sets are merged to form a more comprehensive analysis of the researched problem. Both data sets are also generally collected at the same time (Creswell & Creswell, 2018). Participants of the research included CTE high school teachers, CTE community college instructors, local CTE business employers, and CTE program graduates. All participants were 18 years of age or older.

## Explanatory Sequential Design

An explanatory sequential mixed methods design was used in this study. This

particular design involved the collection of quantitative data first and then providing an explanation of the quantitative results with an in-depth focus on qualitative data. In Phase 1 of the data collection, survey data were collected from CTE high school teachers, CTE community college instructors, local CTE business employers, and CTE program graduates. It was important that CTE program effectiveness was able to be measured. The second phase of data involved a qualitative phase to provide follow-up to the quantitative results and help with the explanation. The qualitative data explored CTE effectiveness through virtual focus group interviews with the survey participants from each of the identified groups (Creswell & Creswell, 2018).

The significance of this research was to gain insight into the effectiveness of a rural high school CTE program in preparing a workforce that is both college and career ready. Beal et al. (2018) warned that education systems that fail to prepare their students for equitable success in postsecondary undertakings constitute a significant challenge that the United States continues to face; however, "the conditions are ripe for the field to create policy changes, increase public and private investment, and grow" (Beal et al., 2018, p. 13). The research conducted through this study helps support whether CTE systems currently provide their students with the training and experiences that lead to successful futures.

**Setting and Economics**

The research took place in a northwest North Carolina school district that consists of 13 elementary schools, four Grades 6-8 middle schools, four traditional high schools, one early college high school, and a community college. Aside from the community college, the district has just over 8,300 students. The current overall population is just

over 68,000 residents. Among the population, racial makeup includes 87% White, 4% African American, 1% Asian, 7% Hispanic, and 1% two or more races. From its establishment, significant revenue resources have included farming, forestry, and manufacturing. Today, there is a strong focus on maintaining and expanding employment opportunities.

The area has enjoyed both successes and setbacks. One major success includes being considered one of the birthplaces of NASCAR racing. Others include being the birthplace of Lowes, Lowes Foods, Northwestern Bank, The Carolina Mirror Company, Gardner Glass, Carolina West Wireless, and Holly Farms. The Window World corporate office and Samaritans Purse have also found a location within the community. Many of these successes have suffered great change over time. The NASCAR Speedway closed in 1996 and now sits desolate. Lowes and Lowes Foods relocated their corporate headquarters. Lowes now only has a hardware store and their contact center within the area. Northwestern Bank has merged with other financial chains. It is now known as Wells Fargo and has two open branch locations in the county. The Carolina Mirror Company has significantly decelerated in its production. The business still resides in the area, but employment is limited. Carolina West Wireless is still headquartered in the area. They have expanded into nearby counties and provide nationwide cellular coverage. Another producer of poultry purchased Holly Farms. The producer is known as Tyson, and it represents the area's largest employer. As for Window World, the CEO is a current resident of the area, and employment opportunities are growing. Similarly, Samaritans Purse has added a corporate location and training center within the region. Careers within this institution continue to be available.

## Problem Focus

It is evident that the location of this study has found success, but the success has often been faced with limitations. Big business has had a substantial role in the development of this community and the success of its citizens; however, history shows that businesses can be here 1 day and gone the next. No community should want to be left with low-paying positions that lack fulfillment and promotion; therefore, the community must focus on reidentifying its economy into one that is embedded in manufacturing, public service, construction, agriculture, human services, transportation, computer science, communications, health care, hospitality, and engineering. At the same time, employers need to fill these jobs with qualified workers (Beal et al., 2018).

CTE can be sustenance to the economic advancement in this community; however, it must begin in the educational system. Studies have shown that CTE course completions have created more positive student outcomes, an increased graduation percentage, and an increased likelihood of college degree or certification completion.

## Research Design and Rationale

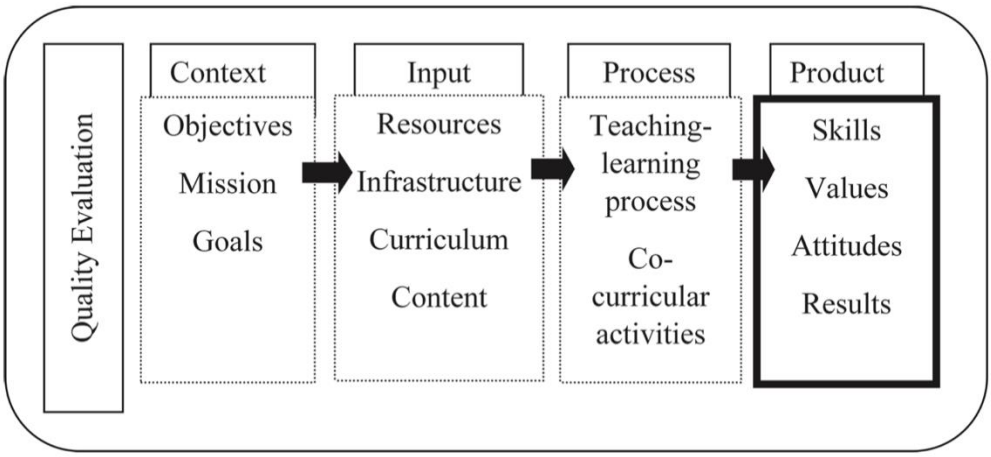
This study was conducted as a program evaluation. Specifically, Stufflebeam's (2003) CIPP evaluation model was the framework used to guide the evaluation. The CIPP acronym represents the core concepts of context, input, process, and product. Since the late 1960s, the CIPP model has been centered on improving the achievement and accountability of school programs. The design has allowed for widespread applicability, yet it is always focusing on program improvement (Stufflebeam, 2003).

Represented by the CIPP acronym, Figure 3 illustrates a model that elaborates on the four types of evaluation (Stufflebeam, 2003). The figure presents an illustration of a

specific framework that depicts a quality evaluation taking place.

**Figure 3**

*CIPP Conceptual Framework*




*Note.* The conceptual framework for CIPP implementation. From Aziz, S., Mahmood, M., & Rehman, Z. (2018). Implementation of CIPP Model for Quality Evaluation at School Level: A Case Study. *Journal of Education and Educational Development*, *5*(1), 189–206.

"Context evaluations assess needs, problems, and opportunities within a defined environment" (Stufflebeam, 2003, p. 31). This information is beneficial to the evaluation users as they outline goals and center their focus on the beneficiaries of specific school programs. The input component of the evaluation assesses appropriate materials. Materials include contending strategies, plans, time, human resources, and budgets. Evaluation users can then design improved efforts that can be funded and have a greater benefit when compared to other approaches. The process component of the evaluation is responsible for monitoring, documenting, and assessing the various teaching and learning actions. This information is important for evaluating the efforts of users to maintain accountability towards the specific execution of a given action plan. Lastly, the product

component of the evaluation identifies all given outcomes. The practicality of student learning and its benefit to society should be closely examined here. The outcome can be used to determine the effectiveness of CTE in meeting student needs. The information may also be used to identify whether the program should be improved, continued, or stopped (Stufflebeam, 2003). Focus group interviews and survey completions were the methods of data collection for the CIPP evaluations.

The CIPP model evaluation serves all stakeholder members with information and specific evidence that promote the continued development of educational services. Both formative and summative assessments are completed. “Formative evaluation is conducted to understand the processes, implementation, and working of the school, analysis of instructional material, structure of the learning task and courses for future improvements” (Aziz et al., 2018, p. 192). In this particular study, formative assessments pertained to both teachers and former students. The summative evaluation added the employer factor. That is due to summative evaluation making "judgments about the merits of a completed product or program" (Aziz et al., 2018, p. 192). Former students and teachers also provided feedback towards the desired outcomes being achieved through CTE courses.

**Research Questions**

1. What specific qualities are CTE programs expected to address during program completion?
2. What strategies are in place within the district to ensure that program objectives align with workforce needs?
3. How are specific CCR skills exhibited during and after CTE classes?
4. How effective is the studied rural CTE program in preparing students to be

CCR?

Each of the four research questions were aligned with the CIPP model evaluation. Research Question 1 related to the context evaluation. It focused on the goals aligned with the CTE program. Research Question 2 focused on input evaluation. It connected the study explicitly to stakeholder involvement, as strategies and procedures were reviewed to ensure that objectives within the program matched community workforce needs. Research Question 3 emphasized the process evaluation. It looked at the impact and effectiveness of CTE instruction concerning CCR skills. The final research question aligned with the product evaluation. Former students, instructors, educators, and employers all were asked to provide their perception of the effectiveness of the CTE program in preparing students to be college and career ready. These four questions provided a framework for a program evaluation that collected data to identify strengths and areas for improvement in the CTE program (Stufflebeam, 2003).

**Research Alignment Table**

Table 1 provides specific information on CIPP evaluation components, data sources, procedures, and presentation mechanisms that relate specifically to each of the four research questions.

**Table 1**

*Research Alignment Table*

| Research question | CIPP evaluation component | Sources of data | Procedures | Presentation of data |
|---|---|---|---|---|
| What specific qualities are CTE programs expected to address during program completion? | Context | • CTE high school graduates, CTE high school/ college instructors, and employer survey responses<br>• CTE high school graduates and employer interviews | • Survey emailed to participants<br>• Virtual focus group interviews scheduled with participants following their completion of the survey | • Specific quantitative survey data<br>• Transcribed notes |
| What strategies are in place within the district to ensure that program objectives align with workforce needs? | Input | • CTE high school graduates, CTE high school/ college instructors, and employer survey responses<br>• Teacher, instructor, and employer interviews | • Survey emailed to participants<br>• Virtual focus group interviews scheduled with participants following their completion of the survey | • Specific quantitative survey data<br>• Transcribed notes |
| How are specific CCR skills exhibited during and after CTE classes? | Process | • CTE high school graduates, CTE high school/ college instructors, and employer survey responses<br>• CTE high school graduates, teacher, instructor, and employer interviews | • Survey emailed to participants<br>• Virtual focus group interviews scheduled with participants following their completion of the survey | • Specific quantitative survey data<br>• Transcribed notes |
| How effective is the studied rural CTE program in preparing students to be CCR? | Product | • CTE high school graduates, CTE high school/ college instructors, and employer survey responses<br>• CTE high school graduates, teacher, instructor, and employer interviews | • Survey emailed to participants<br>• Virtual focus group interviews scheduled with participants following their completion of the survey | • Specific quantitative survey data<br>• Transcribed notes |

## Sources of Data

There were two types of instruments used as sources of data collection in this study: a validated survey and follow-up focus group interviews. Four surveys were created and aligned to obtain necessary responses from CTE high school teachers, CTE community college instructors, local CTE business employers, and CTE program graduates. Each of the four surveys is located in the Appendix. The survey represents quantitative data. Following the collection of survey data, focus group interviews were used to administer individual conferences with CTE high school teachers, CTE community college instructors, local CTE business employers, and CTE program graduates. The follow-up interviews represented qualitative data. The focus group interviews were conducted virtually through the Zoom platform.

## Procedures

As identified, both surveys and focus group interviews were used in this study. Permission to conduct research was obtained from both the district superintendent and the community college president. The surveys were distributed first. A fill-able survey was issued through email to all participants within the desired CTE population. The surveys were shared electronically through a Google Form among CTE high school teachers, CTE community college instructors, local CTE business employers, and CTE program graduates. A separate email list was created for each of the four groups. As participants completed the survey, their responses were returned to the database. Next, the interviewing method involved me as the interviewer and survey completers as the interviewees. Each individual who completed a survey identified if they would also like to be involved in the interview process. Interviews were conducted through a focus group

structure, electronically recorded, and transcribed. The interview focus groups included CTE high school teachers, CTE community college instructors, local CTE business employers, and CTE program graduates. The focus group interviews occurred virtually through the Zoom platform. All questions were open-ended and derived from specific responses found on their survey. Transcripts were coded to highlight meaningful data that were specifically connected to this study.

Data for Research Question 1 was extracted from survey questions and interviews pertaining to CTE program goals. The interview portion allowed elaboration from participants regarding specific CTE goals and their alignment with CCR.

Research Question 2 acquired data through survey and interview questions that focused directly on specific strategies that are in place to align program objectives and workforce needs. Programs should adapt to a workforce. Being able to adapt refers to meeting the needs of a changing society and economy. Teachers, instructors, and employers all play a key role in identifying this alignment. The survey was utilized to pinpoint adaptive measures, and the interviews allowed for further discussions to occur with specific alignment examples being presented.

Research Question 3 provided data through the survey and interviews based on specific CCR skill identifications. Unlike identifying shortcomings of the program, data were gathered from exhibited skills from current and former CTE students. Teacher, instructor, and employer responses focused on observation of obtained CCR skills. Former student responses focused more on their recollection of actually performing the skills.

The fourth research question was answered by survey questions and interview

data that encompassed perceptions of participants regarding the effectiveness of the CTE program in preparing students to be CCR. CTE high school teachers, CTE community college instructors, local CTE business employers, and CTE program graduates all had an opportunity to express their perceptions and explain their reasoning.

**Presentation of Data**

The mixed methods approach to this study centered my presentation of data on specific quantitative survey data and transcribed notes that derived from qualitative interviews. The quantitative data are presented in tables. Each of the survey questions is displayed for clarity and connection to the study. The significance of each response was closely examined. As for qualitative data, it was important to implement a coding process for the interviews conducted. Coding is essentially a mapping tool that provides "an overview of disparate data that allows the researcher to make sense of them in relation to their research questions" (Elliott, 2018, p. 2851). Information that emerged from the data were used to support the researcher in formulating the perspectives and experience of all participants. Specific codes reflected components of the 17 attributes of a successful CCR graduate.

Based on the explanatory sequential design, the presentation of quantitative data preceded the qualitative data. The data were particularly important for the rural district's CTE director; however, the data are also being presented to CTE high school teachers, CTE community college instructors, local CTE business employers, and CTE program graduates.

**Participants**

Participants within this study were all representatives of the rural school district's

CTE program, CTE community college programs, and CTE employers. The study utilized a convenience sampling approach. “A convenience sample occurs when participants who fit a study’s criteria are enrolled in the study” (Emerson, 2021, p. 76). The sample included CTE high school teachers, CTE community college instructors, local CTE business employers, and CTE program graduates. This sample represented a convenience sample due to their connection to CTE. The advantage of convenience sampling includes its readily accessible data, the researcher’s ability to reach individuals who meet desired criteria, and the increased likelihood of the sample addressing the critical issues.

Participants were determined based on their ability to provide information on the effectiveness of a rural school district’s CTE program. Each individual was an important contributor to the answering of research questions. Student participants included recent 2019 and 2020 CTE graduates. A pool of student names and contact information was collected from the school district’s CTE database, and students from each high school district were sure to be involved. A total of 80 students were emailed the survey. The students who completed the survey were also asked to participate in the focus group interview. CTE graduates are direct products of the instruction provided within each of the CTE programs. They were able to provide firsthand feedback towards obtained learning and taught objectives.

High school teachers and community college instructors were required to actively hold CTE certification. To obtain survey responses, the survey was emailed to all high school CTE teachers and all community college CTE instructors. Individuals who completed the survey were then asked to participate in the focus group interview. High

school teachers were able to provide insight into their curriculum and student attainment of learning. They also discussed their relations with employers. Community college instructors referenced their curriculum as well but also provided insight towards the preparation level of the students they are receiving from the district high schools. Student academic and CCR abilities were referenced.

