

IMPROVING POST-SECONDARY COLLEGE AND CAREER AWARENESS AND
READINESS AT A RURAL CAREER AND TECHNICAL CENTER IN NORTHERN
VIRGINIA

by

Janet Lynn Pack

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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ABSTRACT

The purpose of this applied study was to solve the problem of a lack of post-secondary college and career awareness and readiness among students in a rural Career and Technical Education (CTE) center in Northern Virginia and to formulate a solution to address the problem. The central research question was “How can the problem of a lack of post-secondary college and career readiness (CCR) and awareness among students be solved at a rural CTE Center in Northern Virginia?” The researcher used a multimethod design consisting of both qualitative and quantitative approaches. The first approach was semi-structured interviews using open-ended questions with administrators. The second approach was a focus group consisting of business leaders. The third approach was a closed-ended survey with CTE students. The researcher used an inductive thematic analysis approach to analyze the interviews and six stages of analysis was used: orientation to the data, identification of themes, examining the themes, formulating and assignment of themes, and composing the results (Braun and Clarke, 2013). Five themes emerged from the coded interviews with administrators and four themes emerged from the interview of a focus group. A CTE student survey was conducted, data was analyzed to generate descriptive statistics of minimum, maximum, mean and standard deviation. Descriptive statistics aided in the development of a solution to the problem of a lack of CCR and awareness. Universal themes that emerged were students’ lack of soft skills, the need for students to be CCR when they graduate, the necessity for parents to be involved in CCR and awareness, a demand for increased partnerships between schools and businesses, and the need to integrate academics and CTE to provide application and context. These themes align with prior empirical research data.

Keywords: college and career readiness, Career and Technical Education, rural, careers, post-secondary education, partnerships, distributed leadership, and social learning theory.

Dedication

This dissertation is dedicated to my family. I thank my husband and adult children who helped with day-to-day operations of the home and encouraged me throughout this journey. In fact, they told me that quitting was not an option. I thank my parents who taught me from an early age that I could do anything I put my mind to and were my cheerleaders throughout my education. A special dedication is to my dad who did not complete school because his mother died, and he had to help on the farm at a very early age. He died before I was able to finish my dissertation. He was so proud of me, and I wish he was here to see me finish. Dr. Dotson reminded me that he is cheering me on from heaven. I dedicate this dissertation to my large family of siblings, in-laws, aunts, uncles, nieces, nephews, and cousins for their encouragement. I hope the completion of my dissertation is an encouragement to all of them.

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The only way I would have met this milestone is through Christ. He is my deliverer. I do believe God has great plans for me because of the unbelievable challenges I have faced during my dissertation journey. I am grateful that God chose me and for all His blessings and refinement. I thank God for the people he led to me in my walk with Christ and helped me to want to become more like Christ. I thank God I chose Liberty University to pursue my doctoral studies.

I thank my parents for always believing in me and encouraging me every step of the way. My dad and my mom have shared with me repeatedly how proud they are of me. They told me I could do it. I thank God for giving me wonderful parents. I could not have picked any better. I am grateful for their strong work ethic, positivity, and unconditional love. These are traits impressed upon me and I hope to sustain them throughout my life.

I want to thank my husband, son, and daughter for their support and not letting me quit when I was weary from trials. Mark, Zachary, and Hannah, you are the reason I work hard to provide a good life and example. I love my large family. We celebrate each other's accomplishments and share a deep love and closeness that not all families share, and I am who I am because of them. I want to thank my sister-in-law and best friend, Melissa De-Domenico Payne for being my editor. Her friendship, encouragement, and love make this life sweeter. I want to thank Dr. Dotson, my chair, and Dr. Pritchard for their support and encouragement throughout the dissertation process. Dr. Dotson encouraged, supported, and helped me all along the way. Thank you, Dr. Dotson, for believing in me. Dr. Dotson has been an example of a person that I would like to emulate and become more like Christ.

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List of Abbreviations

Advanced Placement (AP)

Association of Career and Technical Education (ACTE)

Career and Technical Education (CTE)

College and Career Readiness (CCR)

Distributed Leadership (DL)

English Language Learners (ELL)

Every Student Succeeds Act (ESSA)

Grade Point Average (GPA)

National Center for Education Statistics (NCES)

Portrait of a Graduate (POG)

Professional Learning Community (PLC)

Project-Based Learning (PBL)

Science, Technology, Engineering, and Math (STEM)

Social Learning Theory (SLT)

Students with Disabilities (SWD)

The Strengthening Career and Technical Education for the 21st Century Act (TSCTE)

United States Department of Education (USDOE)

Virginia Department of Education (VDOE)

Work-based Learning (WBL)

CHAPTER ONE: INTRODUCTION

Overview

The purpose of this applied study was to solve the problem of a lack of post-secondary college and career awareness and readiness among students in a rural CTE center in Northern Virginia and to formulate a solution to address the problem. The research investigated aspects of college and career awareness and readiness through the exchanges of administrators, guidance counselors, teachers, businesses, technical schools/colleges, and students through individual and focus group interviews and a survey.

Globally, there is an effort to have students become college and career ready and with it has come federal and state standards, attention to the rates of graduation, and avenues to marketable, specialized careers (Mardis, 2019). Regardless of plans after high school graduation, college or work (or a combination thereof), the academic preparation should be the same (Steedle, Radunzel, & Mattern, 2019). Today, the CTE programs at educational institutions beyond high school move more towards academics than technical skills (Steedle et al., 2019). To meet the needs of students to become globally competitive in the workforce all members of the professional learning community (PLC) must work together to provide authentic and innovative learning opportunities for our students. We must disrupt current practices in education.

Background

There is a significant need for students to graduate from high school with an awareness of careers and/or post-secondary opportunities aligned to the local labor market needs and to be college and career ready. Today, governing bodies have a discourse about readying students for success through placements in post-secondary schools and careers; however, creating success for students in real-world environments has proven to be intangible (Gonzales, Jones, & Ruiz, 2019;

Gottfried & Sublett, 2017; Kasza & Slater, 2017; Malin & Hackmann, 2017; Passarella, 2018; Plasman, Sublett & Griffith, 2019; & Valero, Reid, Dell, Stacy, Moore, & Clift, 2020). In a study of rural schools, researchers found the challenges were connected with beliefs and associations, such as belief that jobs in the rural community do not require college; desire to stay and not move away from the area; and resistance to taking advanced placement (AP) courses because this requires students to commit to the rigor and risk impact to overall grade point averages (Mokher, Lee, & Sun, 2019). The purpose of this applied study is to solve the problem of a lack of post-secondary college and career awareness and readiness among students in a rural CTE center in Northern Virginia and to formulate a solution to address the problem. The researcher found this problem while analyzing Workplace Readiness Skills Exam data over a two-year period. On average, students received lower scores on three categories of the exam and the corresponding areas as follows: (a) organizations, systems, and climates: Identifies the big picture issues and his or her role in fulfilling the mission of the workplace (63.8%), (b) lifelong learning: Continually acquires new industry-related information and improves professional skills (60%), and (c) job acquisition and advancement: Prepares to apply for a job and to seek promotion (72.31%).

The supervisor of CTE, as well as the principal of the school, gave permission to conduct the study. Students in 10th through 12th grades take CTE courses aligned with their career plans. Employing an applied design study to determine the best way to improve awareness in a stand-alone CTE center will address a current research gap. There have been movements to help better prepare students for college and careers; however, there are gaps in their preparation to transition successfully which is critical for the student to be competitive on the local, national, and global levels (Malin & Hackmann, 2017). Students require a proper direction in moving from high

school to postsecondary education as well as having the skills to complete postsecondary degrees and credentials (Malin & Hackmann, 2017). The study's central research question is how can the problem of a lack of post-secondary college and career awareness and readiness among students be solved at a rural CTE Center in Northern Virginia?

Historical Background

Since the Smith-Hughes Act of 1917, common concerns regarding CTE have remained as follows: (a) teacher shortages; (b) educators separating CTE from academic programs and competing against each other; and (c) a need for workforce experiences for students (Imperatore & Hyslop, 2017). President Roosevelt in 1936 created a team to research vocational education (Imperatore & Hyslop, 2017). The group advised there be regulations enacted to have students receive more training directly with employers. Today, school leaders focus on skill development, including both hard and soft skills and work-based learning (WBL) so students gain skills while working with employers as recommended in the 1936 Roosevelt study. The law, Every Student Succeeds Act (ESSA), forged the integration of academics with CTE (Coppes, 2016). The ESSA focused on workplace readiness and accountability, academic and CTE integration, and students receiving career services (Coppes, 2016).

The United States Department of Education (USDOE) created a model of 16 career clusters correlated to CTE courses and careers (Rosen, Visher, & Beal, 2018). The legislatures have created several acts for CTE. The Carl D. Perkins Act gave funding to each state for CTE (Rosen, Visher, & Beal, 2018). The Strengthening of Career and Technical Education (TSCTE) for the 21st Century Act passed in July 2018 and provided for an increased role for business and industry, more focus on meeting both student and employer needs, and state and local flexibility (Imperatore & Hyslop, 2017). The TSCTE 21st Century Act reauthorized Perkins V (Salmon,

2018). The TSCTE 21st Century Act reduced the federal government's involvement, decreased the education secretary's power, and banned Common Core Standards' conditions (Ferguson, 2018). Each state now has the authority to create its own objectives and strategies (Ferguson, 2018).

Social Background

In the 20th century, the focus on vocational education and socialization began with common schools, industrialization, and urbanization. The industrial revolution shifted the way work linked to education (Guttek, 2011). Before industrialization and socialization, vocational education involved the apprenticeship model. Progressives Addams and Dewey deemed that children need exposure to a breadth of vocations during their education (as cited in Guttek, 2011). Mohandas Ghandi created the Tolstoy Farm in 1910 and recommended vocational education with the idea that young people should have vocational education in order to protect themselves from unemployment (as cited in Kumar, 2018). The Smith-Hughes Act of 1917 provided the first federal stipulations and support for CTE (Dougherty & Lombardi, 2016).

Today, there is a renewed excitement surrounding CTE. Proponents are lobbying that CTE is for everyone and not just those who are not going to college. With the enthusiasm came federal and state laws requiring not only that students graduate high school but also that schools provide CTE students with a WBL experience. WBL experiences brought business and industry into education as required by the ESSA.

Not all administrators are accustomed to building partnerships with business and industry. In a study of high school principals, it was determined that the principals believed the overwhelming function of high school is CCR (Kaufman, 2015). Although all principals believed in business partnerships and that these relationships are instrumental in meeting educational

goals, only 14% of principals had reached out to businesses to create partnerships (Kaufman, 2015). Principals all reported that high schools today are not meeting the goal of preparing students for college or careers. Business and education working together is a win-win. Businesses in the community can provide support financially and provide real-world experiences to our students. Businesses can connect with our students and build a pipeline for students to work for the organization.

There are equity issues related to CCR. Economic status, student race/color, the makeup of a school, and the location of the student's home can influence whether a student is CCR. The ESSA required schools to facilitate the CCR of all students and supported the goal with Title I monies (King, 2015). The students supported by Title I are students with disabilities (SWD), economically disadvantaged, English language learners (ELLs), and nonwhite students (Pak & Desimone, 2019; Young, Winn, & Reedy, 2017). The majority of states had not traced responsibility for the nonwhite populations to determine whether pathway choices gear towards colleges or careers (Klein, 2019).