Employers represented local businesses that offer opportunities for CTE graduates within the district. A list of local employers was provided by the local Chamber of Commerce. A point of contact for each employer was also involved. Included in the employer participation request were effective CCR attributes to be measured in the study. Their participation provided input towards the success and failures of both high school and community college CTE completion.

**Summary**

The purpose of Chapter 3 was to outline the research methodology for assessing the effectiveness of a rural school district's CTE program in preparing its students with CCR skills. These data are significant based on today's workforce needs. An overview of the methodology concludes that the study used a mixed methods approach to collect data for answering the four research questions. An explanatory sequential design was used to support the sequence of data collection. The participants within the study have been identified and were all suited for providing their experiences and contributing to the study of CTE. The purpose of Chapter 4 is to provide results from the identified methodology in this chapter. Results identify the perceptions of CTE high school teachers, CTE community college instructors, local CTE business employers, and CTE program graduates of CTE effectiveness. Chapter 5 verifies the findings through a discussion. An

overview of the study is provided, and both recommendations and a conclusion will be provided.

# Chapter 4: Results

This study was purposefully focused to gain insight into the current labor market demands and address any identifiable skill gaps among today's high school graduates. Employers have identified their struggle of finding employees with adequate skills and experiences (Beal et al., 2018). Research has been utilized from both surveys and focus group interviews. Data sources included high school CTE teachers from four traditional high schools, CTE instructors from a community college within the school district, local employers, and high school CTE graduates from four traditional high schools.

Research and legislation prove that efforts have been made to transform the current CTE programs from vocational tracks to meaningful educational opportunities that encompass student participation. Reports continue to show that CTE programs that do not meet expected outcomes should be phased out and reinvented with a mirrored reflection of the current labor market demand (Northern & Petrilli, 2019). Feedback was focused on a northwest North Carolina school district and intended to address the identified research questions. The following four research questions helped to guide the study:

1. What specific qualities are CTE programs expected to address during program completion?
2. What strategies are in place within the district to ensure that program objectives align with workforce needs?
3. How are specific CCR skills exhibited during and after CTE classes?
4. How effective is the studied rural CTE program in preparing students to be CCR?

The mixed methods approach to this study was achieved by survey submissions and focus group interview completions. The survey was purposefully created to embody parts of the researched literature review. Specifically, the 12 elements from the NACTE framework and the 17 attributes of a North Carolina future ready graduate were the guiding principles in creating the survey. It is believed that these two components together can depict whether a CTE program is meeting its operating guidelines and making progress towards preparing its graduates for success beyond high school. Each of the attributes was able to be aligned specifically to a given CTE assessment element. Next, the focus group interviews were developed based on the survey responses. Conducting the research in this manner allowed for a thorough explanatory sequential design to be followed. The quantitative surveys provided a basis of program effectiveness, while the interviews helped to better explain the collected data. Each of the four focus group interviews was conducted individually but shared common themes that are connected to the identified research questions.

The collected data portray the perceptions of ten 2018 and 2019 CTE graduates, 16 high school CTE teachers, eight CTE community college instructors, and five local CTE employers. It was important for the researcher to look at the data as a sequence of program effectiveness. The CTE High School Teacher Survey concentrated on the teacher's personal reflection towards their instruction, practices, and overall program meeting the expectation of an effective program. The CTE Community College Instructor Survey had criterion statements focused directly on their observation of high school CTE graduates. Community college instructors were not questioned in regard to their personal impact. Instead, this study is solely focused on the product and readiness of CTE high

school graduates. The CTE Employer Survey took the same approach as the community college survey, as it also was directed towards the product of a CTE high school graduate. The final CTE High School Graduate Survey explored firsthand experiences of students who were recently active members of the CTE program. Each of the criterion statements was based on personal experiences with all components of the program.

## Survey Results

The quantitative results obtained from the distribution of surveys are discussed in this section. Survey results are presented in the following order: CTE high school teacher respondents, CTE community college instructor respondents, CTE local employer respondents, and CTE high school graduate respondents. This sequence of data allows me to begin the presentation of data with the group expected to provide instruction and promote CTE completion, then move to the presentation of data with the two groups that are able to provide specific feedback on the product of the high school CTE programs, and conclude with the group practicing their learned skills at the postsecondary or career level.

### CTE High School Teacher Survey

The survey presented to CTE high school teachers reflected criterion statements in each of the 12 elements from the NACTE framework. Table 2 presents the data on the 12 criterion statements linked to standards-aligned and integrated curricula. The focus here is specific instruction being provided by the high school teachers and their ability to integrate content that goes beyond their specific standards.

**Table 2**

*Standards-Aligned and Integrated Curriculum*

| Standards-aligned and integrated curriculum criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Curriculum is based on industry-validated technical standards and competencies. | 0% | 6.3% | 68.8% | 25% | 0% |
| My instruction integrates critical thinking. | 0% | 6.3% | 43.8% | 50% | 0% |
| My instruction provides opportunities for students to think creatively. | 0% | 0% | 56.3% | 43.8% | 0% |
| My instruction is aligned with relevant content and standards in the core subject area of reading. | 0% | 18.8% | 37.5% | 37.5% | 6.3% |
| My instruction is aligned with relevant content and standards in the core subject area of math. | 0% | 25% | 43.8% | 31.3% | 0% |
| My instruction requires the practice of inquiry, or explanations based on found evidence. | 0% | 6.3% | 56.3% | 37.5% | 0% |
| Health and well-being during the transition after graduation was discussed in my CTE courses. | 0% | 31.3% | 43.8% | 18.8% | 6.3% |
| My instruction provides opportunities for students to practice their problem-solving abilities. | 0% | 6.3% | 31.3% | 62.5% | 0% |
| As a CTE teacher, I emphasize the importance of being a good digital citizen (Responsible user of Technology). | 0% | 12.5% | 56.3% | 31.3% | 0% |
| Finances were a component of my CTE instruction. | 12.5% | 31.3% | 43.8% | 12.5% | 0% |
| After completing my CTE courses, students should represent a more knowledgeable and global citizen. | 0% | 0% | 75% | 25% | 0% |
| The importance of world language classes was discussed in my CTE classes. | 31.3% | 43.8% | 12.5% | 0% | 12.5% |

The data in Table 2 base their standards and curriculum integration on the North Carolina future ready graduate attributes that include critical thinker, creative thinker, proficient reader, skilled mathematician, curious researcher, science-savvy, health-focused lifelong learner, effective problem solver, capable technology user, financially literate citizen, knowledgeable global citizen, and multi-lingual. Among these statements, high school CTE teachers recognized only two areas as being "not at all achieved." These areas were connected to being a financially literate citizen and incorporating world language or being multi-lingual. The "minimally achieved" section had increased selection on particular statements. Specifically, statements that had 25% or more responses in this category include those connected to having instruction towards the core area of mathematics, health and well-being, finances, and world language. Other responses in Table 2 fell within the "moderately achieved," "substantially achieved," or "not applicable" categories.

It is obvious that each of these criterion statements would not be identified as specific objectives within all the CTE courses; however, each one does represent skills possessed by a future ready graduate and should be incorporated within programs that are preparing its graduates to have employability skills and an advantage over other contenders. The most notable concerns in this area are financial and world language instruction.

Table 3 presents criterion statements that are connected to sequencing and articulation. There are four total statements. There is strong reference to course sequences, earned credentials, and collaboration.

**Table 3**

*Sequencing and Articulation*

| Sequencing and articulation criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| The program of study includes a sequence of courses across secondary and postsecondary education. | 6.3% | 6.3% | 31.3% | 56.3% | 0% |
| The program of study leads to postsecondary credentials. | 0% | 31.3% | 18.8% | 50% | 0% |
| There is collaboration between secondary and postsecondary CTE staff. | 12.5% | 62.5% | 25% | 0% | 0% |
| The program of study is coordinated with broader career pathway systems. | 0% | 6.3% | 50% | 43.8% | 0% |

Personally, I have little potential effect on program courses and postsecondary credentials. Those are state regulated. The criterion statement data do suggest evidence that sequenced courses across secondary and postsecondary education, the obtainment of postsecondary credentials, and coordination with broader career pathway systems are all represented with high percentages of achievement. On the other hand, collaboration between secondary and postsecondary CTE staff appears to be missing the mark; 75% of

the collected data say that collaboration between these two groups is either “minimally achieved” or not achieved at all. These data are concerning when considering the secondary and postsecondary CTE staff are sharing many of the same students.

Table 4 is based on student assessment. Assessments are a key component in understanding and identifying student learning. Assessments may be verbal or written, and CTE programs should always consider program objectives and the attainment of employability skills.

**Table 4**

*Student Assessment*

| Student assessment criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Verbal assessments of content understanding are provided to my students. | 0% | 0% | 50% | 50% | 0% |
| Writing assessments of content understanding are provided to my students. | 0% | 18.8% | 43.8% | 37.5% | 0% |
| During group projects, I ensure that all group members are active participants. | 0% | 0% | 50% | 43.8% | 6.8% |
| Formative and summative assessments are aligned with | 0% | 0% | 31.3% | 68.8% | 6.3% |

| | | | | | |
|---|---|---|---|---|---|
| content to validate student learning. | | | | | |
| Assessments provide information on student attainment of employability skills. | 0% | 25% | 37.5% | 37.5% | 0% |

The section of data presented in Table 4 shows that CTE high school teachers feel overall proficient in the area of student assessment. There are only two statements that have data in the rating of minimally achieved. First, 18.8% of the respondents feel that they minimally achieve the usage of writing to conduct student assessments. Next, 25% of the respondents feel that their assessments providing information towards student attainment of employability skills is "minimally achieved." Employability skills includes attributes of a future ready graduate such as critical thinker, creative thinker, a strong team contributor, a relationship builder, and a self-directed responsible learner.

Table 5 emphasizes the Prepared and Effective Program Staff section of the NACTE framework. Preparation and effectiveness are two separate things; however, they must be intertwined within a program to promote successful implementation.

**Table 5**

*Prepared and Effective Program Staff*

| Prepared and effective program staff criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| As CTE staff, I meet the appropriate state and district certification and licensure requirements. | 0% | 6.3% | 18.8% | 68.8% | 6.3% |
| As CTE staff, I engage in ongoing professional development that is related to CTE. | 0% | 0% | 25% | 75% | 0% |
| CTE and other core academic staff collaborate to coordinate curriculum objectives. | 25% | 31.3% | 31.3% | 12.5% | 0% |

Of the three criterion statements presented in this section, the obvious point of focus is the collaboration between CTE and other core academic staff. Over half of the respondents believe there is no collaboration between these teachers in reference to their coordination of curriculum objectives. “Minimally achieved” was reported by 31.3% of the respondents, while 25% of the respondents presented that the statement is “not at all achieved.”

Table 6 references instruction. There are five criterion statements based on the overall educational environment, instructional standards, academic and technical

instruction, incorporation of relevant equipment, and differentiation to meet the needs of all individuals within the student population.

**Table 6**

*Engaging Instruction*

| Engaging instruction criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| The educational environment builds a culture of learning. | 0% | 6.3% | 56.3% | 37.5% | 0% |
| Instruction throughout the program of study is driven by content area standards. | 0% | 0% | 25% | 75% | 0% |
| Instruction connects both academic and technical knowledge and skills. | 0% | 0% | 37.5% | 62.5% | 0% |
| Instruction incorporates relevant equipment. | 0% | 0% | 50% | 50% | 0% |
| Instruction is differentiated to meet the needs of a diverse student population. | 0% | 6.3% | 68.8% | 25% | 0% |

The overall achievement of Table 6 is high. Most CTE high school teachers agree that their instruction is relevant to the criterion statements. There were no responses

indicating any of the statements not being achieved within the CTE program. The only small percentages of "minimally achieved" were identified in the areas of an environment that builds a culture of learning and instruction being differentiated to meet a diverse student population; however, both percentages were only 6.3%.

Table 7 continues to build on the idea of a diverse student population. Specifically, access and equity is assessed. Any successful program must be accessible to the complete student population.

**Table 7**

*Access and Equity*

| Access and equity criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| The program of study is promoted to all available participants. | 0% | 6.3% | 25% | 68.8% | 0% |
| Career guidance is provided to all participants. | 0% | 12.5% | 31.3% | 56.3% | 0% |
| Necessary equipment is provided to all participants. | 0% | 18.8% | 37.5% | 43.8% | 0% |
| Underrepresented student populations are recruited for participation. | 0% | 25% | 25% | 50% | 0% |
| Tutoring services are provided to all participants. | 6.3% | 18.8% | 31.3% | 37.5% | 6.3% |

Unlike the data connected to engaging instruction, Table 7 presents more

discrepancies and criterion statements being “minimally achieved.” Each of the five statements has data percentages in this section. Among the highest percentages of minimal attainment are linked to necessary equipment, recruitment, and tutoring services being provided to all participants; however, this section of the survey also has strong representations of being “substantially achieved.” The “substantially achieved” section outweighs the “minimally achieved” data.

Table 8 continues with facilities, equipment, technology, and materials. These include the resources that are essential for workplace replication and alignment to curriculum standards. Much of this is connected to accessibility and financial support.

**Table 8**

*Facilities, Equipment, Technology, and Materials*

| Facilities, equipment, technology, and materials criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Current workplace environments are replicated through facilities and equipment. | 12.5% | 25% | 43.8% | 18.8% | 0% |
| Facilities and equipment align with curriculum standards. | 6.3% | 25% | 31.3% | 37.5% | 0% |
| Student safety is demonstrated through appropriate use of facilities and equipment. | 6.3% | 6.3% | 25% | 62.5% | 0% |
| Regular inspection | 0% | 12.5% | 43.8% | 43.8% | 0% |

| | |
|---|---|
| of facilities and equipment are conducted. | |

The data in Table 8 appear to be more evenly dispersed when considering the responses of the CTE high school teachers. The data suggest that facilities, equipment, technology, and material access vary across the CTE programs. An area to highlight from this data set is the strong achievement percentages connected to student safety and regular inspection occurrences. Current workplace environment replications through facilities and equipment and curriculum standard alignment statements are represented by much higher "minimally achieved" and "not at all achieved" responses.

Table 9 incorporates another component of partnerships and collaborations. This table looks specifically at business and community partnerships. Earlier collaboration statements were connected to CTE and other content areas and high school CTE teacher collaboration with community college CTE instructors.

**Table 9**

*Business and Community Partnerships*

| Business and community partnerships criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Partnerships are formed with a diverse range of stakeholders. | 6.3% | 25% | 31.3% | 18.8% | 18.8% |
| The program has a structured approach to coordinating partnerships. | 6.3% | 12.5% | 43.8% | 18.8% | 18.8% |

| | | | | | |
|---|---|---|---|---|---|
| Partnerships drive objectives connected to workforce skill demands. | 6.3% | 12.5% | 43.8% | 25% | 12.5% |

Each of the statements in Table 9 received similar responses. CTE high school teachers expressed that the largest majority of their programs have achieved some type of partnership with businesses and the community. The area of focus from this table is in the category of "not applicable."

Table 10 provides data on student career development. Here we assess the value of CTE in providing those connections for success after program completion. Career decisions, ambitions, and parental communication of opportunities are referenced in this table.