Theoretical Perspective

This study used the Distributed Leadership (DL) theory lens. DL is described as being about action and not just about the leaders' titles within the organization (Spillane, 2005). Leadership action is based on exchanges between all individuals in an organization and not just the principal or CEO. DL includes the exchanges of the managers, employees, and the setting and all three aspects: (a) managers, (b) employees, and (c) actions are critical (Spillane, 2005). The setting is a dependent variable to actions between the managers and subordinates and explains the practices occurring between them (Spillane, 2005). Action and situation go hand-in-hand and can either stifle action or can change the setting. Leadership action is the heart of DL

(Spillane, 2005).

A famous concept borrowed from Aristotle, DL is explained as collaborating parts of a system and the system is greater than the sum of the parts (as cited in Spillane, 2005). These practices alone are not the only variables but also the change in leadership practices through the collaboration with others and the setting. It is imperative to understand how, why, and when leadership action occurs (Spillane & Orlina, 2005). In the context of building a culture of collaboration, it is not only the collaboration but the processes and strategies employed to build the culture of collaboration; the obligation to understand how the plans' steps and targets are implemented day to day; the manner leadership actions change along the spectrum; and the present level of importance that motivates and encourages undertakings that stir educators to collaborate (Spillane & Orlina, 2005).

Recommended of future studies of student CCR is a focus on external DL; schools traditionally have focused primarily on internal members of the learning community (Malin & Hackmann, 2017). Many schools do not extend DL to external members of a PLC (Malin & Hackmann, 2017). Stakeholders are to partner with businesses and organizations to elicit funds, to sustain programs, and to create skill-developing pathways (Pasarella, 2018). DL is a durable and fundamentally sound practice in education reform and builder of capacity (Hargreaves, 2016; Hargreaves & Ainscow, 2016; Harris, 2011; Harris 2013; Harris & Deflaminis, 2016). DL provides opportunities for parties to contribute to CCR plans and can expand power and credibility to CCR transformations (Pak & Desimone, 2019). Klein, Taylor, Munakata, Trabona, Rahman, and McManus (2018) declare that even if teacher leaders have the ability, desire, and opportunity to use DL, inside and outside influences often block the efforts.

Bandura's social learning theory (SLT) explained how we learn from persons with whom we interact within a social setting by watching, duplicating, and modeling (as cited in Stone, 2017). People change and arrive at a new efficiency for learning through watching and the activity helps them to expand their knowledge and abilities with the information conveyed by the modeling influences (Bandura, 1999; Rosenthal & Zimmerman, 1978). Modeling is not merely a process of behavioral imitation. Modeling influences convey rules for duplicate and new behavior. Higher-level observational learning happens through an individual's hypothetical modeling involving the creation of new steps to take based on the underlying rule but goes beyond what a person watched or listened to previously (Bandura, 1999; Rosenthal & Zimmerman, 1978). People are not mere followers of the learning process but participate in the learning process and create new ideas.

People make future decisions about behavior in an ever-changing environment based on their mind's categorizing of: (a) importance, (b) different alternatives, (c) results of the prior action in similar situations and (d) action adapted to the present setting (Bandura, 1999). The process of categorizing urgency, weighing different alternatives, pulling from memory similar situations, and analyzing behavior in context improves decision-making when it comes to behavior. Students need varied experiences in different settings to adapt to the fast-paced, ever-changing environment. Business partnerships and WBL opportunities bring about experiences for students in different settings and provide the context for learning. Educational institutions must go outside the brick and mortar school to give students real-world and innovative experiences.

The first chapter will impart fundamental information on college and career awareness and readiness. Chapter One will discern the problem statement, purpose statement, and

significance of the research to Career and Technical Education (CTE) programs in a rural CTE center in Northern Virginia. The outlined research questions will lead and direct the researcher's study. The researcher will provide key definitions within the dissertation.

Problem Statement

The problem is there is a lack of post-secondary college and career awareness and readiness among students in a rural CTE center in Northern Virginia. Researchers agreed on the significance of preparing high school students with local college degrees and careers (Gonzales et al., 2019; Malin & Hackmann, 2017; Passarella, 2018; Plasman et al., 2017; Sublett et al., 2019); however, the U.S. is left with students graduating without the skills needed for the 21st century (USDOE, n.d.). CTE has an awareness problem in that the recognition of all stakeholders for the new term "CTE" (as opposed to "vocational education") is average and the knowledge of how schools design or carry out CTE continues to be inadequate (The Value, 2017). Secondary students lack the right guidance from professionals and services in choosing a career path (Verma, Sood, & Kaira, 2019). Secondary students are unclear about career opportunities across the globe (Verma et al., 2019). All students need technical skills with credentials that are stackable and need social skills for careers in the 21st century (Stringfield & Stone, 2017). CTE students lack awareness of local careers and post-secondary education opportunities on the micro-level.

In Virginia, CTE students have career pathways; however, these pathways do not always align with local labor market needs and/or local educational opportunities. If educators do not create new opportunities for pupils to learn skills that help them gain the competencies that prepare them to link to needed skills for living with government, to be competitive, and to exist, educational institutions are worthless (Koonce, 2018). This research is important because of the

local and national economy and the need to be globally competitive. Schools should work with state and regional labor market data and align it to high school CTE courses and community colleges (Stone, 2014). The focus of the research is creating CTE student awareness of local, aligned careers and/or post-secondary educational opportunities to have students graduate CCR.

The research study takes place in a rural CTE center in Northern Virginia with Auto Body, Automotive Technology, Building Trades, Cybersecurity, and Nurse Aide students. In the United States, according to the National Center for Higher Education Management Systems, 20.8% of 9th-grade students earn an associate or bachelor's degree. Many high school graduates do not have entry-level skills and 40% of students who graduate take remedial courses before taking courses that will count toward their majors and college degrees. CTE students should be prepared for local college degrees and careers (Northern & Petrilli, 2019). Education stakeholders should concentrate on organizing groups of students according to common careers, demanding college-like content; dual enrollment with colleges; marketable certifications; and opportunities for workplace experiences (Pasarella, 2018). In a rural CTE center in Northern Virginia, there is the problem of a lack of student awareness of post-secondary college and career opportunities and CCR.

Purpose Statement

The purpose of this applied study is to solve the problem of a lack of post-secondary college and career awareness and readiness among students in a rural CTE center in Northern Virginia and to formulate a solution to address the problem. The researcher will use a multimethod design consisting of both qualitative and quantitative approaches. The first approach will be semi-structured interviews with open-ended questions with administrators. The second approach will be a focus group consisting of business leaders. The third approach will be

a closed-ended survey with CTE students.

It would be remiss to only focus on CTE student's college and career awareness without addressing readiness. Students need to be aware of career pathways but there is a need to meet the needs of the 21st century workplace. To be college and career ready, students will need to have skills in math, literacy, and science relative to their CTE courses and career path (Park, Pearson, & Richardson, 2017). Businesses and college graduates concur students need technical and academic skills and application to be successful in careers and college (DiBenedetto & Myers, 2017; Hart, 2015). There is a need to disrupt current educational practices.

Significance of the Study

This study will help to improve awareness of local post-secondary opportunities and careers for CTE students in a rural CTE center in Northern Virginia and increase partnerships with businesses and schools to meet the requirement for students to graduate CCR. A focus will be to use a DL approach to involve all PLC members in solving the problem as the issue affects all of the members.

This research is important because of the local and national economy and the need for students to be globally competitive. Sixty-six percent of jobs of the future will need less than a bachelor's degree (Carnevale, Smith, & Strohl, 2014). Of the 40% of students entering community colleges upon high school graduation, only 41% move on to undergraduate studies and 60% are working while attending college (American Association of Community Colleges, 2017; D'Amico, Gozales, Canche, Rios-Aguilar, & Salas, 2019). With 99% of all jobs since the 2008 recession requiring some college, great work is ahead to connect students, higher education, and the local labor market (Carnevale, Jayasundera, & Gulish, 2016; D'Amico et al., 2019). These statistics illustrate how community colleges could be an economic driving force

and how they serve an unbalanced number of minorities and underprivileged with certificate programs (Gonzales & Canche, 2018).

The problem found in this study affects all PLC members: (a) students; (b) businesses; (c) parents; (d) teachers; (e) administrators; (f) guidance; (g) community groups, and (f) post-secondary technical schools/colleges. Local employers are not able to meet hiring needs. Students are not aware of careers available and directly aligned to the CTE career pathway they engage in based on their interests. Parents and students are not prepared to make financial decisions regarding post-secondary options. School leaders may not be skilled in developing long-lasting business and industry partnerships. Traditionally teachers confine their practices to the brick and mortar classrooms.

CTE programs across the globe found that all share common problems: (a) dishonoring of CTE, (b) firming of K-12 career pathways, (c) connecting businesses to WBL application, and (d) lacking funding models to supplement state and local funding of programs (Fitzgerald & Singmaster, 2017). A study found students who completed a CTE program of study had an increased probability of having a better grade point average (GPA), displaying a higher CTE GPA, and obtaining a larger number of credits in science, technology, engineering, and mathematics (STEM) (Castellano, Ewart, Sundell, & Richardson, 2017). Although challenges are facing CTE, there are many benefits to CTE, especially in preparing students to be college and career ready.

Research Questions

Central Question: How can the problem of a lack of post-secondary college and career awareness and readiness among students be solved at a rural CTE Center in Northern Virginia?

Sub-question 1: How would administrators in an interview solve the problem of a lack of post-secondary college and career awareness and readiness among students at a rural CTE Center in Northern Virginia? **Sub-question 2:** How would businesses in a focus group solve the problem of a lack of post-secondary college and career awareness and readiness among students be solved at a rural CTE Center in Northern Virginia? **Sub-question 3:** How would quantitative survey data of CTE students inform the problem of a lack of post-secondary college and career awareness and readiness among students at a rural CTE Center in Northern Virginia?

Definitions

1. *Career clusters* – Career clusters model of correlated CTE courses and careers created by the United States Department of Education (Rosen, Visher, and Beal, 2018).
2. *Career pathways* – Career pathways are comprehensive sequences of programs of study created as a ladder to advanced post-secondary education and preparation (Rosen, Visher, and Beal, 2018).
3. *Carl D. Perkins Act* – Carl D. Perkins Act is a U.S. legislation that provides funding to states to create and enhance high school and post-secondary CTE programs (Rosen, Visher, and Beal, 2018).
4. *College and Career Ready* – a student are college and career ready when they do not have to take remedial courses in college or technical school (Conley, 2012).
5. *Distributed Leadership* - Distributed leadership conceptualizes a leadership habit surrounded by collaborative interfaces of leaders, subordinates and the context like implements and practices (Spillane, 2006).
6. *Every Student Succeeds Act (ESSA)* - ESSA provides states the freedom to create systems of accountability as it relates to workplace readiness. The policy highlights CTE with statements

about academic and CTE programs working in tandem, teachers being prepared to teach, and career services provided to students (Coppes, 2016) *Every Student Succeeds Act (ESSA)* - ESSA provides states the freedom to create systems of accountability as it relates to workplace readiness.

7. *Strengthening Career and Technical Education for the 21st Century Act* –Strengthening CTE for the 21st Century Act focused on an increased role for business and industry, meeting both student and employer needs, and state and local flexibility (Imperatore & Hyslop, 2017).