**Table 10**

*Student Career Development*

| Student career development criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Career development is coordinated to support student career decision-making. | 0% | 6.3% | 56.3% | 37.5% | 0% |
| Career ambitions are discussed with CTE students. | 0% | 0% | 43.8% | 56.3% | 0% |
| Student guardians are provided with information | 6.3% | 50% | 31.3% | 12.5% | 0% |

| | | | | | |
|---|---|---|---|---|---|
| towards work-based learning opportunities. | | | | | |

Data from Table 10 suggest that most CTE high school teachers feel that the statements aligned with career development being coordinated to support student career decision-making and career ambitions being discussed with CTE students are at some level being achieved. Most responses fell in the "moderately achieved" section. Very few teachers, 6.3%, identified that the criterion statement connected to student guardians being provided information towards their student's work-based learning as being "not at all achieved." The remaining data for this criterion statement were represented as some type of achievement.

Table 11 displays data results from criterion statements connected to career and technical student organizations. This often refers to created clubs that are formed to further impact student exposure to a given program. Statements in this table reference the organizations being an integral part of the program of study, organization activities reinforcing CTE knowledge, and the activities reinforcing employability skills.

**Table 11**

*Career and Technical Student Organizations*

| Career and technical student organization criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Career and technical student organizations are an integral part of the program of study. | 0% | 6.3% | 62.5% | 31.3% | 0% |

| | | | | | |
|---|---|---|---|---|---|
| Organization activities reinforce technical education knowledge. | 0% | 12.5% | 50% | 37.5% | 0% |
| Organization activities reinforce employability skills. | 0% | 6.3% | 50% | 43.8% | 0% |

All criterion statements connected to the career and technical student organizations in Table 11 have been achieved at different ranks. Most data fell in the "moderately achieved" and "substantially achieved" sections. These data suggest that all CTE programs have an implemented student organization that encompasses technical education knowledge and employability skills.

Table 12 highlights work-based learning. There are four statements within this table that reference accessibility, alignment, and supervision by the CTE teacher. These statements focus on the student's ability to transform theory and simulation into real-world experiences.

**Table 12**

*Work-Based Learning*

| Work-based learning criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Work-based learning experiences are accessible to every student within the program of study. | 6.3% | 31.3% | 31.3% | 31.3% | 0% |
| The work-based | 6.3% | 12.5% | 43.8% | 37.5% | 0% |

| | | | | | |
|---|---|---|---|---|---|
| learning experiences are aligned with classroom instruction. | | | | | |
| The work-based learning experiences are aligned with individual student career goals. | 6.3% | 12.5% | 43.8% | 31.3% | 6.3% |
| As a CTE teacher, I closely supervise student learning experiences within work-based learning opportunities. | 25% | 0% | 18.8% | 31.3% | 25% |

The data in Table 12 suggest that there are minimal achievement gaps in work-based learning experiences being accessible to every student within the program, work-based learning being aligned with classroom instruction, and work-based learning being aligned with individual student career goals; however, at 31.3%, the minimal achievement is relatively high in the statement connected to the work-based learning experiences being accessible to all students. This represents nearly one third of the collected responses. On the other hand, 25% of the respondents identified that supervising the learning experiences that are obtained from the work-based learning opportunities is “not achieved at all.”

Table 13 presents the final survey data that were collected from high school CTE teachers. It presents findings on data and program improvement. There are four statements in this table highlighting teacher understanding of data collection, their access to the data, how the data are shared with students, and the data supporting student

success.

**Table 13**

*Data and Program Improvement*

| Data and program improvement criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| I understand the value of data collection. | 0% | 0% | 50% | 50% | 0% |
| I have access to the data of students who are enrolled in my program of study. | 0% | 12.5% | 37.5% | 50% | 0% |
| Data are shared with students. | 12.5% | 25% | 31.3% | 31.3% | 0% |
| Collected data support student success within the program. | 0% | 12.5% | 56.3% | 31.3% | 0% |

There is only one statement within Table 13 that identifies an area that is not being achieved. The area is identified as data being shared with students; 12.5% of high school teachers feel that this statement is "not at all achieved," and 25% of the high school teachers feel that the statement is "minimally achieved." The strength of this table resides in the statement connected to teachers understanding the value of data collection; 100% of the respondents identified that this is either "moderately achieved" or "substantially achieved."

## CTE Community College Instructor Survey

The survey presented to CTE community college instructors had criterion statements that aligned with the NACTE framework and the attributes of a North Carolina future ready graduate. Eight of the framework elements were found to be relevant to this particular survey. Table 14 represents the first set of criterion statements that were completed by the community college instructors. The responses were in

reference to the element of standards-aligned and integrated curriculum. The attributes of a North Carolina future ready graduate were also included in this section of the survey.

**Table 14**

*Standards-aligned and Integrated Curriculum*

| Standards-aligned and integrated curriculum criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Graduates of high school CTE programs are able to think critically. | 0% | 25% | 37.5% | 25% | 12.5% |
| Graduates of high school CTE programs are able to think creatively. | 0% | 25% | 25% | 37.5% | 12.5% |
| Graduates of high school CTE programs have relevant content knowledge in the core subject area of reading. | 0% | 0% | 75% | 12.5% | 12.5% |
| Graduates of high school CTE programs have relevant content knowledge in the core subject area of math. | 0% | 25% | 50% | 12.5% | 12.5% |
| Graduates of high school CTE programs are able to provide explanations based on found evidence. | 0% | 37.5% | 37.5% | 12.5% | 12.5% |
| Graduates of high school CTE programs are able to problem-solve effectively. | 0% | 25% | 37.5% | 25% | 12.5% |
| Graduates of high school CTE programs are good digital citizens (Responsible users of Technology). | 0% | 25% | 37.5% | 25% | 12.5% |
| Graduates of high school CTE programs have a financial understanding. | 0% | 25% | 50% | 0% | 25% |
| Graduates of high school CTE programs are knowledgeable and global citizens. | 0% | 12.5% | 62.5% | 0% | 25% |
| Graduates of high school CTE programs are knowledgeable of their personal health and well-being | 0% | 12.5% | 62.5% | 0% | 25% |
| Graduates of high school CTE programs are knowledgeable of world languages. | 12.5% | 62.5% | 0% | 0% | 25% |

The data from Table 14 suggest that community college instructors are receiving students who possess the observable attributes of a future ready graduate. The only attribute with evidence of being "not at all achieved" was in the area of students being knowledgeable of world languages. All other criterion statements had the majority of their responses in one of the three achieved selections. The highest acknowledged achievement was in the statements connected to the obtained student content knowledge in the subject areas of math and reading. Other attributes related to critical and creative thinking, problem-solving, and good digital citizenship represented similar achievement, just at a more minimal standard. Aside from this, an interesting category to notice is the "not applicable" column. Many of the community college instructors identified the attributes as being "not applicable" within their programs of study.

Table 15 represents the Sequencing and Articulation section of the instructor survey. There are only two applicable criterion statements within this element. Just like the high school teacher survey, these statements refer to programs including a sequence of courses and being combined with broader career pathway systems.

**Table 15**

*Sequencing and Articulation*

| Sequencing and articulation criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| The program of study includes a sequence of courses across secondary and postsecondary education. | 0% | 25% | 25% | 37.5% | 37.5% |
| The program of study leads to postsecondary credentials. | 12.5% | 0% | 25% | 25% | 37.5% |

The data from Table 15 identify that over 60% of the respondents have some type of sequence that bridges secondary and postsecondary program study; 37.5% of the respondents identify that there is no connection. As for postsecondary credentials, 50% identify their courses as achieving this criterion. The 12.5% attached to "not achieved at all" and the 37.5% attached to "not applicable" both identify an inability to obtain postsecondary credentials.

The following data in Table 16 identify the community college instructor's observation of student assessment criterion statements. The three statements relate to the confidence of high school CTE graduates in completing verbal and written assessments, and also their ability to participate within group projects.

**Table 16**

*Student Assessment*

| Student assessment criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Graduates of high school CTE programs are confident with verbal assessments of content understanding. | 0% | 25% | 62.5% | 0% | 12.5% |
| Graduates of high school CTE programs are confident with written assessments of content understanding. | 0% | 50% | 37.5% | 0% | 12.5% |
| Graduates of high school CTE programs are active participants within group projects. | 0% | 25% | 50% | 12.5% | 12.5% |

Obviously, not all courses offer each of the assessment examples presented in Table 16. Evidence of this is provided in the "not applicable" section of the table that has

12.5% in each of the rows; however, data imply that when students are presented with the tasks of verbal assessments, written assessments, or group projects, they are able to demonstrate a level of achievement. No category in this table had data connected to being "not achieved at all."

Table 17 focuses on engaging instruction. The statements are based on instruction CTE graduates received in their high school programs. CTE community college instructors were asked to identify the level of success their students presented in both academic and technical knowledge and skills. A competent user of technology is also referenced in Table 17.

**Table 17**

*Engaging Instruction*

| Engaging instruction criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Graduates of high school CTE programs are successful in both academic and technical knowledge and skills. | *0%* | *37.5%* | *37.5%* | *12.5%* | *12.5%* |
| Graduates of high school CTE programs are competent users of necessary equipment. | *0%* | *12.5%* | *37.5%* | *25%* | *25%* |

Data in Table 17 suggest that students are entering their community college programs with a level of achievement within objectives connected to academic and

technical knowledge and skills; however, the greatest percentages show only a minimal and moderate level of achievement. Only 12.5% of respondents have observed substantial knowledge and skill achievement. On the other hand, when necessary equipment is required, the community college instructors identified that the student users are demonstrating an achieved level of competency; 25% identified the student competency as being "substantially achieved."

Table 18 has only one criteria statement. The title is Access and Equity. Its statement is associated with a diverse group of students entering the community college after graduating from the district CTE programs.

**Table 18**

*Access and Equity*

| Access and equity criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Graduates of high school CTE programs represent a diverse student population. | 12.5% | 12.5% | 50% | 12.5% | 12.5% |

The data presented in Table 18 are balanced. Responses were collected in each of the five possible rating choices. Half of the respondents identified that a diverse population was being "moderately achieved." "Not at all achieved," "minimally achieved," "substantially achieved," and "not Applicable" each received 12.5% of the remaining data.

The facilities, equipment, technology, and materials criterion statements for the community college instructors are provided in Table 19. Both of the statements reference

the workplace environment; more specifically, student familiarity with the facilities, equipment, and safety practices.

**Table 19**

*Facilities, Equipment, Technology, and Materials*

| Facilities, equipment, technology, and materials criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Graduates of high school CTE programs are familiar with the workplace environments that are replicated through facilities and equipment. | *0%* | *50%* | *12.5%* | *25%* | *12.5%* |
| Graduates of high school CTE programs demonstrate safety in their practices. | *0%* | *12.5%* | *12.5%* | *25%* | *50%* |

According to Table 19, CTE high school graduates are entering the community college with varying levels of achievement towards being familiar with workplace environments that are being replicated within their programs of study. Half of the achievement within this criteria statement is represented as minimal, and 25% of the achievement is represented as substantial. In the area of safety, 50% of the respondents identified their environments as being "not Applicable." The remaining 75% of responses are identified as some level of achievement.

Table 20 and Table 21 each contain a single criteria statement. Table 20 focuses

on student career development. Data reveal if students are continuing to follow a created education or career plan at the community college level. Table 21 focuses on work-based learning. Its data simply identify if high school CTE graduates have had experience with work-based learning.

**Table 20**

*Student Career Development*

| Student career development criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Graduates of high school CTE programs continue to follow a personalized education/career plan. | 0% | 25% | 37.5% | 12.5% | 25% |

**Table 21**

*Work-Based Learning*

| Work-based learning criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Graduates of high school CTE programs have had experience with work-based learning. | 25% | 25% | 25% | 0% | 25% |

Data collected in Table 20 and Table 21 do represent evidence towards somewhat of a continuation of resources and opportunities being provided at the high school level. When applicable, Table 20 suggests that students are reaching a level of achievement when considering continued usage of a personalized education or career plan. Table 21

provides data towards only 50% of community college instructors accruing evidence of their students completing a work-based learning experience at the high school level. One quarter of respondents identified this as being “not at all achieved.”

**CTE Local Employer Survey**

Just as the previous surveys, the survey presented to CTE local employers had criterion statements that aligned with the NACTE framework and the attributes of a North Carolina future ready graduate. Ten of the framework elements were found to be relevant to this particular survey. Table 22 identifies survey information pertaining to standard alignment and curriculum integration. Here, employers provided feedback on observable future ready attributes. These attributes align with other surveyed groups and the attributes of a North Carolina future ready graduate.

**Table 22**

*Standards-aligned and Integrated Curriculum*

| Standards-aligned and integrated curriculum criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Graduated CTE student employees demonstrate critical thinking skills. | 0% | 20% | 40% | 40% | 0% |
| Graduated CTE student employees demonstrate the ability to think creatively. | 0% | 0% | 60% | 40% | 0% |
| Graduated CTE student employees demonstrate necessary reading abilities. | 0% | 0% | 20% | 80% | 0% |
| Graduated CTE student employees demonstrate necessary math abilities. | 0% | 0% | 60% | 40% | 0% |
| Graduated CTE student employees demonstrate knowledge of their personal health and well-being. | 0% | 20% | 40% | 40% | 0% |
| Graduated CTE student employees demonstrate problem-solving abilities. | 0% | 20% | 40% | 40% | 0% |
| Graduated CTE student employees demonstrate being responsible users of technology. | 0% | 0% | 0% | 100% | 0% |
| Graduated CTE student employees demonstrate being financially literate. | 0% | 20% | 40% | 40% | 0% |
| Student employees demonstrate being a knowledgeable and global citizen. | 0% | 20% | 40% | 40% | 0% |
| Graduated CTE student employees demonstrate a world language understanding. | 0% | 0% | 60% | 40% | 0% |

The data in Table 22 is an overall positive representation of CTE graduates being able to demonstrate levels of attributes that promote success in the workplace. None of

the 10 statements were at the level of being "not at all achieved." The only statements with recognized percentages of minimal achievement among employers dealt with critical thinking, personal health and well-being, problem-solving, finances, and global understanding. Combined, these five statements only represent 20% of the collected data. The remaining 80% of data collection fell in the categories of moderate and substantial achievement. Employers identified the most substantial achievement when referencing the CTE graduates' reading abilities and technology usage.

Table 23 presents only two statements in reference to sequence and articulation. The statements involve graduated CTE students possessing a secondary credential and collaboration occurring between high school CTE teachers and employers. This information references qualified graduates and program cooperation with outside agencies.

**Table 23**

*Sequencing and Articulation*

| Sequencing and articulation criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Graduated CTE student employees possess postsecondary credentials. (Ex. Certificates) | 0% | 0% | 60% | 40% | 0% |
| There is collaboration between high school CTE staff and my business. | 0% | 40% | 20% | 20% | 20% |

There are notable achievement differences in Table 23. The statement involving graduated CTE students possessing a postsecondary credential has significantly higher achievement than the collaboration statement. All collected data show that employers moderately or substantially achieve some type of postsecondary credential. Focusing on the statement pertaining to collaboration between high school staff and local businesses, only 40% of respondents find moderate or substantial achievement in their collaboration. Another 40% of the respondents identified the collaboration as being minimally achieved. The remaining 20% of collected data fell in the "not applicable" category.

The data in Table 24 are based on employer responses to criterion statements that reference student assessment. The four statements focus on verbal assessment, written assessment, group work abilities, and overall performance assessment. The future ready attribute of being a strong team contributor is connected to this data set.

**Table 24**

*Student Assessment*

| Student assessment criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Graduated CTE student employees demonstrate an ability to verbally speak their understanding of assigned tasks. | 0% | 0% | 40% | 60% | 0% |
| Graduated CTE student employees demonstrate an ability to physically write about their understanding of assigned tasks. | 0% | 20% | 40% | 40% | 0% |
| Graduated CTE student employees are active participants in group work assignments. | 0% | 0% | 20% | 60% | 20% |
| Graduated CTE student employees are assessed on their ability to perform given tasks. | 0% | 0% | 40% | 60% | 0% |

Again, Table 24 presents data that identify mostly moderate and substantial achievement. The only minimal achievement in this table is the identified 20% connected to the graduate's ability to provide written expression towards an assigned task. Twenty percent of the respondents also identified that group work was not applicable in their profession. Overall, the data suggest that students are able to successfully represent their abilities through various assessment instruments.

Table 25 concentrates on a prepared and effective staff. The one criterion statement identifies if graduated CTE students are meeting certification and licensure requirements. This information identifies a component of employee qualification.

**Table 25**

*Prepared and Effective Program Staff*

| Prepared and effective program staff criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Graduated CTE student employees meet certification and licensure requirements. | 0% | 0% | 20% | 60% | 20% |

The data in Table 25 suggest that the majority of CTE graduates do meet certification and licensure requirements. More specifically, 20% of respondents experience this at a "moderately achieved" rating, and 60% of the respondents find substantial achievement in this category. That leaves the remaining 20% of data in the "not applicable" category.

Table 26 expresses criterion statements connected to engaging instruction. These

statements express the ability of graduated CTE students to apply technical knowledge and academic knowledge to complete tasks each day; both represent knowledge expected to be obtained from a CTE program.

**Table 26**

*Engaging Instruction*

| Engaging instruction criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Graduated CTE student employees are expected to apply technical knowledge to complete tasks each day. | 0% | 0% | 20% | 80% | 0% |
| Graduated CTE student employees are expected to apply academic knowledge to complete tasks each day. | 0% | 0% | 20% | 80% | 0% |

Data in Table 26 are consistent in both statements. CTE employers expressed high success in their CTE graduates having the ability to apply technical and academic knowledge. The 80% of substantial achievement is among the highest percentage of success that was obtained from this survey. The remaining 20% of respondents agreed that their CTE graduates represent moderate achievement in these categories.

Table 27 only presents one criterion statement. The information in Table 27 is connected to access and equity. Local CTE employers were asked to rate the level of diversity within applicants they receive from CTE programs.

**Table 27**

*Access and Equity*

| Access and equity criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Current local graduated CTE applicants represent a diverse population. | 0% | 0% | 40% | 60% | 0% |

Information in Table 27 identifies that there is achievement in local graduated CTE applicants representing a diverse population. “Moderately achieved” was selected by 40% of employers. The remaining 60% of the surveyed employers selected the rating of this criterion statement as being “substantially achieved.”

Just as the previous table, Table 28 also only presents one criterion statement. The information in Table 28 references facilities, equipment, technology, and materials. Based on the resources students have access to during CTE program instruction, employers are able to rate their CTE student employee’s familiarity with the workplace environment.

**Table 28**

*Facilities, Equipment, Technology, and Materials*

| Facilities, equipment, technology, and materials criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Upon being hired, graduated CTE student employees are familiar with the workplace | 20% | 0% | 60% | 20% | 0% |

| environments. |
|---|

Table 28 displayed data of graduated CTE employees with familiarity in the workplace and some without. Twenty percent of the respondents identified that their new CTE employees have not achieved workplace familiarity. Sixty percent presented that their hired CTE employees show moderate achievement, and 20% presented substantial achievement in this same category.

Table 29 and Table 30 share similarities in highlighting partnerships and collaboration towards work experiences. Table 29 looks specifically at business and community partnerships. The data identify if partnerships have been created and if partnerships have allowed for the distribution of feedback between the workplace and the CTE program. Furthermore, Table 30 focuses on the work-based learning experience. The data portray if the opportunities have been presented and if collaboration occurs with the CTE teachers when the work-based learning experience is achieved.

**Table 29**

*Business and Community Partnerships*

| Business and community partnerships criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| I have formed a partnership with the high school CTE program. | 20% | 20% | 20% | 20% | 20% |
| Partnerships have provided opportunities for me to provide feedback to CTE programs. | 20% | 20% | 20% | 20% | 20% |

**Table 30**

*Work-Based Learning*

| Work-based learning criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| As a CTE workplace, we provide work-based learning experiences for CTE students. | 20% | 0% | 20% | 40% | 20% |
| As a CTE workplace, I am able to collaborate with CTE teachers on work-based learning experiences. | 20% | 20% | 20% | 20% | 20% |

There are many similarities in Table 29 and Table 30. The data show to be equally distributed among most of the criterion statements. In Table 29, all categories are represented by 20%. There is a lack of consistency within the CTE employer's ability to form partnerships and provide feedback. Table 30 is similar. In the first criterion statement within this table, there is a 40% substantial achievement when considering the CTE workplace providing work-based learning experiences for CTE students. Another 20% identified that there is no achievement in this same category. As for the second statement involving collaboration with CTE teachers on the work-based learning experiences, the 20% is across the board. In other words, 20% find there to be no achievement in this statement, and 60% find differing levels of achievement. The remaining 20% felt it was "not applicable."

The final data set from the CTE employer survey is found in Table 31. This table

reviews data and program improvement. The criterion statements reflect the CTE employer relaying workforce needs to CTE programs and being asked to provide data on students during work-based learning experiences.

**Table 31**

*Data and Program Improvement*

| Data and program improvement criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| As a CTE workplace, I provide data related to workforce needs with CTE programs. | 20% | 20% | 20% | 20% | 20% |
| While providing work-based learning experiences, I am asked to provide data on students. | 20% | 0% | 20% | 20% | 40% |

As in previous data tables, Table 31 also presents a spread of 20% in the statement referring to the CTE workplace providing data related to workforce needs to CTE programs; 20% presented that this was "not at all achieved." Sixty percent presented differing levels of achievement, and the remaining 20% felt it was "not applicable" to them. The second statement that was connected to student data had the largest percentage, 40%, in the category of "not applicable." Twenty percent of the respondents felt that this statement was not achieved at all, while the remaining 40% identified moderate and substantial achievement.

**CTE High School Graduate Survey**

High school CTE graduates represent the product in this research. They are completers of the high school CTE program and are currently at the community college or employee level. The survey presented to high school CTE graduates offered them an opportunity to reflect on their program. The survey was created using the same framework and design as the one completed by the high school teachers, community college instructors, and local employers. The 12 elements from the NACTE framework and the 17 attributes of a North Carolina future ready graduate were integrated within.

Table 32 provides data on the standards-aligned and integrated curriculum. Eleven criterion statements were included to provide student feedback on their personal attainment of future ready attributes. The academic attributes were related to reading, math, science inquiry, health, technology, finances, and world language. Other learning skill attributes included critical thinking, creative thinking, and problem-solving.

**Table 32**

*Standards-aligned and Integrated Curriculum*

| Standards-aligned and integrated curriculum criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| I found that my CTE instruction offered opportunities that promote the development of my critical thinking skills | 0% | 0% | 30% | 70% | 0% |
| My CTE classes expected me to think creatively to form new ideas. | 0% | 0% | 30% | 70% | 0% |
| CTE provided opportunities for me to use reading skills to learn the material. | 0% | 0% | 40% | 60% | 0% |
| Components of math practice were found within my CTE courses. | 0% | 0% | 80% | 20% | 0% |
| My CTE courses required the practice of inquiry, or explanations based on found evidence. | 0% | 0% | 60% | 40% | 0% |
| My health and well-being during the transition after graduation was discussed in my CTE courses. | 0% | 40% | 40% | 20% | 0% |
| Problem-solving techniques were necessary when solving problems in my CTE courses. | 0% | 0% | 30% | 70% | 0% |
| My CTE instructors emphasized the importance of being a good digital citizen (Responsible user of Technology). | 0% | 0% | 30% | 60% | 10% |
| Finances were a component of my CTE instruction. | 0% | 0% | 50% | 40% | 10% |
| After completing CTE courses, I felt that I was a more knowledgeable and global citizen. | 0% | 0% | 20% | 80% | 0% |
| My CTE teachers referenced the importance of world language classes. | 10% | 60% | 20% | 10% | 0% |

There appear to be two outliers in Table 32. The discussion of health and well-being during the transition after graduation and referencing the importance of world language are both represented by higher percentages connected to minimal achievement. Forty percent of respondents identified minimal achievement in the area of health and well-being instruction, while 60% of respondents identified world language references being minimally achieved in their CTE program. Ten percent of the same respondents identified no achievement of world language references in their program. On the other hand, all other statements related to standards-aligned and integrated curriculum had 100% of achievement in the combined moderate and substantial categories. Among the highest achievement was in the areas of critical thinking, creative thinking, problem-solving, and global citizenship. As for core content areas, reading practices had a higher substantial achievement percentage at 60%.

Table 33 indicates data findings based on sequencing and articulation. The three criterion statements focus on student opportunities with sequenced courses, research, and preparation for postsecondary opportunities. All these referenced opportunities remained on a high school campus.

**Table 33**

*Sequencing and Articulation*

| Sequencing and articulation criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| I experienced a sequence of courses within my CTE program. (I.E. Level 1, Level 2, Level 3) | 0% | 0% | 20% | 70% | 10% |
| Opportunities were provided to research beyond the direct instruction for additional information. | 0% | 10% | 30% | 60% | 0% |
| I was prepared for postsecondary educational opportunities | 0% | 0% | 50% | 50% | 0% |

The data in Table 33 suggest that student graduates have found relatively high percentages of substantial achievement in each of the three criterion statements. Ninety percent of the respondents experienced or had the opportunity to experience a sequence of courses within their program. Only 10% found this statement to be not applicable to them. All respondents were also able to identify a level of achievement towards researching beyond their direct instruction to obtain additional information. Ten percent found the research statement to be "minimally achieved." The final statement on preparing the graduates for postsecondary educational opportunities was split with 50% of respondents identifying this to be "moderately achieved" and 50% identifying it to be "substantially achieved." Both percentages suggest strong evidence.

Table 34 identifies data on student assessment. Students identified verbal and written assessment opportunities, group project participation, and the alignment of classroom assessments. Each statement plays a large role in identifying the student's attained knowledge.

**Table 34**

*Student Assessment*

| Student assessment criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Opportunities to verbally share my CTE content understanding were provided. | 0% | 0% | 30% | 70% | 0% |
| Opportunities to write about my CTE content understanding were provided. | 0% | 10% | 30% | 60% | 0% |
| During group projects, my CTE instructor ensured that all members are active participants. | 0% | 0% | 40% | 60% | 0% |
| Classroom assessments were aligned with content being taught by the teacher. | 0% | 0% | 40% | 60% | 0% |

Overall, all student assessment statements have some identified level of achievement. The statement pertaining to written assessment opportunities is the only

statement with data connected to minimal achievement. Ten percent of respondents identified this as being "minimally achieved," while 30% identified moderate achievement and 60% identified substantial achievement. The remaining three criterion statements connected to verbal assessment, group projects, and assessments aligned to class objectives had data only in the moderate and substantial categories. The highest level of substantial achievement was 70% connected to verbal assessment.

Table 35 and Table 36 both relate to certain components of graduate perceptions of CTE teachers. First, Table 35 involves a prepared and effective program staff. Two criterion statements focus on teachers being knowledgeable of the content they teach and their expectation of relationship building. Table 36 involves engaging instruction. It also has two criterion statements, and they relate to the graduate's personal responsibility of learning and their feelings towards CTE teachers meeting their personal needs.

**Table 35**

*Prepared and Effective Program Staff*

| Prepared and effective program staff criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| My CTE teachers were knowledgeable of the content they were teaching. | 0% | 0% | 30% | 70% | 0% |
| Building relationships was an expectation of my CTE teachers. | 0% | 10% | 50% | 40% | 0% |

**Table 36**

*Engaging Instruction*

| Engaging instruction criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| In my CTE courses, I felt that I was responsible for my learning. | 0% | 0% | 10% | 80% | 10% |
| I feel that the instruction provided by my CTE teachers met my personal needs. | 0% | 0% | 40% | 60% | 0% |

The data in Table 35 present strong evidence towards CTE graduates agreeing that their teachers were knowledgeable towards the content they were teaching. Thirty percent viewed this as moderate achievement and 70% identified substantial achievement. The idea of building relationships also had high percentages of moderate and substantial achievement. Only 10% of respondents in this category identified relationship building as being "minimally achieved" by their CTE teacher. In Table 36, there are no nonachievement or minimal achievement data. Student perception of their personal responsibility for learning was identified as being 10% "moderately achieved" and 80% "substantially achieved." The remaining 10% felt it was "not applicable" to them. In the same table, one can see that graduates also felt that their CTE teachers met their personal needs. Forty percent identified this as being "moderately achieved" and 60% identified it as being "substantially achieved."

Table 37 is all about access and equity. Specifically, the access to tutoring

services and CTE classes of interest being available to students were investigated. The access and equity was specific to each given high school campus.

**Table 37**

*Access and Equity*

| Access and equity criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Tutoring services were provided in my CTE program. | 0% | 0% | 60% | 30% | 10% |
| The CTE classes that I was interested in were available to me. | 0% | 0% | 30% | 70% | 0% |

Again, Table 37 illustrates high levels of achievement towards access and equity. Looking specifically at tutoring services, students identified that 60% of their programs had moderate achievement, 30% had substantial achievement, and 10% of their programs were “not applicable” to providing tutoring services. Similar percentages were provided in reference to CTE classes of interest being available to students; 30% of graduates identified moderate achievement in having access to desired CTE classes, and 70% identified substantial achievement towards access to their desired CTE classes.

Table 38 emphasizes the collected data pertaining to facilities, equipment, technology, and materials. There are five criterion statements. The statements focus on facilities, equipment, and technology matching current workplaces and following safety guidelines.

**Table 38**

*Facilities, Equipment, Technology, and Materials*

| Facilities, equipment, technology, and materials criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| The facilities used within the CTE program matched current workplace practice. | 0% | 0% | 40% | 60% | 0% |
| The equipment used within the CTE program matched current workplace practice. | 0% | 0% | 40% | 60% | 0% |
| The technology used within the CTE program matched current workplace practice. | 0% | 0% | 60% | 40% | 0% |
| I had the equipment needed to be successful in my CTE program. | 0% | 0% | 20% | 80% | 0% |
| The CTE teacher referenced safety guidelines. | 0% | 0% | 40% | 60% | 0% |

Data in Table 38 suggest that graduates are confident in their high school CTE program achieving the facilities, equipment, technology, and material needs. Data of all

five of the criterion statements fall within the moderate and substantial achievement categories. The highest-rated level of substantial achievement is the 80% connected to CTE programs providing the needed equipment to allow for student success within the program.

The next data set in Table 39 has an important focus on business and community partnerships. These types of partnerships are important for connecting with business representatives and receiving evaluation for learning experiences. Three criterion statements reference these ideas.