Summary

This chapter revealed the overview and background information related to college and career awareness and readiness to address the problem of the lack of awareness of post-secondary education and career opportunities and CCR among students in a rural CTE center in Northern Virginia and to formulate a solution to address the problem. The author included a central question and three sub-questions which will guide the study through the research plan, definitions, and a summary. The DL theory and the Social Cognitive Theory (SCT) will be the basis on which to build partnerships that extend from the school system's walls. Social Constructivism arguably related to the SCT as it mirrors precepts found in the SCT (Simon, 2001). The CTE programs that excel will be those that stimulate life-long learning and ready students for post-secondary education, business ownership, careers that have promising growth, and/or frequently changing careers within a career path.

Because 88% of CTE students would like to attend post-secondary schools shortly after graduating high school, it is imperative young scholars take on schooling and technical preparation right after graduation (ACTE, 2016). Unfortunately, many young people face barriers in this pursuit. As this is an identified issue, the legislature, school, employer, and

humanitarian groups have come together to tackle the need for pupils to have well-defined career pathways from secondary school, to post-secondary schools, and/or to the local workforce, and assisting the young people in gaining the skills needed to move from one to another (Rosen et al., 2018). There is still work to do to prepare students to be CCR and aware. It will take all members of the PLC to meet the goal of preparing young people for the 21st century.

Investigators analyzed CCR accountability measures and found the California Office to Reform Education to be the most inclusive (Darling-Hammond, Wilhoit, & Pittenger, 2014). In this model there is a scholarly realm, a non-cognitive realm, and a school district ethos/environment realm. Across all of the areas of the CCR purviews are the eradication of inequality and uneven practices. An accountability measure for disadvantaged students is important as those with parents who did not go to college have fewer resources to help their children to go to school after graduation, which impacts student opportunity for upward economic mobility (Smeeding, 2016). To have students graduate from high school CCR, CTE lends itself to integrating academics and technical skills, soft skills, business partnerships, and WBL opportunities that can contribute to the local and global economy. When working with businesses in the local economy, researchers found businesses care most about soft skills as it relates to have employees arrive to work on time, work collaboratively, solve problems, and communicate effectively (Tchorzynski, 2015).

CHAPTER TWO: LITERATURE REVIEW

Overview

The purpose of this applied study is to solve the problem of a lack of post-secondary college and career awareness and readiness among students in a rural CTE center in Northern Virginia and to formulate a solution to address the problem. The problem is there is a lack of post-secondary CCR among students in a rural CTE center in Northern Virginia. The researcher conducted an in-depth examination of the research addressing college and career awareness and readiness preparation for public school students that facilitates success in the 21st century and knowledge economy with a focus on CTE. Chapter Two will give a synopsis on current literature concerning college and career awareness and readiness preparation for public school students. The next part of the study will provide a synopsis of recent literature concerning college and career awareness and readiness of students. After the initial examination of literature, the researcher discovered gaps in the research that indicated need for further research. The majority of the chapter will explain the frameworks and theories and how they correspond to the main problem.

Theoretical Framework

The theoretical frameworks, DL and SCT, guided this study. DL is a viable method in today's ever-changing and multi-faceted realm and DL should align to a school's main work, which is learning (Hargreaves & Fink, 2008). All members of the PLC need to use social cognitive skills to take different research-based approaches, interact in different experiences, receive guidance socially, to model influences, and to assimilate new cognitive frameworks that will help lead educators to analyze best practices and put them into practice (Hargreaves & Fink, 2008).

Distributive Leadership Theory

Students should be CCR when they graduate high school in order to be successful in today's knowledge economy. Practical real-life experiences with opportunities to connect with careers put students on the right track. Connections with businesses and community organizations offer real-world application and exposure to careers. Many school leaders use DL inside schools, but the change needed to reform schools requires DL inside and outside the school to ensure students graduate college and career ready. To facilitate the change needed to have students graduate CCR, leaders would need confidence in their ability to move others in the direction needed to accomplish CCR goals and strategies.

Leadership Defined

Leadership is about the actions related to the essential labor of an entity's employees and the systems employed to sway other employees' intentions, judgements, and customs (Spillane & Orlina, 2005). DL is about actions and not just the leaders within an organization (Spillane, 2005). Organizations should not use DL as a leadership plan but as a structure for thinking about leadership (Spillane & Orlina, 2005). There have been many investigations on leadership, but most focused on the leader-plus portion and their research posited two aspects of DL (Spillane & Orlina, 2005). The two aspects are leader-plus and the leadership practice.

Leader-Plus and Leadership Practice

The first aspect of DL is leadership practice (Spillane, 2005). The leader-plus aspect encompasses every person's contribution to leadership practice regardless of one's position. Leadership practice is defined as leaders' actions that advance through relations between managers, subordinates, and the setting (Spillane, 2005). According to many investigators, DL theory fits within a systems perspective whereby a collective social process emerges from the

interactions of multiple actors (Malin & Hackmann, 2017; Bolden, 2011; Uhl-Bien, 2006; Supovitz, Auria, Spillane, & Auria, 2019). An expert in DL explained DL as being grounded in action as opposed to an employee's position, systems, and actions (Spillane, 2005).

Collaboration

Practices alone are not the only variable; it is also the change in leadership practices through the collaboration with others, the setting, and the processes over time and place. It is imperative to understand the how, why, and when leadership practice occurs (Spillane & Orlina, 2005). It would be hard to create vigorous pathways of careers without collaborative work and knowledge of PLC members in both high school and post high school areas (Malin & Hackmann, 2017; Taylor, Kirby, Bragg, Oertle, Jankowski, & Khan, 2009). Factors, parents, businesses, etc. influence the rules, routines, and systems (Honey, Pearson, & Schweingruber, 2014). In the context of building a culture of cooperation, it is not only the group effort but also the system used to create a culture of team work; the need for knowing how these actions and goals are carried out in everyday action; how leadership practice progresses over time; and urgency to sway and support undertakings that move educators to collaborate (Spillane & Orlina, 2005). Official leaders are the doorkeepers of DL (Malin & Hackmann, 2017; Harris, 2008).

Leaders could use DL practices and systems to move a school forward in preparing students for college and careers. A principal alone cannot move a school toward a culture that prepares students to be CCR and prepared for the 21st century. Everyone working together in and outside a school to use the DL system of thinking could have success in improving CCR and awareness (Malin & Hackmann, 2017). With official leaders being the doorkeepers of DL more principals need to build business and community partnerships. All members of the PLC need to work together to foster CCR and awareness of students.

Social Cognitive Theory

A leader in SCT described SCT as a complex connective pattern and advancement in skills and its influence on one's accomplishments (Bandura, 1999). As individuals are not born with a sense of self, people gain the sense of self through social experience as is conducive to social constructivism (Bandura, 1986). Many precepts found in the SCT also mirror social constructivism. Social constructivism proclaims that individuals construct cognition through social engagement, translation, and comprehension (Page, 2007; Vygotsky, 1962). Gaining knowledge of these skills and behaviors are due to observations and models of others' behavior and the consequences of the behavior (Bandura, 1999). The mind moves people forward in making decisions regarding behaviors needed to perform in constant change environments according to their mind's categorizing of importance, identifying different alternatives, recognizing the results of prior action in similar situations, and strategizing to carry out adapted action based on the present setting (Bandura, 1999; Bandura, 1986; Rosenthal & Zimmerman, 1978).

People have progressed to a greater ability to learn by observation, and the skill enabled them to advance their comprehension and expertise from knowledge transmitted by demonstrating affects (Bandura, 1986; Rosenthal & Zimmerman, 1978). Modeling is not a fixed act as it moves rules used for copied and novel behavior. When a person comes across current rules, they keep them in mind while assessing a current scenario and what results is an innovative act imposed by a person beyond what had been modeled for them. A person behaves according to the anticipated consequences of an action (Bandura, 1999; Bandura 1986). For example, if a person identified a positive result of a behavior, they would carry it out; if a person

identified a negative result of the behavior, the individual would avoid the action (Bandura, 1999).

It is a leader's perceptions of their own leadership ability and their skill in inspiring a group to move in a desired direction in order to carry out systems and achievements. It is not only the leader's ability to move others but the skill to lead and motivate themselves (Wood & Bandura, 1989). In order to successfully lead and solve the problem of a lack of CCR college and awareness, a leader must be confident in their abilities to move staff in a desired direction while modeling the way. An organization's tasks can be analyzed through the SCT (Wood & Bandura, 1989). Modeling, mastery, and guided skill advance the understanding of societal and achievement skills (Wood & Bandura, 1989). Wood and Bandura (1989) defined master modeling as the creation of skills by learning patterns of behavior and consequences. Guided skill mastery is explained as demonstrative simulations to transmit abilities and cognition and chances for perfecting the models. Transfer program is described as the support needed to incorporate new skills in work settings every day.

Bandura incorporated self-efficacy into the SCT and it is key in the choice of behavior among individuals, because as a person reflects on thoughts behaviors are carried out (Bandura, 1986; Sublett & Plasman, 2017). How a person thinks about behavior influences their belief in self. In an organization, a person's control maneuvers within a group of people and dynamics and self-efficacy. The overall impact of collective behavior could be swayed by a person's respect for aggregate objectives (Ng & Lucianetti, 2016). Leaders need to respect collective goals and let go of controlling behaviors.

Related Literature

There have been numerous quantitative studies in college and career readiness and fewer qualitative. The purpose of the literature review is to discover cutting-edge understanding of a particular field; enlighten prior knowledge of the field; explain the significance of an issue being examined; discuss a gap in the current literature; and add to the field of knowledge (Leite, Padiha, & Cecattil, 2019). The related literature will help provide a foundation for the study of college and career awareness and readiness in a stand-alone CTE center. Although all schools are dealing with the need to prepare students for college and career readiness and awareness, there were not any studies of stand-alone CTE centers.

21st Century Challenges

Leaders in schools will need to collaborate with staff to create and improve systems to meet challenges in facilitating the learning of college and career readiness for students. Sixty-five percent of all careers in the country require a type of education beyond high school (Carnevale et al., 2010; Carnevale et al., 2013; Mariani, Berger, Koerner, & Sandlin, 2016). Many high school graduates do not have entry-level skills, and 40% of students who graduate take remedial courses before taking courses that will count toward their major and college degree (Malin & Hackmann, 2017).

Workforce and Education

Researchers have declared that the United States does not prepare students for unfilled positions offered by employers and have reported there is much commotion in the U.S. about students lagging in STEM as well as in general education topics (Carnevale et al., 2013). A report created by the National Academies Committee on Science, Engineering, and Public Policy suggested alarming concerns for the U.S. related to the global competitiveness of businesses and identified deficits in education and competence in STEM needed of employees across the

country (Ellison & Allen, 2016). There is a need for the U.S. to increase STEM graduates by 34% each year (Smith, 2017). STEM academies and specialty schools have cropped up around the U.S. to prepare students for the 21st century workplace and global competition (Gonzales et al., 2014).

Researchers had identified CTE as a catalyst to the incorporation of technology into career readiness exploration (Izzo, Yurick, Nagaraja, & Novak, 2010; Morningstar, 2015). CTE centers that partner with colleges to provide dual credit opportunities have been found to decrease the time needed for students to complete a program in college; increase student access to colleges; advance the STEM curriculum in secondary school; support the consistency in curriculum between secondary school and college; assist postsecondary schools in enlisting students (including nontraditional students); facilitate the move to colleges after graduation; and decrease post-secondary expenses (Izzo et al., 2010; Morningstar, 2015).