**Table 39**

*Business and Community Partnerships*

| Business and community partnerships criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Representatives from local businesses presented in my CTE classes. | 10% | 40% | 20% | 30% | 0% |
| I received some evaluation from my work-based learning experiences. | 0% | 20% | 40% | 40% | 0% |
| Since graduating, I have had contact with business representatives that I met while taking CTE courses. | 50% | 30% | 10% | 10% | 0% |

The data in Table 39 represent the lowest amount of achievement among all data

sets connected to CTE high school graduates. Looking first at the statement connected to local business representatives being present in CTE classes, 10% of respondents identified that as being “not achieved at all” and 40% rated it as being “minimally achieved.” The remaining 50% of data fell in the categories of moderate and substantial achievement. The second criterion statement involving evaluations being received from work-based learning experiences had only 20% of minimal achievement. The remaining 80% of data were evenly split between “moderately achieved” and “substantially achieved.” The final statement in Table 39 represents the greatest discrepancy in achievement. This statement involves graduated CTE students continuing to have contact with business representatives who were met during their coursework. Half of the respondents identified this as being “not at all achieved,” 30% rated it as “moderately achieved,” and 10% achievement was identified in both the moderate and substantial categories.

Data in Table 40 transitioned focus towards student career development. Two criterion statements reference this topic. Those statements involve CTE instruction preparing the graduate for postsecondary career opportunities and support being provided when updates to career plans were needed.

**Table 40**

*Student Career Development*

| Student career development criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| I feel that my CTE instruction prepared me for a postsecondary | 0% | 0% | 30% | 70% | 0% |

| | | | | | |
|---|---|---|---|---|---|
| career opportunity. | | | | | |
| I was supported when updates were needed for my Career Plan. | 0% | 0% | 50% | 50% | 0% |

The data in Table 40 demonstrate that CTE graduates found sustained achievement from their programs' career development. For the first statement involving CTE instruction that prepares postsecondary opportunities, graduates identified 30% moderate and 70% substantial achievement. In the second statement, graduates reflected on their career plan and identified that there was 50% moderate achievement and 50% substantial achievement towards necessary updates being made to their individual plan.

In conjunction with extracurricular activities, Table 41 is centered upon career and technical student organizations. The criterion statement in this table focuses on the availability of CTE student organizations at the high school level. These types of organizations vary in purpose and objectives.

**Table 41**

*Career and Technical Student Organizations*

| Career and technical student organization criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| A CTE student organization was available for me to participate in. | 0% | 10% | 30% | 60% | 0% |

The data in Table 41 suggest that CTE student organizations have some level of achievement across the district. Depending on the program, 10% of graduate respondents

identified the achievement to be minimal. On the other hand, 30% of respondents identified moderate achievement, and 60% identified substantial.

Table 42 presents data specifically on work-based learning. Job shadowing, apprenticeships, internships, or other opportunities may represent work-based learning. This table focuses on the criterion statements involving the experiences offered by CTE programs, the work-based alignment with classroom instruction, and the work-based alignment with career goals.

**Table 42**

*Work-Based Learning*

| Work-based learning criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Work-based learning experiences were offered in my CTE program. (Job shadowing, internships, apprenticeships, etc.) | 0% | 10% | 70% | 20% | 0% |
| The work-based learning experiences were aligned with my classroom instruction. | 0% | 0% | 60% | 30% | 10% |
| The work-based learning experiences were aligned with my career goals. | 0% | 0% | 40% | 50% | 10% |

Based on the surveyed graduates, work-based learning experiences were provided

to some degree in each of the complete programs. Ten percent experienced minimal achievement, 70% experienced moderate achievement, and 20% experienced substantial achievement. When considering alignment to classroom instruction and career goals, there was no minimal achievement selected by the CTE graduates. Instead, the graduates identified 60% moderate achievement and 30% substantial achievement in the alignment between work-based learning and classroom instruction. They identified 40% moderate achievement and 50% substantial achievement in the alignment between work-based learning and career goals. Ten percent acknowledged alignment as "not applicable" to them.

The final data set in relation to CTE graduates is presented in Table 43. This table identifies data connected to data and program involvement. Graduates used the two criterion statements to identify if data from classroom learning and work-based learning were shared with them.

**Table 43**

*Data and Program Improvement*

| Data and program improvement criterion statements | Not at all achieved | Minimally achieved | Moderately achieved | Substantially achieved | Not applicable |
|---|---|---|---|---|---|
| Data from classroom learning was shared with me. | 0% | 10% | 80% | 10% | 0% |
| Data collected from my work-based learning was shared with me. | 0% | 10% | 40% | 40% | 10% |

Table 43 shows there to be small indications of minimal achievement in both statements involving data. Ten percent of the graduate respondents identified minimal achievement in classroom and work-based data being shared with them. When considering moderate achievement, 80% felt that rating aligned with data being shared by classroom learning, and 40% identified the moderate position with data being shared by work-based learning. In the category of substantial achievement, 10% acknowledged substantial achievement with shared classroom data, and 40% acknowledged it with shared work-based learning data. Ten percent of respondents identified the work-based learning data as "not applicable" to their program.

**Focus Group Interviews**

At the conclusion of the survey collection and review, established respondents were scheduled for a focus group interview. The conclusion of the survey provided an opportunity for respondents to choose if they were interested in participating. Because of this program evaluation's explanatory sequential design, the interviews were able to further explain survey responses and make connections between the collected data and research questions. The focus group interviews were completed in small groups of CTE high school teachers, CTE community college instructors, local employers, and CTE high school graduates. Predetermined questions were created. The discussions were recorded and later analyzed to determine specific information that was essential to this study.

**CTE High School Teacher Focus Group Interview**

After completion of the high school CTE teacher survey, results were analyzed and four guiding questions were formed for the focus group interview. The interview questions consisted of:

1. College and career ready has many skills. How do you feel that CTE builds these?
2. What do you feel would be effective collaboration and could it help align objectives?
3. Discuss any current needs or recommendations. What do these consist of?
4. Reflect on your experiences. Is there anything that you feel made our CTE program more effective?

The research questions were discussed by the focus group, and I was able to collect important details.

During Question 1, the criterion statements connected to an integrated curriculum, reading standard alignment, math standard alignment, health and well-being, finances, and world language were referenced. Each of these statements had low ratings within the CTE teacher group. The CTE teachers referenced how their content connected to other core areas; however, it was stated that "core areas may be teaching similar skills as us at certain grade levels, but it seems that many of these skills are referenced before high school." The example of this claim involved reading recipes and understanding the concept of doubling or splitting in half. These seem to be rather simple concepts, but students continue to struggle with them. Furthermore, high school CTE teachers find themselves having to reiterate reading standards connected to comprehension, punctuation, and conveying thoughts. It was stated that "students sometimes struggle with the application of learned skills when they are necessary in our classrooms. There is somewhat of a 'fun-course' mentality that has been formed." The teachers went on to say that this is a mentality formed by students, other educators, and parents. As for finances,

the teachers expressed that only certain classes currently emphasize this knowledge. Those classes include agriculture and principles of finance. The teachers within the focus group had no information on world language incorporation.

Question 2 highlighted collaboration opportunities. Collaboration between secondary, postsecondary, and other core staff members within the high school building were considered in this discussion. The teachers began by discussing the lack of collaboration. They shared that there was currently only one meeting per year for high school teachers within the school district. Teachers felt that this was not enough to build professional relationships with their colleagues who may be teaching similar content at a neighboring school within the district. One teacher even referenced during the interview that she was unaware of another interviewee teaching the same class as her. Instead of contacting other teachers within the district, she found herself "reaching out to DPI for guidance." It was also discussed by the teachers that they felt programs were aligned to funnel into programs at the community college level, but the teachers at the high school level are not connected with the instructors at that level. Beyond this, the employer collaboration is equally not present. Teachers discussed how they were aware of jobs shifting and having to adapt to a changing world; however, without collaboration, all of the necessary objectives for success are even more difficult to obtain.

Question 3 focused on recommendations. The high school teachers referenced facilities, equipment, technologies, and materials. They began by identifying the greatest barrier as funding. The foods and nutrition teachers talked about their lack of input towards bids connected to their classroom kitchens. By allowing input, the teachers feel that student workspaces could better align with real-world workplaces. The idea of more

collaboration with companies to allow for in-person visits was also discussed. Teachers felt that creating and using business partnerships would greatly support access to more closely aligned facilities, equipment, technology, and materials.

Question 4 acted as a reflective component to conclude the interview. It was about CTE program effectiveness and how the teachers felt it could be made more effective. First, the teachers discussed that there needed to be a mindset change. “Students need to see the importance of our programs, the school community should not view our classes as a schedule filler, and parents should be reminded of the importance of student effort and success within our classes.” Next, the teachers felt that there should be more showcasing of student success. It was mentioned that often students who struggle in other areas within the school are able to find success within CTE. Promoting this success was felt to be beneficial by the high school CTE teachers. Lastly, a CTE board was discussed. Throughout the entire interview, the mention of collaboration and connectedness was present. “The CTE board would be made up of high school CTE teachers, CTE community college instructors, and local CTE employers.” The purpose of this group was identified as being a bridge of support from a program’s start at the high school level to its completion once an employer has hired a student.

**CTE Community College Instructor Focus Group Interview**

After reviewing the Community College Instructor Survey results, a focus group was identified, and guiding questions were created. There were four guiding questions that included:

1. The qualities of critical and creative thinking were rated relatively high among your survey results. Other core areas were rated much lower. What are you

specifically seeing in your classrooms?

2. What do you feel would be effective collaboration and could it help to align objectives high school and community college CTE?
3. Based on facilities, equipment, technology, and materials, what are your recommendations for making the high school programs more adaptive?
4. Reflect on your experiences. Is there anything that you feel made our CTE program more effective?

Each of these questions was created in conjunction with survey results and further exploring possible answers to the posed research questions.

The CTE instructors began their discussion of Question 1 by saying that first-generation college students represent the majority of their population; however, "these students continue to represent higher achieving academic standards rather than continued developmental levels in mathematics or reading." More specifically, students are "better than expected on financial components," "average in math," and their "level of comprehension is manageable." The most identifiable weakness is writing. Community college instructors expressed how their students were challenged with the task of expressing an assignment or reflection when being required to write. Punctuation and the ability to present clear written expression were two major areas of weakness. When discussing creative and critical thinking, the instructors did express that students exhibited stronger skills when working in a group setting.

In Question 2, the collaboration discussion began with a concern towards missing students. Specifically, the community college focus group felt that an inability to collaborate is causing them to lose students. "The CTE enrollment at the community

college level continues to drop each year." The instructors agreed that they have lost connection, and relationships matter. They realize that their programs are being occupied with students who have just graduated from the local high schools; therefore, they feel that they must begin to make it a priority to visit the high school campuses to make connections and form relationships with both teachers and students. The community college instructors emphasized their role in collaborating with industries. It was stated that "industries drive our programs." The instructors accentuated that they currently have instructors within the program who are "teaching for an industry that they are not aquatinted with in the community."

Question 3 led the community college instructors to a discussion on facilities, equipment, technology, and materials. Overall, instructors felt that students were somewhat familiar with the resources located on the college campus. Their high school experiences were many times a "smaller replica." It was highlighted that confidence is key. Students stepping into their classroom should be confident in their learned skills and be able to apply them in any environment. Class trips and graduation project opportunities were also referenced. Class trips involved high school students traveling to the college campus for further class instruction and an opportunity to generate further interest. Graduate projects were mentioned as an opportunity to align a student with additional opportunities. All graduation projects have a hands-on requirement that instructors felt may lead to an opportunity for involvement and practice with more resources.

The interview concluded with Question 4. This question dealt with reflection and program effectiveness. The three words expressed by all focus group interviewees

involved communication, relationships, and collaboration. The instructors expressed that there has been a creation of silos to represent high school, community college, and local employer CTE. One representative stressed the idea of "county CTE." He went on to say that "if we expect to have increased enrollment, better marketing, and a program able to fulfill the needs of our community, we must reflect on our current connectedness and become a single Career and Technical Education unit."

**CTE Local Employer Focus Group Interview**

CTE local employers completed the survey with the creation of a focus group to follow. The focus group discussion was guided by the following questions:

1. Critical thinking, problem-solving, written communication, and being a knowledgeable global citizen rank among the lowest-rated attributes. What are you seeing in your workplaces, and are there any attributes the CTE program should specifically focus on?
2. How effective is the current CTE program in creating students to be career ready?
3. Collaboration between high school CTE staff and business partnerships represent the greatest weakness in your collected data. How do you feel about these interactions?
4. How can the district make the CTE program more effective?

Each of the guiding questions was specific to analyzed survey data and was aimed at supporting the research for this study.

The first focus group question allowed elaboration on four of the North Carolina future ready attributes. The employers identified critical thinking, problem-solving,

written communication, and being a global citizen ranked among the lowest-rated attributes within the employer surveys. Focus group members were not surprised by this information. One employer mentioned, “Employee drive within the workplace contributes a lot to their ability to be successful in these identified attributes. When student employees are not engaged, their work ethic and product suffers.” Other focus group members agreed and suggested, “When student employees work hard and remain engaged, their skill level is high and all attributes are met.” The employers could not think of any additional attributes to be addressed. Instead, the conversation continued to revolve around work ethic and ensuring that students know what the job will consist of. They identified the importance of students having a deep understanding of the careers within each of the CTE programs. “Their understanding now will lead to a more successful career later.” Also, it was mentioned that “CTE jobs can be hard. Students need to find value in manual labor again.”

Question 2 allowed the CTE employers to reflect on the CTE program’s effectiveness towards creating CCR students. Overall, it was agreed that the program was addressing this desire. A couple of the focus group members expressed the growth of the program over time. It was said that “Today’s CTE program offers more than it ever has before. The opportunities are endless.” Another group member mentioned the program’s success but also the need for more student participation. This employer had no recent CTE graduates apply for positions at the conclusion of the last school year.

Question 3 investigated the collaboration component. Most employers who were part of this study do not have partnerships with the CTE programs. One focus group participant spoke specifically on the importance of being involved: “We could definitely

entertain the idea of conducting tours within our facility. Our last school involvement was 15 years ago." Other focus group members agreed. "It is going to take scheduling and communication, but I feel that building stronger partnerships can support all parties involved with CTE."

The final section of the interview focused on making the district CTE program more effective. Again, the discussion returned to the collaboration and communication between program employers. The employers stated again that they felt the programs were finding success in the measurable attributes being taught to students. Their suggestions concentrated more on allowing the students into their workplaces and visiting schools. "I think we need to make ourselves more known to students and more focused on receiving them as future employers within our businesses."

**CTE High School Graduate Focus Group Interview**

At the conclusion of the CTE High School Graduate Survey collection, the group of willing members combined to form the focus group. The group was asked to participate in a discussion based on four posed questions:

1. Along with learned content within your core academic areas and developed critical and creative thinking skills, what are the qualities you feel are most needed for success within your experienced CTE courses?
2. Business partnerships have been a common weakness among all respondents. Could you provide more detail towards these findings?
3. Have your high school and community college CTE courses aligned? This also includes facilities, equipment, technology, and materials.
4. How effective do you feel your CTE program has been in preparing you to be

college and career ready?

The posed questions were based on survey results and further progress towards answering this study's research questions.