Post-secondary Transition

There have been movements to help better prepare students for college and careers; however, there are gaps in their preparation to transition students successfully upon graduation (Kannapel & Flory, 2017; Malin & Hackmann, 2017). A student must be competitive on the local and national level. The researchers asserted students require an appropriate direction in moving from high school to postsecondary education as well as the skills to complete postsecondary degrees and credentials.

Although there is a push to have all students CCR, program papers continued to associate readiness for careers as groundwork for post-secondary education and negate the need of specialized and work-place readiness skills (Gray, 2010; Hernandez-Gantes, 2016; Stone, 2013; Symonds, Schwartz, & Ferguson, 2011). A problem CTE persistently faces is citizen mindset

that CTE is not as valuable as a college education (Gray, 2010; Hernandez-Gantes, 2016; Symonds et al., 2011). Scholars advocated for CTE and academic integration as research has found this reform to benefit students; CTE students were found to perform as well as or surpass students who were studying curricula designed to prepare students for college (Hernandez-Gantes, 2016; Pierce & Hernandez-Gantes, 2015).

The use of an advisory committee, apprenticeships, PLC partnerships, and CTE have been found to be essential in helping students transition from high school to careers and college (Burton et al., 2014; Gibbs, 2016; Passarella, 2018; Plasman et al., 2018; Rosen et al., 2018; Rosenfeld, 2018; Stone, III, 2017). Teaching and learning in CTE focused on career context and active learning with the ability to transfer the knowledge to other contexts are needed for all students (Bransford, Brown, & Cocking, 2010; Prince, 2004; Schonfeld, 1991). School reform has worked to make curriculum applicable for students. CTE curricula has focused on rigor and academic integration and initiatives to progress CCR (Stone, 2013; Symonds et al., 2011).

Equity

There is an equity challenge in all areas of college and career awareness and readiness. In 2013, 57.4% of black and 57.2% Latino males in New York graduated from secondary school as compared to 80% of white males (Expanded Success Initiative, 2018; Knight-Manuel, Marciano, Wilson, Jackson, Vernikoff, Zuckerman, & Watson, 2016). English Language Learners ages 14 to 21 years are at a greater risk of dropping out of school and are typically male, Hispanic, noncitizens, and living below the poverty line (McWhirter, Rojas-Arauz, Ortega, Combs, Cendejas, & McWhirter, 2019; Velez, Silvia, & Tolbert, 2016).

Black and Hispanic students enroll in community college at an unequal rate compared with White males and are more likely to drop out before earning an associate degree, further

creating earning disadvantages (Rosen et al., 2018). In addition, 18% of Black males and 21% of Latino males graduate CCR (Expanded Success Initiative, 2018; Knight-Manuel et al., 2016). The research suggests there is an opportunity to recruit more minority students for CTE where they can earn skills and credentials. The research indicates there is a large disparity in college enrollment between Black students and White students nationwide. Fifty to 68% of Black students enrolled in college as compared to 75% to 80% of White students (Knotek, Fleming, Thomson, Rouch, Senior, & Martinez, 2019).

Studies underscored the significance of STEM schools and found reading, math, and science standards tests fared better for particular student groups (White male, Black female, poor, and Hispanic). Data is prevalent indicating the need for CTE students to have both academic and technical skills for jobs of the future. Those who participate in CTE programs are primarily from low-income families where the students' parents did not attend college. In addition, students who complete CTE programs do not tend to complete postsecondary education degrees (Morningstar, 2015). CTE programs offer many advantages to students by providing students opportunities to learn technical skills as well as employment skills.

There is a widespread equity issue as it relates to access and support of careers and colleges for African American, Hispanic, Indian, low socio-economic, and 1st generation college students. Scholars have completed a large amount of research regarding secondary school reform addressing CCR; this research has uncovered intolerable injustices related to gateways, CCR, post-secondary education, degree attainment, and occupational results of students related to ethnicity, sex, economic status, and living environments (ACT, 2017; Bragg & Taylor, 2014; Malin & Hackmann, 2018; Musus-Gillette, Robinson, McFarland, KewalRamani, Zhang, & Wilkinson-Flicker, 2016). There are many obstacles for this population of students.

In New York in 2013, 57.4% of Black and 57.2% Latino males graduated from secondary school as compared to White males with over 80% becoming graduates (Expanded Success Initiative, 2018; Knight-Manuel, Marciano, Wilson, Jackson, Vernikoff, Zuckerman, & Watson, 2016). English Language Learners 14 to 21 years of age are at a greater risk of dropping out and are typically male, Hispanic, noncitizens, and living below the poverty line (McWhirter, Rojas-Arauz, Ortega, Combs, Cendejas, & McWhirter, 2019; Velez, Silvia, & Tolbert, 2016). The statistics provide an opportunity to have more minority students recruited in CTE to earn skills and credentials. Studies portrayed the significance of STEM schools and reading, math, and science standards tests fared better for particular student groups (White male, Black female, poor, and Hispanic). Data is prevalent in the need for CTE students to have both academic and technical skills for jobs of the future, but those who are CTE completers are primarily from low-income families, the students' parents did not attend college, and the completers do not tend to complete postsecondary education degrees (Morningstar, 2015). CTE programs offer many advantages to students by providing students opportunities to learn technical skills as well as employment skills.

College and Career Readiness and CTE

There is a natural fit for CCR and CTE (Brand, Valent, & Browning, 2013). There is a need for significant innovation in all education but CTE is a thorough program already in existence and students participating in high-quality CTE can gain college and career skills (Brand et al., 2013). CTE offers contextualization for academics and is necessary to be CCR (Rosenfeld, 2018). Recommended steps to achieve this goal include making teaching and learning in secondary schools more rigorous, engaging, and relevant; ensuring that more students are college and career ready; increasing high school graduation rates, especially for lower-

performing students; providing opportunities for youth to learn about and experience careers; and smoothing the transition to postsecondary success (Brand et. al., 2013).

CCR is comprised of three sets of skills (a) academic skills needed to be successful in postsecondary education (requiring no remedial courses); (b) soft skills; and (c) technical skills related to a particular career. Researchers have found CTE program courses provide students the chance to gain technical and soft skills (Balfanz, Bridgeland, Bruce, & Hornig Fox, 2013; Brand et al., 2013; Castellano et al., 2016; DiBenedetto & Myers, 2016; Hyslop & Imperatore, 2015; Valent & Browning, 2013). Schools could revamp CTE and create systems that integrate academics, which would provide a stronger foundation for students to become CCR. Further, investigators have found CTE already provides students with real-world projects and applications, technical skills, and soft skills.

Funding of CTE and CCR Priorities

A group of authors used four Perkins IV legislative regulations to guide a longitudinal study (Castellano et al., 2016). The investigators described the mandates required of a school's program of study (POS) to receive money through Perkins IV. The directives require the POS to include: (a) both secondary and postsecondary courses, (b) demanding core and CTE courses with strategies to successfully transition from high school to college and careers, (c) a chance to earn college credit while in high school, and (d) an earned industry credential upon graduation. In 2010, the USDOE expanded priorities with a blueprint given to school districts with underpinnings of school and organization alliances, school counseling, academic counseling, and a system to hold others accountable (Castellano et al., 2016). Legislators included in Title IV of the ESSA the requirement to augment education beyond academics with CTE and included

funding for the initiative (Malin et al., 2017). Lawmakers wrote Titles I and II Part A to provide for funding to support CCR in all schools (English, Cushing, Therriault, & Rasmussen, 2017).

Students who are not as likely to obtain certifications and attend college are those who are a part of an ethnic subgroup, economically disadvantaged, children of parents who did not attend college, and students who are lower achievers (Castellano et al., 2016). The authors asserted that the equity issue could provide an opportunity to motivate these groups to pursue college by carrying out “POS, career academies, and early college high schools” (Castellano et al., 2016, p. 65). The research suggests that educators should create new school models to create POS and systems to facilitate academic, skill, and employment success for all students, especially those students in groups underrepresented and disadvantaged learners.

CTE Cluster Pipelines, POS, and Course Enrollment

Investigators explored what extent that POS enrollment increases student academic achievement (GPA) and high school graduation (Castellano et al., 2016). Castellano et al. (2016) measured the effects of required POS that pair traditional core classes with career and technical classes and work-based learning experiences in order to have students successfully transition from high school to colleges and careers. Overall, there was an effect size, $\beta = .12$, with the number of CTE credits and high school commencement. The effect size of the number of CTE credits on grade point average was not significant with $\beta = -.002$. The authors discovered a pipeline between specific secondary CTE courses and CTE in college. There was an array of one course taken in high school to one course taken in college. In another study, a unit increase in CTE credit at the postsecondary level equated to one-third of a college course (a 0.75-unit increase would equate to one-quarter of a college course) (Plasman et al., 2019).

CTE Pipeline to Postsecondary Education Study Justification

Research indicates that the study of acquiring skills through the CTE channel is acutely pertinent at this time as projected careers for the 21st century jobs demand a significant level of technical skill past high school (Broadbent and Cacciattolo, 2013; Bureau of Labor Statistics; Plasman et al., 2019; Rosenfeld, 2013). Plasman et al. (2019) explained that taking additional CTE related courses in college could build on technical abilities and improve a student's chances of attaining a post-secondary degree or a professional certificate. Further, many studies found that CTE courses taken in high school often equates to increased student achievement at both the secondary and postsecondary level across the U.S. (Gottfried, 2015; Plasman et al., 2019).

The study of acquiring skills through the CTE channel is acutely pertinent at this time as projected careers for the 21st century jobs demand a significant level of technical skill past high school (Plasman et al., 2019). Authors justified studies explaining that taking additional CTE-related courses in college could build on technical abilities and improve a student's chances of attaining a post-secondary degree or a professional certificate (Plasman et al., 2019). In the field, investigators wanted to determine if CTE courses taken in high school equated to increased student achievement at both the secondary and postsecondary level due to the increase in CTE course taking across the US (Gottfried, 2015; Plasman et al., 2019).

College and Career Readiness Models

Several researchers had studied the grounding of efficacious CCR and found successful interventions were vital in training students to be ready for the 21st century global economy (Bouffard & Savitz-Romer, 2012; Carnevale, Smith, & Strohl, 2010; Conley, 2010; USDOE, 2010; Villares & Brigman, 2019). Some interventions included CTE and academic integration, school counseling, and new school models. Researchers found that one intervention -- career academies -- greatly diminished dropouts, improved attendance, boosted earned high school

credits, and raised the probability of high-risk students submitting applications to postsecondary schools (Castellano, Richardson, Sundell, & Stone III, 2016).

Another suggested intervention involves educators using CTE to assist students in becoming CCR through equipping them with awareness of possible STEM occupations and linking them to occupational determinations and to the learners' postsecondary choices (Mardis, 2019). Occupation pipeline curricula that combined CTE and postsecondary programs provided a pathway to improve readiness, increase attainment of degrees beyond high school, progress occupation advancement, and money-making sustainability (Winkler & Warren, 2019).