In Question 1, the student graduates reflected on the qualities and attributes they feel are most important to the completion of CTE courses. They identified math skills, critical thinking, writing, verbal communication, and reading comprehension as among the most important. When students were asked to reflect on their direct instruction related to these academic areas, one student responded by saying, "The skills are necessary for success within the programs, but I haven't felt that there has been a lot of reteaching involved." In other words, the students explained that many of the components listed in the survey were being used throughout the programs but not regularly being retaught; however, all students did feel like they were being supported when struggling with any of the identified attributes.

Question 2 focused on the idea of business partnerships. Students were all in agreement that local business involvement within their program was very minimal. One individual responded that they would find it beneficial for more "business collaboration." A student explained, "Aside from internships, job-shadowing, and apprenticeships, we have to seek the business partnerships. They did not regularly enter our classroom or provide business information." When recruiting tactics were mentioned, the students reflected on the idea and identified how important that could be in offering them future employment opportunities.

Question 3 analyzed alignment between high school and community college CTE. The students expressed strong alignment between the two; however, they did reference

the importance of community college instructors visiting their high school campuses to provide more specific insight. One student referenced the "Community College Showcase." They explained, "The showcase occurred one time and allowed the students to learn more about the college level CTE courses." The students viewed this as beneficial to them but could have been done more to reach more students. As for aligning with facilities and equipment, the students identified that "for the most part, we have access to the same types of materials." The students stated that they are also able to confirm that the resources they have access to are similar to those found within the workplace.

The final question involved effectiveness. Many of the students stated, "Overall, we view the CTE programs as effective." They expressed that these types of programs best prepared them for the classes they currently are taking at the community college level. One student expressed, "The interactions I had while in my CTE program are what I owe a lot of my current success to." Each of the students took time to explain their successes. All students even expressed how they would repeat the program and try to be even more involved. Before concluding the interview, the topic of business partnerships was reviewed. One student expressed how the partnership at the community college level had introduced him to a possible future employer. Others voiced their support of increased future partnerships and opportunities to have a closer connection to local employers.

**Common Themes Emerge**

**Table 44**

*Correlation Between Research Questions and Themes*

| Research question | Emerging themes |
|---|---|
| Research Question 1: What specific qualities are CTE programs expected to address during program completion? | • Perception of attribute alignment core content area success outweighs learning strategy skill development<br>- Core content outweighs strategy skills<br>• Weakness among health awareness, world language, and financial mastery |
| Research Question 2: What strategies are in place within the district to ensure that program objectives align with workforce needs? | • Access to the workplace<br>• Purposeful partnerships<br>- Internships, apprenticeships, job shadowing |
| Research Question 3: How are specific CCR skills exhibited during and after CTE classes? | • A continuation of skill usage<br>- Alignment of used skills confirmed between high school, secondary education, and workplace<br>• Workplace blending<br>- Facilities, equipment, technology, and materials alignment |
| Research Question 4: How effective is the studied rural CTE program in preparing students to be CCR? | • Success in creating skilled workers<br>• Weakness among the communication between students, teachers, instructors, and employers |

**Conclusion**

Research data were presented in this chapter to create a more detailed look at promoting the effectiveness of a rural CTE program that is able to produce students who are both college and career ready. Four research questions guided this study to help form a survey and focus group interview that was focused on obtaining the necessary information from each study group. High school CTE teachers, community college

instructors, local employers, and graduated CTE students were all asked to provide feedback regarding the strengths and weaknesses of the current CTE program. These strengths and weaknesses have been identified. The next chapter further analyzes findings and makes connections with existing bodies of literature.

# Chapter 5: Discussion

## Overview of Study

This study was conducted as a program evaluation of the CTE program within a rural school district in northwest North Carolina. This chapter provides an analysis of the study based on conducted research and its connection to the four identified research questions. Also included are the implications for practice, recommendations for further study, limitations, and delimitations. The content of this study will add to the body of research that has already been completed on the ability of CTE programs to prepare their graduates to be college and career ready.

According to Beal et al. (2018), there was an identified challenge facing the United States. The challenge was related to three specific areas that included a need for economic competitiveness within the world, a need for giving our local workers an advantage over workers abroad, and working to fix an education system that is failing to adequately prepare its students to fully succeed in postsecondary endeavors (Beal et al., 2018). Today, the workforce relates the issues to inadequate workforce development and a failure of student attainment towards being CCR.

Conley (2012) researched to find four categories connected to CCR. The four categories are content knowledge, learning skills and techniques, transition knowledge and skills, and cognitive strategies (Conley, 2012). Each of these categories was found to be consistent with the reasons for hiring difficulty that were identified in the 2018 Employer Needs Survey. With CTE being charged with developing CCR students, there had to be measurable components connected to the four categories identified by Conley. The 17 attributes of a North Carolina future ready graduate and the NACTE framework

were the guiding factors used to align with Conley's four categories of CCR readiness and be able to collect measurable data on the effectiveness of the CTE program. The 17 attributes were adopted by the North Carolina State Board of Education as indicators of a future ready graduate. The NACTE framework evaluates the entire program through connection to 12 specific elements but was also able to link the 17 attributes to performance-based indicators.

The survey for this study was created using both the 12 elements from the NACTE framework and the 17 attributes of a North Carolina future ready graduate. It was believed that these two components were the best guiding factors for determining the effectiveness of a CTE program's overall functioning capacities and its ability to create graduate products that align with Conley's (2012) CCR categories. Along with survey completion, focus group interviews were conducted to further analyze the survey results. All data were aligned with this study's methodology and answered the four identified research questions.

The program evaluation was conducted using Stufflebeam's (2003) CIPP model. Context included the objectives aligned with the qualities of a CTE program. Each of the 12 NACTE framework elements was important in the context section of the model. The framework's 12 elements include standards-aligned and integrated curriculum; sequencing and articulation; student assessment; prepared and effective program staff; engaging instruction; access and equity; facilities, equipment, technology, and materials; business and community partnerships; student career development; career and technical student organizations; work-based learning; and data and program improvement (Imperatore & Hyslop, 2018). The input component addressed the content and its

alignment with workforce needs. This closely connects to the 17 attributes, integrated curriculum, and student career development. Next, the process accentuated the demonstration of CCR skills during CTE programs and after its completion. Facilities, equipment, technology, materials, business partnerships, community partnerships, and work-based learning elements were important in evaluating the process. Lastly, the product component assessed the perception of teachers, instructors, employers, and graduates. The overall results from surveys and focus group interviews guided the assessment of the overall product.

The four research questions used to guide this study and represent each component of the CIIP model were

1. What specific qualities are CTE programs expected to address during program completion?
2. What strategies are in place within the district to ensure that program objectives align with workforce needs?
3. How are specific CCR skills exhibited during and after CTE classes?
4. How effective is the studied rural CTE program in preparing students to be CCR?

Since collecting survey data, guiding focus group interviews, and presenting the findings, I was able to analyze the results in connection to each of the research questions. Themes emerged to help promote a clear representation of results.

**Research Question 1: What Specific Qualities Are CTE Programs Expected to Address During Program Completion?**

The first research question represents the context component of the CIIP model.

Identified qualities should be connected to graduates who are able to succeed beyond the secondary education program. The success extends into credit-bearing community college programs and an entry-level workforce environment (Conley, 2012). The most evident qualities to connect here would be ones that indicate a future ready graduate. Based on the assessed data, two emerging themes developed from this research question: perception of attribute alignment; and weakness among health awareness, world language, and financial mastery.

The first theme was perception of attribute alignment. Overall, data and discussion suggested that the North Carolina future ready attributes were strongly represented with consistent representation in the standards-aligned and integrated curriculum section of each survey. Specific skills with strong representation included critical thinking, creative thinking, mathematics, reading, scientific inquiry, problem-solving, digital citizenship, and global citizenship. When considering criterion statements within the section, each of the four survey groups averaged their highest percentages within the "moderately achieved" category. Moderate achievement promotes the evidence of mentioned skills being taught and referenced consistently throughout the program. The CTE high school teachers referenced their knowledge of connection to other core areas. They felt that they most often have to reiterate the objectives connected to comprehension, punctuation, and conveying thoughts clearly. Not referenced in the focus group interview, it was interesting to see that CTE high school teachers rated critical thinking, creative thinking, and problem-solving skills among their highest addressed qualities. The community college instructors acknowledged comparable achievement among their observations of graduated CTE students. Again, most of their

attribute data fell in the “moderately achieved” category. Unlike the high school teachers, they viewed math and reading skills to have the highest student attainment. In discussion, the instructors felt that student knowledge in the core areas of math and reading was adequate to the needed skills for success within their programs. Similar to high school discussion, communication in the form of writing is also viewed as a struggle. The employers were positive in their student quality identifications. Employers represented that they have observed evidence of their CTE graduate employees having the skills to be successful within their businesses. The employers actually presented the highest percentages of achievement in this category. In their interview, they were satisfied overall with the qualities being learned from the CTE programs. In connection to their statement regarding “student drive,” it is important to reference that skills related to critical and creative thinking or problem-solving most often require an extensive effort. The employers also expressed no other attributes or qualities that should be addressed. The last perspective of Research Question 1 comes from the graduates. Just as the high school teachers, community college instructors, and employers, the attributes of critical thinking, creative thinking, mathematics, reading, scientific inquiry, problem-solving, digital citizenship, and global citizenship were rated high. Of these attributes, the graduates verbally expressed math skills, critical thinking, writing, verbal communication, and reading comprehension as among the most important.

The alignment of data connected to critical thinking, creative thinking, mathematics, reading, scientific inquiry, problem-solving, digital citizenship, and global citizenship are among the most specific qualities that have been integrated within the current CTE programs. The high school teachers were able to identify the attribute

qualities being a part of their instruction. Community college instructors and CTE employers confirmed observation of the qualities within their CTE graduate participants, and CTE graduates confirmed the usage and further acquisition of the attribute qualities.

The next theme in reference to the first research question is focused on weakness among health awareness, world language, and financial mastery. Each of these attributes is represented as being part of the North Carolina future ready graduate. In all four groups of data, the three attributes were persistently represented with no or minimal achievement. In focus group interviews, the high school CTE teachers did reference financial instruction being emphasized in only finance courses such as principles of finance. When the attributes were mentioned in the other group interviews, no meaningful discussion occurred.

**Research Question 2: What Strategies Are in Place Within the District to Ensure That Program Objectives Align With Workforce Needs?**

The second research question represents the input component of the CIIP model. Its evaluation required data associated with the practice of learned objectives within a workplace setting or replicated environment. To answer this research question, I focused on the present strategies between CTE high school teachers and local CTE employers. Themes that emerged from the data included access to the workplace and purposeful partnerships.

Access to the workplace is a theme that developed from the section pertaining to work-based learning. This section contains criterion statements that involve students having access to work-based learning and the ability of teachers to closely supervise the experiences. Without access to work-based experiences, it is impossible to be

knowledgeable of workforce needs. At the same time, teachers need to be active participants of work-based learning if they too want to stay updated on student progress and potential workforce needs. All but just over 6% of the district had some type of achievement in work-based learning experiences. Half of the surveyed teachers within the district identified having achievement in their ability to supervise the experiences closely. Similarly, it is important that CTE employers are able to collaborate with CTE teachers. They were asked about their collaboration with CTE teachers on work-based learning experiences, and 60% identified a degree of achievement. The data from teachers and employers illustrate similar findings on the progress of work-based collaboration being a successful strategy to align program objectives and workforce needs.

The theme of purposeful partnerships focuses on strategies connected to partnerships and supporting program objectives and workforce needs alignment. Based on findings connected to partnerships, the majority of applicable high school CTE teachers identified there to be a structured approach to coordinating partnerships, and an even higher percentage identified that the partnerships drive the objectives connected to workforce skill demands. From the employer perspective, the survey presented similar statements. The employers reflected on their formed partnerships with the CTE program and their opportunity to provide feedback through the partnerships. I coined “purposeful” partnerships to focus on the feedback component. Feedback is a key strategy to aligning the program objectives and workforce needs. Employers illustrated 60% of achievement in providing work-based experience. There are also data that suggest leveled achievement in forming collaboration with the learning experiences. In both focus group interviews with teachers and employers, the topic of purposeful partnerships was discussed. Both

sides insisted they were not fully accomplished in this area.

Inevitably, high school CTE students are able to access the workplace through internships, apprenticeships, and job shadowing opportunities; however, students just entering the workplace do not represent an alignment with program objectives and workforce needs. Important contributors to this research question involve the district being persistent with their teachers having access to supervise and monitor the student interactions, forming collaboration opportunities for CTE high school teachers and employers, and producing partnerships with a feedback component to drive the objectives connected to workforce skill demands.

**Research Question 3: How Are Specific CCR Skills Exhibited During and After CTE Classes?**

The third research question within this study represents the process component of the CIIP model. It goes beyond the identified strategies and alignment to focus on the usage of skills within the program and beyond. The two themes that emerged from the data to support the research question are a continuation of skill usage and workplace blending.

A continuation of skill usage indicates that data and focus group interviews portray a sense of CCR skill continuation from the high school CTE level to employment. The same attributes were used to create each of the surveys. Looking specifically at the category of sequencing and articulation, the data from high school teachers identify achievement towards sequences of courses, postsecondary credentials, and coordination with broader career pathway systems. Programs that contain sequenced courses allow for students to continue practicing their learned CCR skills and evolve them into more

advanced ones. The earning of postsecondary credentials suggests that the learned skills are transferrable into the workforce. Lastly, when a program of study is coordinated with broader career pathways, it again means that developed skills from the CTE program can be further used and adapted to support success in varying careers. Furthermore, CTE employer data support 100% achievement in their employees possessing postsecondary credentials. These data are supportive claims of high school success transitioning to postsecondary success and then being used to fulfill a career. Throughout this entire sequence, parallel skills would have been displayed. More important information pertaining to a continuation of skill usage is identified within the collected student data pertaining to sequencing and articulation. All applicable students identified their experience with a sequence of courses within their program and being prepared for postsecondary opportunities. Again, the continuation of courses leading to preparedness for postsecondary opportunities shows a correlation between CCR skills within a CTE program being exhibited during the classes and after their conclusion.

The theme of workplace blending provides points of specific CCR skills being practiced through facilities, equipment, technology, and materials. Each of the four groups of respondents was asked to provide feedback relating to the alignment and student familiarity with workplace resources throughout the CTE program and into their future workplace. Approximately 88% of CTE high school teacher respondents were able to achieve a similar replication of workplace facilities and equipment. Of applicable community college instructors, 100% agreed that the graduates of high school programs are familiar with the workplace environment that they are able to replicate through their facilities and equipment. The CTE graduates presented 100% achievement when

identifying the facilities within their CTE program matching workplace practice, the equipment within their CTE program matching workplace practice, and the technology used within their CTE program matching current workplace practice. Finally, the CTE employers identified 80% achievement towards their hired CTE graduate being familiar with the workplace environment. These data combined present findings towards certain skills with facilities and equipment being exhibited during and after CTE completion. If there was no evidence of this, data would not be able to support transferring achievement within facilities, equipment, technology, and materials across respondent groups.

Based on survey results, I have determined that the same attributes are consistent throughout the CTE programs and into the workforce. Data also suggest that there are other ways to ensure CCR skills are being exhibited during and after CTE classes. I first identified correlation with this thought through the continuation of skill usage to complete sequenced courses and earn postsecondary credentials. Evidence of the research question is also evident in workplace blending. When beginning at the high school level with CTE instruction occurring through replications of workplace facilities and equipment, students are able to form the necessary skills that will continue to be used at postsecondary replications and the final workplace location.

**Research Question 4: How Effective is the Studied Rural CTE Program in Preparing Students to be CCR?**

The fourth research question within this study represents the product component of the CIIP model. The product involves all components and data groups. The two themes that emerged from this question involve successful skilled workers and communication is key.

Successful skilled workers was common verbiage throughout the completion of this research and accurately depicts the current success of the local school district CTE programs. The data are clear identifiers of the current CTE program achieving consistent attainment of North Carolina future ready graduate attributes; however, I feel that the greatest achievement of skilled workers can be retrieved from the conversations that occurred with each of the focus groups. As program assessors, I really focused on the comments and dialogue from community college instructors and employers to conclude the theme. The CTE community college instructors shared that the population of students they receive is continuing to produce higher achievement in their academic understanding. They mentioned many times that all the attributes presented on the survey were exemplified by the student population at a level that promotes success. Likewise, employers spoke about how the CTE graduates they were able to retain presented a high skill level. There were no further attribute suggestions to be offered. The employers also were knowledgeable of the many opportunities CTE now offers. They are excited when the CTE graduates seek interest in their companies. Aside from just attribute achievement, it is also important to note that the district CTE program demonstrated observable success through data across all 12 elements from the NACTE framework.

Communication is key emerged as a theme to identify a current weakness within the local school district CTE programs. Communication and overall collaboration were weaknesses among all four of the groups. It is evident in survey data and was discussed in each of the focus group interviews. CTE high school teachers responded with their highest percentages of nonachievement in the statements connected to collaboration between secondary and postsecondary success, CTE and other core academic staff

collaborating to coordinate curriculum objectives, and CTE teachers connecting with employers during work-based learning opportunities. Similarly, in the focus group interview, teachers expressed concern with the communication component. They shared that their one meeting each year only involves the CTE teachers within the district. During this meeting, no community college instructors or employers are present. The teachers felt that many of their programs are funneling into the community college programs. Input from instructors at this level would be beneficial. Furthermore, employer communication is also not present. The high school CTE teachers understand that jobs are shifting and changing; but without communication, a clear objective is hard to obtain.

Based on CTE community college instructors, the perspective is the same. There was no criterion statement connected to communication, but discussion did occur on the topic during their interview. The instructors quickly identified that the lack of communication was believed to be causing them to lose students. With the declining enrollment, the instructors identified connections and relationships as major ingredients in retaining students within the programs. This involves a closer connection to both CTE students and the CTE high school teachers.

At the same time, with industries driving the programs, there must be a strong connection to the employers. The local CTE employers also agreed with having a stronger communication line. Their data show a high percentage of no achievement with formed partnerships with CTE programs, collaborating with CTE teachers, and communicating data to the CTE programs. Employers expressed their interest in hiring CTE graduates. They would like to schedule more student tours within their companies and become more known as locations that are focused on receiving the graduates as their

future employers. Lastly, student input towards overall communication aligned with the other groups. Their highest level of nonachievement statements involved having contact with business partnerships since graduating and having representatives from local businesses present in their CTE classes. In the focus group interview, students all agreed that business representation within their program was minimal. They did not feel a sense of recruitment to an employer. The graduates also referenced the benefit of having community college instructors presenting within their high school programs. This would allow for questions to be answered and further interest to be created.

## Implications for Practice

Conley (2012) provided four keys to the identification of essential CCR skills. The categories included content knowledge, learning skills and techniques, transition knowledge and skills, and cognitive strategies. Each of these keys can be connected to the collected data that were framed using the 17 attributes of a North Carolina future ready graduate and the 12 elements from the NACTE framework. Combined, these components of a CTE program assess guidelines and monitor workforce preparation.

### *Key Cognitive Strategies*

When considering the way students think and produce their work, you are considering their key cognitive strategies (Conley, 2012). The data focused specifically on student critical thinking and creative thinking skills in this section, both of which relate to a standards-aligned and integrated curriculum. When considering critical thinking, there is a learning capacity that students must possess. It involves knowledge of a subject being translated into a reflective capacity (Piergiovanni, 2014). Educational experiences from program sequencing and articulation can help build this skill in CTE, as

data suggest that its offerings of sequenced courses across secondary and postsecondary education. No urgent concerns were related to critical thinking in this study. Continued hands-on, writing, and reflective experiences should be incorporated to sustain the critical thought process for CTE students (Piergiovanni, 2014). Similarly, creative thinking is the leading factor towards innovation (DiYanni, 2015). Data show that student creativity is best displayed in the CTE program within a group setting. Building this skill develops reasonable thinkers who are able to reach deeper understandings. The CTE programs should consider perspectives to build this skill. Going back to research from DiYanni (2015), perspectives are key. Employer perspectives, consumer perspectives, and employee perspectives are examples on which CTE can reflect.

### *Key Content Knowledge*

Key content knowledge is the foundational core content understanding that enables students to retain their learning and build further connections. The knowledge and skills connected to career aspirations are also included within this area (Conley, 2012). Being a proficient reader, a skilled mathematician, a health-focused lifelong learner, and multilingual are all subject area skills that were assessed in the data (English et al., 2018). A proficient reader and a skilled mathematician are both areas of the research considered adequate; however, when focusing on the creation of competitive workers, adequate must be improved. The areas of health-focused lifelong learner and multilingual had much lower percentages of achievement. The key here is integration. Based on researched literature, the best action for improving the integration of content knowledge into CTE programs is through fostering a community of practice between CTE and regular academic teachers (Pearson, 2015). The type of community described

here is one that was specifically identified by CTE high school teachers as being absent. It is a type of collaboration that increases relevance and rigor. As for reading, Perin and Holschuh (2019) offered guidance towards incorporating main idea identification, vocabulary improvement, and operational reading through materials students find useful. Other technical knowledge categories to include within this section involve facilities, equipment, technology, materials, and work-based learning. Each of these components is identified as a relevant mathematical tool. Their relevance to mathematical connection is based on the teacher's ability to evaluate their curriculum and make connections to the occupational skills related to classroom-practiced instruction (Rittle-Johnson et al., 2015). World language and health focuses are most challenging. We must not overlook the cultural component of world language. Bilingualism is not a feasible achievement by all students; however, the incorporation of cultural components within a program may continue to motivate students towards world languages. Comparably, health studies may be hard to achieve in a CTE program; however, exercises and specific health-related instruction are not required. Students should leave the program with better health behaviors and a better focus on life (Eriksen et al., 2020). Employment safety and potential mental challenges may be discussed.

### *Learning Skills and Techniques*

Learning skills and techniques incorporates the two categories of ownership towards student learning and specific learning techniques (Conley, 2012). Specific skills connected to data collection include effective problem solver, capable technology user, and self-directed responsible worker (English et al., 2018). The greatest success among these skills was identified as a capable technology user. This was a strong reminder of

how today's students are members of the digital society (Ribble, 2015). The important thing here is that teachers and instructors stay current on their technological skills and understanding. Effective problem solver and self-directed worker did not present identified issues within the study. A self-directed responsible worker can be connected to components of student career development, as it focuses on ownership of planning responsibility and self-improvement. Other references can be made towards student assessment and engaging instruction. Assessment has a lot to do with students communicating their understanding of learned objectives. Written communication was identified as the greatest concern among all forms of communication. Sentence structure, spelling, and punctuation have been identified as important components within the postsecondary setting. Moore and Morton (2017) referenced CTE programs focus their writing assignments on brevity and concision. This may be accomplished through daily journals.

### *Key Transition Knowledge and Skills*

Key transition knowledge and skills are all about the transition after high school. This type of knowledge and skills is not often accessible to all students (Conley, 2012). For this specific study, it was connected to what CTE has to offer its students. A financially literate citizen and strong relationship builder were attributes relevant to the data collection in this section. A financially literate citizen is able to voyage through the complicated financial market (Hicks, 2013). The current CTE program did not have high acknowledgment in this area. Simple connections to salary opportunities and financial management serve students well in their future endeavors. Integration of some type of financial component is recommended.

Strong relationship builder has a lot to do with success. Students appeared to have strong relationships with one another. Their common goal made work completion obtainable. Similarly, this was true among all research groups. CTE high school teachers, CTE community college instructors, CTE local employers, and CTE graduates all presented communities of silos. Their relationships with each other were purposeful and successful; however, there were identified issues with communication and strong relationships outside of the research group. Researched literature reiterated the interaction opportunities among CTE programs. Apprenticeships, school field trips, community college cooperation, industry visits, and job shadowing are all examples of the research groups interacting together (NCDPI, 2019). As Scarnati (2001) referenced, a rowing team is a great example of teamwork, and currently, the CTE program is not rowing together. To support more connection and stronger relationships, a district CTE team could be proposed. Members could include individuals from the high school, community college, employer, and graduate levels. The CTE program must emphasize network creations and lifelong connections. Other categories to reference here include access and equity and work-based learning.

**Recommendations for Further Study**

When considering recommendations for future study, I consider it relevant to focus on the aspects of the research that could further assess the functioning of a CTE program. This study has been successful with its focus on a single school system CTE program. There has been success towards answering the posed research questions, identifying strengths, and identifying weaknesses. One recommendation includes the involvement of other similar districts with which to make comparisons. These additional

studied districts should share similar demographics and experiences for their program users. Having another district to compare data with would be very beneficial to the presentation of findings. If the districts shared varying strengths and weaknesses, it would be beneficial to closely examine why and what specific measures are in place to promote the successes.

Another recommendation for further study includes the addition of a perspective from program participants who do not complete the high school CTE programs. I feel these individuals may be able to provide more information about program weaknesses. As the study is presented now, we only are provided with the perspective of program completers. Those students who were not able to complete any given program have a story to tell as well. It may be linked to a disconnect with the content, a change in career focus, a loss of interest, or simply the inability to complete a given course. No matter the reason, these individuals may be able to provide further relevant data.

**Limitations**

There were limitations connected to this research study. The limitations included access to participants and potential researcher bias. It is important to note that this study was completed during the COVID-19 pandemic. Schools were shut down beginning March 16, 2020, and many businesses shut down for a period of time soon after. North Carolina public schools did not return to class until the 2020-2021 school year. The researched school district began the school year remotely, transitioned to an A/B rotation, and finally went back at full capacity. The changes in the school schedule affected instruction and student opportunities. Remote learning showed to have minimal impact on student learning, while many of the restrictions kept students from being able to

complete certain program objectives. I mention these details to help support the limitation claim towards access to strong participants. Until recently, outside visitors were not being invited into schools and businesses to help cut back on potential contact; therefore, emailed surveys and Zoom focus group interviews were used to collect data. Having to complete all participant contact through virtual processes made communication difficult. It also made respondents more easily overlooked. As for researcher bias, I am an employee of the researched school district. I have been employed by the district for the last 5 years; however, I am not a representative of the CTE department.

**Delimitations**

When considering delimitations, I chose to only use a single geographic sample. This research only involved a single school district. Having just one geographic sample restricted access towards assessing other school districts with similar CTE program opportunities. When considering similar CTE experiences, references may be made towards school districts that offer similar programs, have easy access to postsecondary educational opportunities, and present a local economy with aligning CTE jobs; however, for this program evaluation, I elected to only focus on the studied district.

**Summary of the Study**

It is no secret that education must continue to make adaptations and revisions to stay current with the changing world. Advancements in technology, production, and engineering have created a higher demand for skilled workers. Much of the demand is present in the technical fields. The global competition is too strong for high school graduates to be lacking any CCR abilities; therefore, CTE programs must be well adapted to the current employee traits and skill development facing our current labor market.

Today's CTE programs can take many forms depending on the institutions that design them and the populations they serve (Beal et al., 2018).

This study examined a local CTE's role in bridging the current skills gap and growing student CCR skills. The NCWorks Commission (2018) provided evidence of the skills gap. The highest reportable weaknesses included employability, number of applicants, work experiences, technical skills, soft skills, and education (NCWorks Commission, 2018). The studied district's CTE programs must mesh with real-world opportunities (Northern & Petrilli, 2019). Their success can be strong indicators of economic prosperity within communities that are not filled with big business opportunities. Through the findings of this study, the researcher intended to research and assess the current CTE program within a rural county in North Carolina. Research conclusions hoped to guide the program towards being more effective in creating student graduates who are prepared for success within the current workforce.

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# Appendix

## Quantitative Surveys

## Table A1

# CTE High School Graduate Survey

**Use the following descriptions to help you choose the most appropriate rating to match the criterion.**

**0 – (Not at all achieved)** There is no evidence of the criterion statement.

**1 – (Minimally achieved)** There is minimal evidence of the criterion statement. For example, implementation may have just begun, implementation was very irregular, or implementation was only to a small portion of students.

**2 – (Moderately achieved)** There is evidence of the criterion statement occurring throughout the program. Evidence occurred monthly.

**3 – (Substantially achieved)** There is strong evidence of the criterion statement. Implementation is evident on a regular and constant basis to all students within the program. Evidence occurs at least weekly.