STEM Schools

STEM-focused CTE academies have brought the integration of rigorous academics, technical training, and business partnerships to fruition to meet the goal that all students be CCR for the 21st century, even those students in underrepresented groups (McKinstry & Stockdale, 2016). Researchers wrote that America must change its schools to meet the economic challenges (Gonzales, Gonzales, Jones, & Ruiz, 2014). The researchers addressed the need for creativity and revolution to address the woes of the U.S. economy and postulated that the basis of the knowledge economy is creativity and revolution, and because of the knowledge economy there has been a growth of STEM academies (Gonzales et al., 2014). A study examined STEM academy students and found a considerable statistical difference in performance of young men, Hispanic and white, and monetarily disadvantaged learners in scores of reading, math, and science (Bicer, Navruz, Capraro, & Capraro, 2015; Erdogan & Stuessy, 2015; Saw, 2017).

CTE STEM academies like the technology center, Biosciences and Medicine Academy in Oklahoma, have cropped up all over the nation. A student attributed the academy as a smooth transition to college (Foster, 2014). The academy leaders integrated robust science and math

programs of study with ACT outcomes in math of 27.8 and science 27.6 compared to the results of ACT when the students entered the academy. There was a 7-point gain over the state aggregate (Foster, 2014). In order to attract students to the medical field, the Billings Technical Center focused on three things: (a) dual enrollment, (b) mockups, and (c) discovery of medical occupations connected to occupational pathways offered at the center (Hann & Anderson, 2020).

STEM Key Components

If the economy requires a STEM focus for students to be CCR and school reform could help students be competitive in a global economy, it is vital to study evidenced-based practices regarding STEM and schools. A qualitative study set out to examine the phenomenon of a school's vision that contained three goals: (1) problem solving and questioning, (2) quality people connections, and (3) teamwork and how the vision lines up with methods in the classroom that impacts pupil outcomes (Morrison, McDuffie, & French, 2015). There were 52 recorded classroom observations in two years. Over three years, the researchers interviewed 16 teachers, 30 students, and two school administrators. There was significant statistical variance between the STEM school and non-STEM school students in the area of 10th grade mathematics and reading scores (Erdogan & Stuessy, 2015; Morrison et al., 2015; Saw, 2015). A larger ratio of STEM school students performed better in algebra and geometry. Another study found dedicated STEM school students performed somewhat superior on math and science standards tests than learners enrolled in traditional schools with a STEM focus. Further, the researchers found students more attracted to STEM; attended school more; passed more standardized tests; and were most likely to obtain a postsecondary degree (Erdogan & Stuessy, 2015).

An inclusive STEM high school framework contains three areas: 1) the STEM makeup of the school, 2) the carrying out of the STEM program, and 3) the school's results (Morrison et al.

2015). The researchers provided the set-up of the study which was centered on scholarly work studying teaching and learning (Bransford, Brown, and Cocking, 1999; Donovan & Bransford, 2005; Morrison et al., 2015; McTighe, 2010; Wiggins & McTighe, 2005) and highlighted the need for students to have numerous opportunities to relate learning to real-world situations. STEM schools typically require students meet specific standards for admission that include scores of standardized tests, writing samples, collections of work, recommendations, and dialogs (Erdogan & Stuessy, 2015).

STEM Best Practices

A school system looking to reform its school to meet 21st century workplace expectations must examine evidence-based practices related to STEM (Kasza & Slater, 2017). Goals of STEM academies were found to be similar across studies and involved problem-solving; the process of engineering design; and soft skills of cooperation, interactions, collaboration, communication, demonstration abilities, and organization of schedules (Holmlund, Lesseig, & Slavitt, 2018).

Best practices of STEM academies indicated in the Kasza and Slater (2017) study are assimilation of academic and technical subjects, creation of engineering course plans from the school's subject experts, pupil groups, alliances outside of the school, and practicums. The literature reviews and interviews also led Kasza and Slater (2017) to conclude that the following vital education goals would prepare students for college and careers: problem-solving and the process of engineering design and soft skills of cooperation, interactions, collaboration, communication, demonstration abilities, and organization of schedules.

Career Academies

Career academies and early college model schools and POS improved the chances that students would finish high school and create a career plan (Castellano et al., 2016; Edmunds, 2015; Fernandez & Sun, 2015). Career academies include the mixing of core subjects with CTE (Stone, 2017). The career academy would lie within an area of a high school focused around career-themed courses and across core subjects, foster real-world contexts, include partnerships, and WBL (Hackmann, Malin, & Gilley, 2018). With both work and school parts, researchers found career academies to give relevancy of academic content and to move students to gain abilities esteemed in both democracy and work. The career academy type of school increased attractiveness as research proved it to constructively influence the success of students (Fletcher, Jr. et al., 2018).

The Manpower Demonstration and Research Corporation (MDRC), completed definitive studies of career academies and the substantiation of career academies success (Malin & Hackmann, 2018). Research has recognized the California Partnership Academies (CAP) as an exemplar secondary school reform (Lanford & Maruco, 2017). The students that attended these academies attended more school, passed the California exit exam, and graduated high school. The CPAs have implemented Linked Learning Pathways where industries, two-year colleges, and secondary schools work together. The integrative leadership framework worked beyond the researchers' former study of DL. The researchers did not study the DL framework with CCR and did not address organizations outside the schools/district's boundaries.

Researchers found career academies helped students be self-assured, increased learning abilities, developed student career interests, and promoted strong bonds with instructors in a multi-year environment. The scholars found the CTE or WBL features were of minor benefit to the students. The implications suggested by the authors were that learning environments with

additional remediation efforts and individual support would bring about the same benefits as the academies (Lanford & Maruco, 2017).

International Baccalaureate

Another type of school recognized as a reform for CCR is The International Baccalaureate (IB) school. This nonprofit based in Geneva, Switzerland began with a Diploma Program (DP) in 1968 with students' ages 3-19 years. Scholars have revered the DP as being superior in curriculum and assessment with distinction (Lakes & Donovan, 2018). The IB added a Career Program (CP) in 2011 with an IB Career-Related Certificate (IBCC). The IB created the CP for high school students wanting career-themed programming along with academic thoroughness. Eighty-nine percent of the IB programs in the U.S. are in public schools. Schools that offer IB pay yearly fees to IB. IB programs in a particular secondary school's POS have shown a connection to accomplishment in post-secondary education (Bergeron, 2015; Hill, 2018).

IB programs offer DP students a liberal arts foundation with six disciplines: (a) research, (b) epistemology, (c) service, (d) a second language course, (e) research and writing of an extended essay, and (f) a year in a half involvement in deeds within the community (Hill, 2018; IBO, 2017). The CP provided students two DP courses; three courses in a career-themed POS; a second language opportunity; a career end of program project; an occupation-centered community experience; individual competencies training focused on critical thinking and problem solving; and a course called *Approaches to Learning* (Lakes & Donovan, 2018). IB has been considered an elitist school. The IB created a strategic plan with the creation of the CP program to be more inclusive and address CCR (Lakes & Donovan, 2017).

The IB program students' writings were compared to the Framework for Success in Postsecondary Writing that focused on eight habits of the mind needed by students to be skillful and to attain accomplishment in college. The eight habits are accountability, thinking, innovativeness, inquisitiveness, adaptability, perseverance, involvement, and frankness. The IB's target is to create students who are smart, considerate, intelligent, and globally minded. IB programs not only prepared students to get into college, but also provided students with the mind habits needed to be successful in college (Larson & Kurtyka, 2017).

The authors found that IB program students outperformed the AP students in writing and better prepared them for writing in college. The students' writing demonstrated their skill in the habits of the mind necessary for college success. The researchers described AP programs as primarily a testing of recall of information.

Alternative Education and CCR

There are students in the CTE center who are alternative education students. These students for a myriad of reasons cannot handle the traditional school campus. The goal for these students is no different than those of CTE students in the respect that all students need to learn, experience success, shine, and ultimately be CCR (Tyler, Perez, & Higgins, 2015). The school emphasized academic rigor as much as social and emotional needs. All students learn differently and have different needs.

An Alternative Learning Center Model in Oceanside Unified School District created an environment for alternative education students to succeed by meeting each student's individual social, emotional, and CCR needs. The school allowed for differentiation and offered both remediation and accelerated learning opportunities for its students. The learning took place in daily two-hour instructional blocks. Oceanside partnered with a counseling group that offered

group and individual counseling sessions that took place after instructional time. Students received backpacks of food for the weekend as well as cards for bus transportation through Child Find resources. CCR strategies involved an online program that surveyed students for career interests and taught students about writing cover letters and resumes. Oceanside offered students work-based learning opportunities with partners of the school.

The school reduced suspensions by requiring students with suspensions of more than five days attend the center and work on Restorative Practices Exercises (Tyler, Perez, & Higgins, 2015). Another alternative education setting, Career Success Academy in Colorado, provided an environment that promotes at-risk student success in school with pathways and a partnership with a community college for completion of an associate degree or a certification through the Workforce Services Center of the community college. The program provided a complete set of services to ensure students success (Spencer, 2015). The services provided include advising, coherent and informed academic majors, programs and careers, milestones, and academic supports (Spencer, 2015).

Scholars attributed negative effects as related to zero-tolerance policies or harsh punishment policies. In fact, a study showed that suspensions are credited to one-fifth of variances in school accomplishments (Berkowicz & Myers, 2018). The authors implored that taking students out of the classroom has an adverse effect on school progress and led to a large gap in accomplishments for students of varying races. Researchers found that pupils that have been suspended or expelled are 10 times less likely to earn a high school diploma, more likely to fail classes, less likely to matriculate to the next grade level, more likely to hate school, and more likely to be disciplined through community corrections (Berkowicz & Myers, 2018).

Policymakers across the nation developed strategic aims to raise at-risk pupils' membership in post-secondary education (Carnevale, Smith, & Strohl, 2010; Conley, Roderick, Nagaoka, Coca, & Moeller, 2008; Drummond, de Gonzalez, Rooseboom, & Stout, 2011). Schools and associates have implemented strategies to include post-secondary guidance, remedial coursework, financial-aid support, and visits to post-secondary schools, and services that took place during the school day or after the end of the school day. (Taylor & Bicak, 2020).

Families provided less assistance to at-risk pupils when it came to completing an application to attend post-secondary school. Families of at-risk students often do not have the information crucial to admission procedures; are not as equipped educationally to complete an admissions process; do not know what it means to attend college; and have less insight regarding financial aid for college; receive less family support when applying to college; lack crucial college knowledge; are less academically prepared; and are less informed about financial aid (Roderick et al., 2008; Schneider et al., 2013; Vargas, 2004). Typically, at-risk pupils have less social capital and support than the rest of students, causing a lack of proficiency and wisdom connected to the college-going practice, and reducing college involvement levels (Goodwin, Li, Broda, Johnston, & Schneider, 2016; Klein & Washburn, 2012; Roderick, Nagaoka, Coca, & Moeller, 2009). Interventions like Upward Bound (2016), handouts, financial aid curricula, extension arrangements, and counselors are central implements schools utilize as a way to diminish influences and support at-risk pupils to attain school goals after high-school graduation. Researchers specified that trips to college or technical schools help students become aware of campuses and their means, help spur pupils to initiate completing an application, and influence their decisions to attend the post-secondary schools they experienced during their visits (Goodwin et al., 2016; Klein & Washburn, 2012).