**N/A – (Not Applicable)** Criterion statement is not applicable to me.

| **CTE HIGH SCHOOL GRADUATE SURVEY**<br>**Standards-aligned and Integrated Curriculum** | | | | | |
|---|---|---|---|---|---|
| **Criterion Statement** | **0**<br>**Not at all achieved** | **1**<br>**Minimally achieved** | **2**<br>**Moderately achieved** | **3**<br>**Substantially achieved** | **(N/A)**<br>**Not Applicable** |
| I found that my CTE instruction offered opportunities that promote the development of my critical thinking skills | | | | | |
| My CTE classes expected me to think creatively to form new ideas. | | | | | |
| CTE provided opportunities for me to use reading skills to learn the material. | | | | | |
| Components of math practice were found within my CTE courses. | | | | | |
| My CTE courses required the practice of inquiry, or explanations based on found evidence. | | | | | |
| My health and well-being during the transition after graduation was discussed in my CTE courses. | | | | | |
| Problem-solving techniques were necessary when solving problems in my CTE courses. | | | | | |
| My CTE instructors emphasized the importance of being a good digital citizen. (Responsible user of Technology). | | | | | |
| Finances were a component of my CTE instruction. | | | | | |
| After completing CTE courses, I felt that I was a more knowledgeable and global citizen. | | | | | |
| My CTE teachers referenced the importance of world language classes. | | | | | |
| **Sequencing and Articulation** | | | | | |
| I experienced a sequence of courses within my CTE program. (I.E. Level 1, Level 2, Level 3) | | | | | |

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| Opportunities were provided to research beyond the direct instruction for additional information. | | | | | |
| I was prepared for postsecondary educational opportunities. | | | | | |
| **Student Assessment** | | | | | |
| Opportunities to verbally share my CTE content understanding were provided. | | | | | |
| Opportunities to write about my CTE content understanding were provided. | | | | | |
| During group projects, my CTE instructor ensured that all members were active participants. | | | | | |
| Classroom assessments were aligned with content being taught by the teacher. | | | | | |
| **Prepared and Effective Program Staff** | | | | | |
| My CTE teachers were knowledgeable of the content they were teaching. | | | | | |
| Building relationships was an expectation of my CTE teachers. | | | | | |
| **Engaging Instruction** | | | | | |
| In my CTE courses, I felt that I was responsible for my learning. | | | | | |
| I feel that the instruction provided by my CTE teachers met my personal needs. | | | | | |
| **Access and Equity** | | | | | |
| Tutoring services were provided in my CTE program. | | | | | |
| The Career and Technical Education classes that I was interested in were available to me. | | | | | |
| **Facilities, Equipment, Technology, and Materials** | | | | | |
| The facilities used within the CTE program matched current workplace practice. | | | | | |
| The equipment used within the CTE program matched current workplace practice. | | | | | |
| The technology used within the CTE program matched current workplace practice. | | | | | |
| I had the equipment needed to be successful in my CTE program. | | | | | |
| The CTE teacher referenced safety guidelines. | | | | | |
| **Business and Community Partnerships** | | | | | |
| Representatives from local businesses presented in my CTE classes. | | | | | |
| I received some evaluation from my work-based learning experiences. | | | | | |
| Since graduating, I have had contact with business representatives that I met while taking CTE Courses. | | | | | |
| **Student Career Development** | | | | | |
| I feel that my CTE instruction prepared me for a postsecondary career opportunity. | | | | | |
| I was supported when updates were needed for my Career Plan. | | | | | |

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| **Career and Technical Student Organizations** | | | | | |
| A CTE Student Organization was available for me to participate in. | | | | | |
| **Work-Based Learning** | | | | | |
| Work-based learning experiences were offered in my CTE program. (Job shadowing, internships, apprenticeships, etc.) | | | | | |
| The work-based learning experiences were aligned with my classroom instruction. | | | | | |
| The work-based learning experiences were aligned with my career goals. | | | | | |
| **Data and Program Improvement** | | | | | |
| Data from classroom learning was shared with me. | | | | | |
| Data collected from my work-based learning was shared with me. | | | | | |
| **If you are willing to participate in a focus group consisting of other CTE High School Graduates to explore the topics in this survey further, please click the link below to provide your name and contact information. No identifying information will be connected to your survey responses.** | | | | | |
| **Use this Link to provide Contact Information for your participation in the focus group** | | | | | |

## Table A2

# CTE High School Teacher Survey

**Use the following descriptions to help you choose the most appropriate rating to match the criterion.**

**0 – (Not at all achieved)** There is no evidence of the criterion statement.

**1 – (Minimally achieved)** There is minimal evidence of the criterion statement. For example, implementation may have just begun, implementation was very irregular, or implementation was only to a small portion of students.

**2 – (Moderately achieved)** There is evidence of the criterion statement occurring throughout the program. Evidence occurred monthly.

**3 – (Substantially achieved)** There is strong evidence of the criterion statement. Implementation is evident on a regular and constant basis to all students within the program. Evidence occurs at least weekly.

**N/A – (Not Applicable)** Criterion statement is not applicable to me.

| **CTE HIGH SCHOOL TEACHER SURVEY**<br>**Standards-aligned and Integrated Curriculum** | | | | | |
|---|---|---|---|---|---|
| **Criterion Statement** | **0**<br>**Not at all achieved** | **1**<br>**Minimally achieved** | **2**<br>**Moderately achieved** | **3**<br>**Substantially achieved** | **(N/A)**<br>**Not Applicable** |
| Curriculum is based on industry-validated technical standards and competencies. | | | | | |
| My instruction integrates critical thinking. | | | | | |
| My instruction provides opportunities for students to think creatively. | | | | | |
| My instruction is aligned with relevant content and standards in the core subject area of reading. | | | | | |
| My instruction is aligned with relevant content and standards in the core subject area of math. | | | | | |
| My instruction requires the practice of inquiry, or explanations based on found evidence. | | | | | |
| Health and well-being during the transition after graduation was discussed in my CTE courses. | | | | | |
| My instruction provides opportunities for students to practice their problem-solving abilities. | | | | | |
| As a CTE teacher, I emphasize the importance of being a good digital citizen (Responsible user of Technology). | | | | | |
| Finances were a component of my CTE instruction. | | | | | |
| After completing my CTE courses, students should represent a more knowledgeable and global citizen. | | | | | |
| The importance of world language classes was discussed in my CTE classes. | | | | | |
| **Sequencing and Articulation** | | | | | |
| The program of study includes a sequence of courses across secondary and postsecondary education. | | | | | |
| The program of study leads to postsecondary credentials. | | | | | |
| There is collaboration between secondary and postsecondary CTE staff. | | | | | |

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| The program of study is coordinated with broader career pathway systems. | | | | | |
| **Student Assessment** | | | | | |
| Verbal assessments of content understanding are provided to my students. | | | | | |
| Writing assessments of content understanding are provided to my students. | | | | | |
| During group projects, I ensure that all group members are active participants. | | | | | |
| Formative and summative assessments are aligned with content to validate student learning. | | | | | |
| Assessments provide information on student attainment of employability skills. | | | | | |
| **Prepared and Effective Program Staff** | | | | | |
| As CTE staff, I meet the appropriate state and district certification and licensure requirements. | | | | | |
| As CTE staff, I engage in ongoing professional development that is related to Career and Technical Education. | | | | | |
| CTE and other core academic staff collaborate to coordinate curriculum objectives. | | | | | |
| **Engaging Instruction** | | | | | |
| The educational environment builds a culture of learning. | | | | | |
| Instruction throughout the program of study is driven by content area standards. | | | | | |
| Instruction connects both academic and technical knowledge and skills. | | | | | |
| Instruction incorporates relevant equipment. | | | | | |
| Instruction is differentiated to meet the needs of a diverse student population. | | | | | |
| **Access and Equity** | | | | | |
| The program of study is promoted to all available participants. | | | | | |
| Career guidance is provided to all participants. | | | | | |
| Necessary equipment is provided to all participants. | | | | | |
| Underrepresented student populations are recruited for participation. | | | | | |
| Tutoring services are provided to all participants. | | | | | |
| **Facilities, Equipment, Technology, and Materials** | | | | | |
| Current workplace environments are replicated through facilities and equipment. | | | | | |
| Facilities and equipment align with curriculum standards. | | | | | |
| Student safety is demonstrated through appropriate use of facilities and equipment. | | | | | |
| Regular inspection of facilities and equipment are conducted. | | | | | |
| **Business and Community Partnerships** | | | | | |

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| Partnerships are formed with a diverse range of stakeholders. | | | | | |
| The program has a structured approach to coordinating partnerships. | | | | | |
| Partnerships drive objectives connected to workforce skill demands. | | | | | |
| **Student Career Development** | | | | | |
| Career development is coordinated to support student career decision-making. | | | | | |
| Career ambitions are discussed with CTE students. | | | | | |
| Student guardians are provided with information towards work-based learning opportunities. | | | | | |
| **Career and Technical Student Organizations** | | | | | |
| Career and Technical Student Organizations are an integral part of the program of study. | | | | | |
| Organization activities reinforce technical education knowledge. | | | | | |
| Organization activities reinforce employability skills. | | | | | |
| **Work-Based Learning** | | | | | |
| Work-based learning experiences are accessible to every student within the program of study. | | | | | |
| The work-based learning experiences are aligned with classroom instruction. | | | | | |
| The work-based learning experiences are aligned with individual student career goals. | | | | | |
| As a CTE teacher, I closely supervise student learning experiences within work-based learning opportunities. | | | | | |
| **Data and Program Improvement** | | | | | |
| I understand the value of data collection. | | | | | |
| I have access to the data of students who are enrolled in my program of study. | | | | | |
| Data is shared with students. | | | | | |
| Collected data supports student success within the program. | | | | | |
| **If you are willing to participate in a focus group consisting of other CTE High School Teachers to explore the topics in this survey further, please click the link below to provide your name and contact information. No identifying information will be connected to your survey responses.** | | | | | |
| **Use this Link to provide Contact Information for your participation in the focus group** | | | | | |

## Table A3

# CTE Community College Instructor Survey

**Use the following descriptions to help you choose the most appropriate rating to match the criterion.**

**0 – (Not at all achieved)** There is no evidence of the criterion statement.

**1 – (Minimally achieved)** There is minimal evidence of the criterion statement. For example, implementation may have just begun, implementation was very irregular, or implementation was only to a small portion of students.

**2 – (Moderately achieved)** There is evidence of the criterion statement occurring throughout the program. Evidence is represented by 75% of population.

**3 – (Substantially achieved)** There is strong evidence of the criterion statement. Evidence is represented by 100% of population.

**N/A – (Not Applicable)** Criterion statement is not applicable to me.

| **CTE COMMUNITY COLLEGE INSTRUCTOR SURVEY**<br>**Standards-aligned and Integrated Curriculum** | | | | | |
|---|---|---|---|---|---|
| **Criterion Statement** | **0**<br>**Not at all achieved** | **1**<br>**Minimally achieved** | **2**<br>**Moderately achieved** | **3**<br>**Substantially achieved** | **(N/A)**<br>**Not Applicable** |
| Graduates of high school CTE programs are able to think critically. | | | | | |
| Graduates of high school CTE programs are able to think creatively. | | | | | |
| Graduates of high school CTE programs have relevant content knowledge in the core subject area of reading. | | | | | |
| Graduates of high school CTE programs have relevant content knowledge in the core subject area of math. | | | | | |
| Graduates of high school CTE programs are able to provide explanations based on found evidence. | | | | | |
| Graduates of high school CTE programs are able to problem-solve effectively. | | | | | |
| Graduates of high school CTE programs are good digital citizens (Responsible users of Technology). | | | | | |
| Graduates of high school CTE programs have a financial understanding. | | | | | |
| Graduates of high school CTE programs are knowledgeable and global citizens. | | | | | |
| Graduates of high school CTE programs are knowledgeable of their personal health and well-being | | | | | |
| Graduates of high school CTE programs are knowledgeable of world languages. | | | | | |
| **Sequencing and Articulation** | | | | | |
| The program of study includes a sequence of courses. | | | | | |
| The program of study is coordinated with broader career pathway systems. | | | | | |
| **Student Assessment** | | | | | |

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|---|---|---|---|---|---|
| Graduates of high school CTE programs are confident with verbal assessments of content understanding. | | | | | |
| Graduates of high school CTE programs are confident with written assessments of content understanding. | | | | | |
| Graduates of high school CTE programs are active participants within group projects. | | | | | |
| **Engaging Instruction** | | | | | |
| Graduates of high school CTE programs are successful in both academic and technical knowledge and skills. | | | | | |
| Graduates of high school CTE programs are competent users of necessary equipment. | | | | | |
| **Access and Equity** | | | | | |
| Graduates of high school CTE programs represent a diverse student population. | | | | | |
| **Facilities, Equipment, Technology, and Materials** | | | | | |
| Graduates of high school CTE programs are familiar with the workplace environments that are replicated through facilities and equipment. | | | | | |
| Graduates of high school CTE programs demonstrate safety in their practices. | | | | | |
| **Student Career Development** | | | | | |
| Graduates of high school CTE programs continue to follow a personalized education/career plan. | | | | | |
| **Work-Based Learning** | | | | | |
| Graduates of high school CTE programs have had experience with work-based learning. | | | | | |
| **If you are willing to participate in a focus group consisting of other CTE Community College Instructors to explore the topics in this survey further, please click the link below to provide your name and contact information. No identifying information will be connected to your survey responses.** | | | | | |
| **Use this Link to provide Contact Information for your participation in the focus group** | | | | | |

## Table A4

# CTE Local Employer Survey

**Use the following descriptions to help you choose the most appropriate rating to match the criterion.**

**0 – (Not at all achieved)** There is no evidence of the criterion statement.

**1 – (Minimally achieved)** There is minimal evidence of the criterion statement. For example, implementation may have just begun, implementation was very irregular, or implementation was only to a small portion of students.

**2 – (Moderately achieved)** There is evidence of the criterion statement occurring throughout the program. Evidence occurred monthly.

**3 – (Substantially achieved)** There is strong evidence of the criterion statement. Implementation is evident on a regular and constant basis to all students within the program. Evidence occurs at least weekly.

**N/A – (Not Applicable)** Criterion statement is not applicable to me.

| **CTE LOCAL EMPLOYER SURVEY** | | | | | |
|---|---|---|---|---|---|
| **Standards-aligned and Integrated Curriculum** | | | | | |
| **Criterion Statement** | **0 Not at all achieved** | **1 Minimally achieved** | **2 Moderately achieved** | **3 Substantially achieved** | **(N/A) Not Applicable** |
| Graduated CTE student employees demonstrate critical thinking skills. | | | | | |
| Graduated CTE student employees demonstrate the ability to think creatively. | | | | | |
| Graduated CTE student employees demonstrate necessary reading abilities. | | | | | |
| Graduated CTE student employees demonstrate necessary math abilities. | | | | | |
| Graduated CTE student employees demonstrate knowledge of their personal health and well-being. | | | | | |
| Graduated CTE student employees demonstrate problem-solving abilities. | | | | | |
| Graduated CTE student employees demonstrate being responsible users of technology. | | | | | |
| Graduated CTE student employees demonstrate being financially literate. | | | | | |
| Student employees demonstrate being a knowledgeable and global citizen. | | | | | |
| Graduated CTE student employees demonstrate a world language understanding. | | | | | |
| **Sequencing and Articulation** | | | | | |
| Graduated CTE student employees possess postsecondary credentials. (Ex. Certificates) | | | | | |
| There is collaboration between high school CTE staff and my business. | | | | | |
| **Student Assessment** | | | | | |
| Graduated CTE student employees demonstrate an ability to verbally speak their understanding of assigned tasks. | | | | | |
| Graduated CTE student employees demonstrate an ability to physically write about their understanding of assigned tasks. | | | | | |
| Graduated CTE student employees are active participants in group work assignments. | | | | | |
| Graduated CTE student employees are assessed on their ability to perform given tasks. | | | | | |

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| **Prepared and Effective Program Staff** | | | | | |
| Graduated CTE student employees meet certification and licensure requirements. | | | | | |
| **Engaging Instruction** | | | | | |
| Graduated CTE student employees are expected to apply technical knowledge to complete tasks each day. | | | | | |
| Graduated CTE student employees are expected to apply academic knowledge to complete tasks each day. | | | | | |
| **Access and Equity** | | | | | |
| Current local graduated CTE applicants represent a diverse population. | | | | | |
| **Facilities, Equipment, Technology, and Materials** | | | | | |
| Upon being hired, graduated CTE student employees are familiar with the workplace environments. | | | | | |
| **Business and Community Partnerships** | | | | | |
| I have formed a partnership with the high school CTE program. | | | | | |
| Partnerships have provided opportunities for me to provide feedback to CTE programs. | | | | | |
| **Work-Based Learning** | | | | | |
| As a CTE workplace, we provide work-based learning experiences for CTE students. | | | | | |
| As a CTE workplace, I am able to collaborate with CTE teachers on work-based learning experiences. | | | | | |
| **Data and Program Improvement** | | | | | |
| As a CTE workplace, I provide data related to workforce needs with CTE programs. | | | | | |
| While providing work-based learning experiences, I am asked to provide data on students. | | | | | |
| **If you are willing to participate in a focus group consisting of other CTE Employers to explore the topics in this survey further, please click the link below to provide your name and contact information. No identifying information will be connected to your survey responses.** | | | | | |
| **Use this Link to provide Contact Information for your participation in the focus group** | | | | | |