CCR Interventions

Educational leaders have implemented CCR interventions to address CCR skills needed of students. The interventions include school reform, creating a college-going culture, increasing parental involvement, school counseling, and business and industry partnerships. The principal's role has changed significantly from mediator and manager to instructional leader and change agent in order to address the lack of students' skills identified in the U.S. (Malin & Hackmann, 2016). The leader needs to employ Distributed Leadership to include schools, families, and community groups to accomplish the CCR agenda (Malin & Hackmann, 2016).

School Reform

Due to the fast-growing technology landscape and the lower cost of technology, more people have technology which has led to the knowledge economy and increased global competition. Many researchers started to implore schools to nurture inventiveness and creativity in pupils (Gonzales et al., 2014). Researchers have suggested the critical need to transform our schools for the U.S. to successfully compete in the global workplace.

A significant movement in school reform and transformation regarding CCR has begun in schools. Fullan (2008) developed six steps needed for large-scale reform to organizations or whole systems. The six steps include to care for employees; to have a network of purposeful peers; to create leadership capacity to see continual learning as a process; to be transparent; and to create systems (Gonzales et al., 2014). Educators would need to use disruptive innovation to drastically change education in America (Serdyukov, 2017). Reform of any kind would require strong partnerships between K-12 and post-secondary institutions (Moker, Barnett, Lee, & Harris, 2019). Unless schools transform systems and practices to allow pupils to acquire skills that train them to be ready for change and without new efforts to help students gain the

competencies that prepare them to meet the challenges of citizenry, competition, and existence, schools are inept (Koonce, 2019). Front-runners require skilled systems intellectuals (Malin & Hackmann, 2018).

Systems Thinking

Researchers have defined ST as a model that equipped staff to look toward individual proficiency; work in a team with shared learning; interrogate profoundly entrenched intellectual frameworks; and construct a mutual idea about enterprise scholarship (Meete & Riegel, 2018; Senge, 1990). Organizations used ST to move from traditional top-down systems to an environment that holds enterprises as an interpersonal unit that created outcomes when employees were enabled and not dominated (Meete & Regal, 2018; Schein, 2010). ST should bring about continuous improvement of the science of teaching and learning that provide pupils and educators the capacity to have sustained and continued scholarship (Fullan, 2007).

Educators and students are faced with complicated world realities and scholars advised using ST for tackling the problems (Jolly, 2015; Shaked & Schechter, 2016; Wilson & Van Haperen, 2015). ST is a model calling for organizations to focus on the big picture and interconnections among parts not just each individual part. ST gives scrutiny to the connections of channels (Shaked & Schechter, 2016). Scholars suggested that real-life challenges could be solved by successfully using ST (Shaked & Schechter, 2016).

ST has allowed schools to meet their goals by attaining positive student achievement. Seeing schools through the ST lens allows educators to obtain a thorough knowledge of daily problems, in conjunction with tasks to handle them successfully. Modern-day heads of schools have to think globally and not sequentially, more tactically, with the big picture in mind, and more universally (Shaked & Schechter, 2013). To better realize the reason things happened and

continued to happen is to comprehend its elements as it relates to the entirety (Bertalanffy, 1950; Sigal, Frank, & Anat, 2017).

Professional Learning

The Learning Forward's (LF) director provided a crosswalk between ESSA standards and LF's Standards of Professional Learning. Collectively, purported are: (a) professional learning is a vital task in the continuous improvement process and there is a need for administrators to form the unit needed to reinforce it, (b) distinguish faculty, administrators and instructors, universally, (c) speak to pupil education standards in the Outcomes standard, (d) recognize the need for long lasting knowledge to reach targeted results, (e) support teachers to reach a full comprehension compared to a mere recall of information in successful learning designs, (f) collaborate where ideals, environment, and systems enable it in the Learning Communities standard (g) justify professional learning for faculty to take place during a school day as it gains chances for faculty to learn and should relate to their tasks with students needs as the focal point in the Resources standard, (h) evaluate and inform continuous improvement to ensure faculty effectiveness in attaining achievement goals and have the skills to handle pupil needs using data, and (i) accept collectively the accountability for pupil effectiveness using the vital parts of execution (continuation, mentoring, application, debriefing, and rumination) in the class setting.

LF focused on a logic model as a resource to discover performance measures and to build a plan to attain targeted achievement. School leaders create logic models for individual schools; departments create logic models; and teachers create logic models (McFarland & Mouton, 2018). According to the LF's Theory of Change, the theory begins with standards-based professional learning that moves to transformations in educator knowledge, skills, and dispositions, resulting in transformations in educators' methods, transforms students' achievement, and the cycle begins

again (Bradley, Munger, & Hord, 2015). The logic models required teachers to create individual and student learning goals.

The framework built upon three areas needed to motivate pupils to reach their goals and yearnings: design learning (planning), facilitate learning (teaching), and reflect on learning, assessing and responding (Hirsh, 2017). The basic tenet is that if all of these components were present within a safe learning environment it would bring forth real-life knowledge that motivates all pupils. Schools would need a culture that encouraged teaching with real-world application and relevancy.

College-Going Culture

Scholars have argued the need for schools to develop a culture that encourages students to go to college (Bryan, Moore-Thomas, Day-Vines, Holcomb-McCoy, 2011; Corwin & Tierney, 2007; Gilfillan, 2018; Holland, 2010). Such a culture requires educators to maintain a mindset that all pupils will attend college; educators will provide to students and their families the college means and instruments; and schools will partner with cross-sector organizations to provide all students with careers and college training opportunities (Gilfann, 2018). Pupils attending a school with a college going culture were 160 percent more likely to attend college (Gilfann, 2018; Robinson & Roksa, 2016). One vital aspect of a college going culture would be developing social capital which scholars proclaimed is having a system of affiliations (Bryan et al., 2011). Pupils' social capital affiliations would help to provide them with college readiness instruments, inspiration to discover college choices, support for partaking in demanding curriculum, and corroboration during the college submission procedures (Farmer-Hinton & Adams, 2006; Gilfann, 2018).

Parental Involvement

A vital intervention to increase college and career readiness for students is increasing parents' awareness and understanding of CCR (Cabrera & LaNasa, 2000; Mwangi, Cabrera, & Kurban, 2019). Research has shown that parents have the greatest impact on whether a student attends college and on their career (Mwangi, Cabrera, & Kurban, 2019). Yet parents without college degrees have decreased dedication and commitment to their children attending college. Students having parents who did not go to college recalled decreased support from their parents and indicated that they had lower levels of drive and commitment. These students also reported lower levels of backing evidenced by a parent's action and desire for their child to go to college (Hill, Liang, Price, Ponk, Perella, & Savitz-Romer, 2018; Hill & Wang, 2015).

The association between students and parents and the students' post-secondary schools entry and selection is found to be significant and the students' movement into and through the process of entry into post-secondary education (Arnold, Liu, & Armstrong, 2012; Corwin & Tierney, 2007; Hill & Tyson, 2009; Hossler, Braxton, & Coopersmith, 1989; Mwangi, 2015; Mwangi, Cabrera, & Kurban, 2019; Perna, 2006; Perna & Titus, 2005; Rowan-Kenyon, Bell, & Perna, 2008; Sewell & Hauser, 1992; Sewell & Shah, 1968; Stage & Hossler, 1989; Tierney & Auerbach, 2005). A student's feeling of fitting in at school greatly depends upon guardians and people within the school who motivated them to feel a part of the school (Korpershoek, Canrinus, Fokkens-Bruinsma, & de Boer, 2019; Woolley and Bowen, 2007). Schools take steps to improve parental involvement and there are toolkits provided as examples in the research (Goodall, 2017; Stewart-Ruck, 2016).

Some of the recommended practices for schools are to change school staff's perception of parental engagement from parental interaction with the school to parental involvement in student learning and to provide professional development by experts to all members in all schools to

allow peer to peer discussions (Cordingley, 2015; Goodall, 2017; Goodall, Day, Lindsay, Muijs & Harris, 2005; Harris, Day, Lindsay, & Muijs, 2006). The leadership practice involved in increasing parental involvement focused on modifications of educator actions and not the actual educators partaking in the process (Goodall, 2017; Patterson, Brandon, Chang, Witry, Garza, & Trewet, 2013; Timperley, Wilson, Barrar, & Fung, 2008). Suggested were teacher-completed inventories of current practices, teacher-developed list of wants that were converted into SMART goals, teacher-created vision of parental involvement, and teacher-created list of hindrances to the goals with plans to overcome them (Goodall, 2017).

Significant parental involvement would involve a systems approach and not just a classroom approach (Goodall, 2017). Thus, DL fits well into a system's thinking model. The technical center in this study is within a school system practicing systems' thinking. It is a continuous improvement process where the needs assessment process (data) helps to identify, plan, and implement practices and supports that drive continuous improvement. The model includes data, processes, and systems leading to intended outcomes. Scholarly work on parental involvement and its impact on student achievement and scholarly work highlighting the inequities of success among student subgroups justify a school system's focus on parent engagement (Goodall, 2017; Huat, See, & Gorard, 2015).

As scholars have uncovered equity issues in CCR and the need for parental engagement, the ESSA focused regulations on parental involvement (Mwangi, Cabrera, & Kurban, 2019). ESSA §1116(B), added to the legislation of parent and family involvement and required schools to provide activities to engage families to increase students' academic success and the schools' success. The local education agency (LEA) must put aside one percent of the allocation to

activities that involve parents and schools. The ESSA emphasized and tasked all LEAs to focus on lower income families and English Language Learners.

Navigating the college admission process and financial aid process could be especially difficult for minority groups and families with low economic status as adults in poverty may lack student financial aid knowledge and may be unable to fund the student's postsecondary education (Prins, Kassab, & Campbell, 2015; Taylor & Bicak, 2019). Unless a parent has gone to college or technical school themselves, they do not know the ins and outs of financial aid (Greenfield, 2015). Parents should learn about financial aid to understand post-secondary education options for the student and to help them collectively make informed decisions. The financial decisions involve the parent and the student. Parent engagement is crucial to student CCR.

Parents need to know about the benefits students would derive if they attended college or technical school. Individuals that attain post-secondary education earn more money, have improved health care, nicer work settings, and increased social and economic standing (Yavuz, Parzych, & Generali, 2019). To create a level playing field for all students, it is imperative parents are provided financial aid information (Dahir & Stone, 2012).

The financial aid application and associated tasks are hard to decipher for all pupils, but it is less difficult for higher socioeconomic students than low socioeconomic students because the higher income households have greater social capital, connections to people and networks, that make the tasks less challenging (Bloom, 2007; Greenfield, 2015). Again, equity issues abound for African Americans, Latino, Hispanic, and lower economic status students. A large segment of underprivileged and nonwhite students did not have access to parents or people in homes nearby to tap as a resource and to learn about financial aid for college (Greenfield, 2015; Zarate

& Fabienke, 2007). Across the country, student to guidance counselor ratios remain high and are even greater in high poverty schools (Greenfield, 2015; NACAC, 2012). Scholars have found that the addition of one school counselor could increase students' college entrance by 10 percent (Hurwitz & Howell, 2013; Perusse, Poynton, Parzych, & Goodnough, 2015).

School Counseling

The ESSA Act required that school counseling become a part of CTE and CCR. Researchers have found school counseling to be an evidence-based practice for CCR interventions (Geroski & Knauss, 2000; Kaplan, Skolnik, & Turnbull, 2009). School counseling regarding colleges and careers has demonstrated success; however, evidence has illustrated a need for additional professional development in this area (Gilfillan, 2018; Parikh-Foxx, Martinez, Baker, & Olsen, 2020). Leaders have rarely mandated school counselors to receive training on counseling for colleges and careers (Clinedinst & Koranteng, 2017; Parikh-Foxx et al., 2020). Yet, many researchers found school counselors functions vital to students' preparation for colleges and careers (Lapan, Poynton, Marcotte, Marland, & Milam, 2017; Parikh-Foxx et al., 2020).

Students faced with college and career choices confront additional challenges based solely on ethnicity or the family's socio-economic status. Since 2009, black, Hispanic, and Indians aged 24 to 65 have the smallest college completion levels, although the rate has improved some in recent years (Parikh-Foxx, Martinez, Baker, & Olsen, 2020). Another inequality of college degree attainment remained as lower socio-economic students (41%) completed a bachelor's degree compared to higher socio-economic students (74%) earning the degree (Page & Scott-Clayton, 2016; Parikh-Foxx et al., 2020). Another subset of students identified as needing intensive support for CCR counseling is first generation college-bound

students as research has shown these students are not as capable of relying on their parents for help as their peers who have parents who went to college (Cholewa, Burkhardt, & Hull, 2015; Gilfilan, 2018).

Some investigators proposed the CCSS curriculum for Tier I intervention by school counselors to increase awareness of all things related to going to college, to stimulate students' desires, and to create confidence and belief in students' skills and abilities to successfully manage college after graduation (Villares & Brigman, 2019). There are interventions with respect to different types of schools, but the school counselor's role is critical regardless of the makeup of the school. Another study focused on lining up school counseling services with the Multi-Tiered Systems of Support to meet all students across Tiers I, II, and III with targeted interventions in each Tier (Parikh-Foxx et al., 2020).

The College Board's National Office for School Counselor Advocacy (NOSCA) created eight standards for college and career counseling in 2010. The eight standards are: (a) post-secondary ambitions, (b) educational preparation for college and career readiness, (c) enhancement and extramural encounters, (d) college and career investigation and choice procedures, (e) post-secondary and occupation valuations, (f) post-secondary map to funding college, (g) post-secondary and occupation entry procedures, and (h) movement from post-secondary education to post-secondary enrollment. Research found that guidance counselors use parts of the eight standards based on their own values, had an average value attributed to equity for those other than white and with low socio-economic status, but counselors rated the application of each of the standards inferior (Perusse et al., 2015).

Many cross-sector organizational partnerships are needed to help meet the needs of all students and to meet the challenges presented of the high ratio of students to each counselor,

untrained counselors who provide CCR services to students, and the need to focus on underrepresented student groups. Schools are in need of creating partnerships with organizations outside of the school system. Scholars suggested that school counselors could identify outside sources to secure the resources needed to accommodate the demands of the PLC (Arriero & Griffin, 2018).

Business and Industry Partnerships

Schools are challenged in meeting the CCR needs of students, in meeting the needs of the workforce, and addressing the challenges of student competitiveness in the U.S., so schools have had to partner with organizations outside of the buildings. School plans regarding CCR progressively connected to industries outside of the education sector (Henig, Riehl, Houston, Rebell, & Wolff, 2016; Malin & Hackmann, 2018). Very little CCR cross-sector leadership studies have examined education, community, and businesses leadership in the championing of CCR in secondary school academies (Malin & Hackmann, 2018).

Researchers defined cross-sector collaboration as connecting or distributing means, actions, and abilities by groups in two or more industries together to accomplish what would not be able to be accomplished in one industry alone (Bryson, Crosby, & Stone, 2006; Malin & Hackmann, 2018). Researchers of public administration have studied cross-sector affiliations; however, few studies focused on education where effectiveness centered on DL across industry borders (Malin & Hackmann, 2018). A large involvement of PLC members has improved student learning (Hitt & Tucker, 2016; Malin & Hackmann, 2017).

Partnering with businesses and community leaders provided innumerable benefits to students by helping educators connect with the real-world in their lessons and by providing novel concepts (Mailin, 2018). Economic budget ails, forced reporting, and free enterprise have

brought heads of school to recognize the significance of creating alliances with commerce and not-for-profits (Aidman & Baray, 2016; Bennett & Thompson, 2011). A PLC included a number of alliances working vertically and horizontally and at different levels based on the community to form circumstances and to slash obstacles for kids (Aidman & Baray, 2016).

Summary

The literature review was found to suggest that in order to create change through innovation and meet the needs of students in the 21st century's knowledge economy, leaders need to break down the walls of the traditional school and enlist members of the entire PLC. Members of the community should collaborate and carry out systems and plans for students to become college and career ready. In order to be a change agent educators will need to use social cognitive skills in order to take different research-based approaches, interact in different experiences, receive guidance socially, to model influences, and to assimilate them into new cognitive frameworks that will help lead educators to analyze best practices and put them into place. Research demonstrates the need for educators, students, and collective self-efficacy in order to create and implement change.

Leaders and teachers have to address the STEM skills gaps as well as the college and career readiness skills in order to have learners competent in the 21st century in a global society. CTE is a sustainable, existing program that naturally provides students with technical skills, employability skills, and a real-world context. A gap in the research is present. There are no identified studies on stand-alone CTE centers' best practices in facilitating college and career awareness and readiness in students.

CHAPTER THREE: PROPOSED METHODS

Overview

The purpose of this applied study is to solve the problem of a lack of postsecondary college and career awareness and readiness among students in a rural CTE center in Northern Virginia and to formulate a solution to address the problem. A multimethod design will be used and will consist of both qualitative and quantitative approaches. The first approach will be semi-structured interviews with open-ended questions with administrators. The second approach will be a focus group consisting of businesses. The third approach will be a closed-ended survey with CTE students. Chapter Three supplies a narrative of the research design, including data collection and analysis, the research questions, the setting, the participants, the researcher's role, the ethical considerations, and the summary.

Design

A multimethod research design will be used for this applied study. Creswell (2008) explained there are researchers, referred to as methodological pluralists, who use two or more methods in their research. Creswell (2008) asserted there are numerous realities in education and using one method will not bring both empirical and personal breadth afforded when using one method. The researcher will examine the participants through open-ended interviews. Kasza and Slater (2017) conducted such a qualitative research study with interviews of educators. The phenomenon in the qualitative study was the best practices and key learning objectives of a successful STEM school.

According to Creswell (2018), researchers chose a qualitative or quantitative study and the approach based on their background, views, format, plan, approaches, and research issue. The research methods found to solve the research problem require a multimethod study as it sets

out to improve student awareness of careers, post-secondary educational opportunities and CCR. The research problem and the methods lent itself to what Creswell (2018) described as a multimethod study with qualitative interviews and a quantitative survey.

The investigator will use three data collection approaches for this applied dissertation. There will be two qualitative approaches and one quantitative approach. The first qualitative data collection method will be interviews with administrators from a rural CTE center in Northern Virginia. The second qualitative data collection method will be a focus group with businesses. The third data collection approach will be a survey of CTE students with a Likert scale. adapted from South Carolina's College and Career Ready survey (George, Dory, Hoffman, & Chung, 2007). For the survey a purposeful sample of all CTE students in the CTE center will be delivered electronically through the use of a Google Form. All students have a Chromebook issued by the school system and are proficient in completing Google Forms.

Research Questions

Central Question: How can the problem of a lack of post-secondary college and career awareness and readiness among students be solved at a CTE Center located in Northern Virginia?

Sub-question 1: How would administrators in an interview solve the problem of a lack of post-secondary college and career awareness and readiness among students at a rural CTE Center in Northern Virginia?

Sub-question 2: How would business leaders in a focus group solve the problem of a lack of post-secondary college and career awareness and readiness among students be solved at a rural CTE Center in Northern Virginia?

Sub-question 3: How would students inform the problem of a lack of post-secondary college and career awareness and readiness among students at a rural CTE Center in Northern Virginia?

Setting

The multimethod, applied study will take place in a rural Northern Virginia area CTE center. The CTE center includes CTE programs as well as alternative education programs. The high school CTE programs and students within the building are in the following career clusters: (a) automotive, (b) construction, (c) medical, and (d) technology. There is a middle school alternative program and three step, level alternative programs. The building opened as a CTE center in 1968. The investigator chose this setting for an applied study as a problem was identified through data, experiences, and exchanges while working directly with CTE teachers and students in a natural working environment. The researcher is the primary administrator of CTE programs in the building.

The daily schedule is based on a day one and day two alternating block schedule. There are 206 CTE students, 102 on day one and 98 on day two. The organizational structure consists of a leadership team of a principal and two assistant principals, a lead alternative education teacher, and a lead nurse aide teacher. Security personnel include one school security officer and one school resource officer who is shared with another school. Administrative staff consists of two secretaries and one bookkeeper. There is a lead custodian and another custodian that keeps an older building pristine. There are nine CTE teachers, one teaching computer courses to alternative education students. Eighty-five percent of the CTE students are White, 11 percent are Hispanic, and 4 percent are Black students.

The school system participates in an equity program, developed by Gary R. Howard, which was a large investment and commitment. The system is student, family, and community centered and leaders from the top down care and support the PLC. There is a strong commitment to CTE with a relentless focus on preparing students for life beyond high school.

Participants

The two qualitative methods, interviews with individuals and interviews with members of a focus group, will involve a similar sampling strategy, purposeful sampling, which is when an investigator wants to explore, realize, and learn and a sample of experts is needed to learn the most from the participants. Educational investigators asserted purposeful sampling creates a thorough knowledge of cases that include abundant subjective and objective facts and stories (Merriam, 2015; Patton, 2015).

Purposeful sampling is defined as “a process in which data gathering is guided by the evolving theory and the aim is to develop categories in terms of their properties and dimensions and integrate those categories (i.e., relate them to each other within the theory being developed)” (Gentles & Vilches, 2017, p. 3). Participants in the study are chosen because they offer experience and context and will add prolific information to the study. For the quantitative portion of the study a random sampling will be done to decrease the chance of bias. The quantitative method of a survey will involve a probability purposeful random sampling of all CTE students. The researcher will record, transcribe, and analyze the frequency counts.

The Researcher’s Role

I am an educator working in the public-school system for over 20 years, as an Apprenticeship Representative for five, and an instructor for a local community college, I have had the pleasure to get to know and care for young people. During the first five years teaching

CTE courses, being promoted to the role of Instructional Technology Resource teacher, to a Co-Op coordinator and now serving as a CTE administrator, I have first-hand knowledge and expertise in CTE, business and industry needs, and skills students need to be successful in college and careers.

I have experiential knowledge that has provided me with a passion for CTE as my dad was a skilled tradesman who provided me a full and stable childhood, due to my work with adults in apprenticeship training programs, and while helping students gain marketable skills in the CTE classes I taught at the beginning of my career. I am a professional colleague to the participants except for the CTE students who know me as an assistant principal of the CTE center.

As an administrator at the site and someone who knows the students well, it is imperative a simple random sample be used to elicit students for the survey. The simple random sample will remove the investigator from the selection of students and eliminate bias in the survey. Because of the power and obedience relationship, it is not appropriate for the researcher to have the teachers the investigator supervises in the study (Stangor, 2011). Bracketing is described as researchers recognizing the importance to give way to one's background in order to take a new view of the study subjected to evaluation (Creswell & Poth, 2018).

Procedures

IRB permission will be obtained following Liberty's required process (see Appendix A for IRB approval). The researcher will gain approval to conduct the study in writing by the assistant superintendent of instruction (see Appendix B). A focus group should have approximately 20 members (Merriam, 2015). The researcher will not interview any teacher or staff member supervised by the scholar.

School leaders and business leaders will be petitioned through letters of invitation by email to participants who can better meet the experiences that most relate to the CTE center. Purposeful sampling will be used to select the participants who can best advise the researcher about CCR and awareness of CTE students at the center. Purposeful sampling will allow the best participants to be selected as they have immediate and direct familiarity with preparing students for college and careers (Creswell & Poth, 2018).

Data Collection and Analysis

The first sub-question for this study investigates how administrators in an interview would solve the problem of a lack of post-secondary CCR and awareness among students at a rural CTE Center in Northern Virginia. Data collection and analysis will comprise of open-ended interviews. During the interviews, the interviewer will use “opinion and value questions” described by Merriam (2015) as the types of questions one asks if interested in an individual’s opinions and beliefs about a problem (p. 118). The interviews will be semi-structured as Merriam (2015) recommends one do when providing participants with a definition, for example, of mentoring and then asking the participant to recognize a teacher who is a mentor. Semi-structured interviews relate to the qualitative design as it seeks to answer the “how” and “why” questions (Azungah, 2018).

For the quantitative part of the study, the investigator will collect CTE student data through a survey using a 5-point Likert scale. Data will be collected into a Google Sheet as soon as a student clicks the submit button on the survey. The analysis of the Likert survey will be completed using a quantitative computer program in order to obtain the descriptive statistics. The data will be analyzed using the IBM Statistical Program for Social Sciences, IBM SPSS, and a statistical software program to determine frequencies and percentages for each of the questions

(Harvey, Timmerman, & Vazquez, 2016). The researcher will read a definition of college and career ready and ask the interviewees to answer focused questions about career and college awareness and readiness. The first step to take in qualitative analysis is to generate descriptive statistics like rate of recurrence, average, means, standard deviations (Brickman & Rog, 2009).

The student survey is created using a Likert scale as follows:

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

The researcher will use the Likert scale survey to obtain quantitative data. Quantitative data alone will not capture the rich detail that the qualitative data provides which is the reason a multimethod design will be used for this study.

Interviews

The first sub-question of this study investigated how administrators would solve the problem of a lack of post-secondary CCR and awareness among students at a rural CTE Center in Northern Virginia. Interviews will be conducted with administrative team members from various sites the CTE center serves. The researcher plans to use Google Meets to conduct the interviews. The semi-structured interviews will be scheduled for one and a half to two and a half hours, take place synchronously face-to-face, and be recorded to capture the interview and keep it for data analysis (Merriam, 2015). Time will be allocated immediately after the interview for the researcher to transcribe for data analysis.

Creswell (2008) spoke to the need to concentrate on some parts of the data and ignore other parts of the data looking at only five to seven themes within it. Creswell (2008) described the qualitative investigator using multiple forms of open-ended data as it will add to the validity of the study through triangulation. Gonzales et al. (2014) used data gathered through watching, interviewing, and program documents to create a triangulated framework that established models to bring about increased internal validity which is in line with the research questions. The researcher plans on utilizing a focus group, interviews, and surveys in order to triangulate.

For validity, the investigator intends to use peer debriefing and member checking (Creswell, 2008). The examiner will address reliability by using generalizing, comparing with other cases, and by rechecking codes to determine if there are any movements within the themes throughout the inquiry (Creswell, 2008). There will be the use of inductive inquiry to develop in-depth themes while going back and forth between the database and themes and then a deductive inquiry to see if a scholar needs to further explore a theme or if more information needs collecting for the study (Creswell, 2008).

Creswell (2008) described a qualitative study as evolving because the academic sets out to explain the participants' awareness of careers and post-secondary educational opportunities. The scholar will need to look upon their own experience and be cognizant of how it may impact the study and themes throughout the research (Creswell, 2008). The researcher plans to use reflection throughout the study to reduce the chance of bias in the study.

The questions for the face to face interviews are as follows:

Read the definition of college and career ready: a student is college and career ready when they do not have to take remedial courses in college or technical school (Conley, 2012).

Next, the researcher will ask the following questions of participants:

1. How do you define college ready?

The question sets out to determine how the participant defines college ready. Castellano et al. (2016) used the U.S. Association for Career and Technical Education's (ACTE) definition of CCR which encompasses three sets of skills with the first being the core academic skills that allow students to enter postsecondary education without the need for remedial courses.

2. How do you define career ready?

This question asks to determine how the participant defines career ready. Castellano et al. (2016) used the U.S. Association for Career and Technical Education's (ACTE) definition of CCR which encompasses three sets of skills with the third being do students leave high school ready to enter college and/or start a career? Santelises' (2017) report reflected almost fifty percent of students who graduate high school in the U.S. are not ready for college or a career.

3. Describe the attributes of a student you identify as ready to leave high school and being aware of post-secondary opportunities and/or careers?

This question solicits to determine what attributes the participant assigns to a CCR student. Hein et al. (2013) identified student indicators for postsecondary college and career success as: (a) fewer than 10 absences; (b) successfully completing all classes but one; (c) completing a specific math sequence; (d) 3.0 or higher GPA; (e) score 4 or higher on an AP test; (f) completion of a dual enrollment course; (g) passing state assessments; (h) completion of the FAFSA; (i) minimum scores for national exams; and (j) participation in bridge and college and career programs or study.

4. Describe the partnerships you have with businesses in the community?

This question summons to determine the partnerships the school has with businesses in the community. Castellano et al. (2016) reported that in 2010 the U.S. Department of Education broadened a model provided to school districts with 10 support components recommended to meet Perkins IV mandates related to a program of studies and the first one is business partnerships.

5. Describe the partnerships you have with colleges and technical schools in the community?

This question looks to determine the partnerships the school has with colleges and technical schools in the surrounding area. The Carl D. Perkins Act (2006) provides funds to help cover costs associated with students developing technical competencies while taking CTE programs of study and is aligned with students gaining skills for college and career transitions and contains recommendations to include relationships with businesses and post-secondary schools (Malin and Hackmann, 2017; Taylor et al., 2009).

6. How are colleges and careers explored by students in your school?

This question invites to determine opportunities students have to explore colleges and careers in the participant's school. Villares and Brigman (2019) conducted an experimental study on College/Career Success Skills curriculum and is focused on reviews of effective CCR literature on the important components of CCR. Villares and Brigman (2019) report Cohen's d effect sizes for mediation provided by guidance on occupation growth and the process of making decisions was .20, there was a .40 effect size when peers assisted with delivery of the curriculum, and a general effect size for guidance mediation being a .30.

7. Why are CTE courses for all students?

This question calls to determine if the participant agrees that CTE courses are for all students. Plasman's et al. (2017) experiment found that there is an association between students completing a CTE cluster and then completing postsecondary programs.

8. How do CTE courses uniquely benefit students in CCR and awareness?

This question provokes to determine if the participant identifies CTE courses with inherently authentic and real-world rigorous learning. Brand et al. (2013) asserted that giving pupils more chances to engage in CTE provides an existing, broad, and comprehensive blueprint and makes a difference in each of CCR areas needing improvement.

9. Describe the instructional steps would you recommend schools take to improve student awareness of post-secondary opportunities and CCR?

This question provokes to determine the participant's ideas for improving student awareness of post-secondary opportunities and careers and CCR. Brand et al. (2013) describe steps schools can take to increase CCR. Some of the steps Brand et al. (2013) recommend to achieve this goal include: (a) making teaching and learning in secondary schools more thorough; (b) captivating attention; (c) making school work applicable to life; (d) improving graduation rates for all; and (e) giving students more career and college investigation activities.

10. How are CTE courses and academic courses integrated in your school?

This question induces to determine how CTE and academic courses integrate in the participants' school. Gibbs (2016) suggests research proves students who take CTE courses integrated with academic courses are less likely to drop out of school and are more likely to set up career goals.

Focus Group

The second sub-question for this study was used to investigate how business leaders in a focus group would improve awareness of post-secondary education and career opportunities for students in a rural CTE center in Northern Virginia? The focus group consists of safely designed talks in an accommodating and safeguarding setting that focuses on insights about a particular topic of concern (Bickman & Rog, 2009; Krueger & Casey, 2000). This study will employ open-ended questions using both observation and interviewing qualitative data collection approaches. The employment of focus groups is much like interviews if structured with group interviews and seeks out to investigate others perspectives and values on education reform (Nyumba, Wilson, Derrick, & Mukherjee, 2018).

There are pre-planned questions for the business leaders in a focus group. There is a total of 17 focus group interview questions. Each focus group session will be between one and a half and two and a half hours (Bickman & Rog, 2009). The focus group members' responses will provide data that is abundant unlike the limited five-point Likert scale survey of CTE students. The interviews, the focus group, and the survey are designed to capture individual perceptions regarding CCR.

The overall goal of the social constructivist is to examine the study through the eyes of the participants, as described by Creswell (2018) and Merriam (2015). The constructivist worldview is suitable for a qualitative study. In a focus group, the participants construct meanings through group talk with sharing of their own views, hearing others, and refining their views and this collaboration provides for data different than that of individual interviews (Hennink, 2014; Merriam, 2015). The focus group will provide narrative data into administered data through transcripts which are coded according to themes (Bickman & Rog, 2009; Huberman & Miles, 1994).

The researcher will use face-to-face, semi-structured, open-ended questions of focus group participants in a rural school system in Northern Virginia. The focus group will consist of five members which are in line with Merriam's (2015) recommendations. The researcher plans to have the CTE supervisor be the mediator of the focus group due to experience in leading focus groups.

Creswell (2008) discussed the need to concentrate on some parts of the data and ignore other parts of the data looking at only five to seven themes within it. Creswell (2008) described the qualitative investigator using multiple forms of open-ended data as it will add to the validity of the study through triangulation. Gonzales et al. (2014) used data gathered through watching, interviews, and program documents to attain triangulation that established themes and generated internal validity of the study. The researcher plans on utilizing interviews, a focus group, and surveys to triangulate.

For validity, the investigator intends on facilitating peer debriefing and member checking (Creswell, 2008). The examiner will address reliability by using generalizing, comparing with other cases, and by rechecking codes to determine if there are any movements within the themes throughout the inquiry (Creswell, 2008). There will be the use of inductive inquiry to develop in-depth themes while going back and forth between the database and themes. A deductive inquiry will enable the researcher to see if a scholar needs to further explore a theme or if more information needs collecting for the study (Creswell, 2008).

The questions asked of the focus group are as follows:

Read the definition of college and career ready: a student is college and career ready when they do not have to take remedial courses in college or technical school (Conley, 2012).

1. Describe whether students leave high school ready to enter college and/or start a career?

The question induces the opinions, values, and perceptions of student awareness and readiness for post-secondary opportunities and careers. A report reflected almost 50% of students who graduate high school in the U.S. are not ready for college or a career (Santelises, 2017).

2. What are attributes of a student that is prepared to enter college or a career upon graduation?

The question focuses on the attributes of a student believed to be college and career ready. Identified student indicators for postsecondary college and career success are: (a) fewer than 10 absences; (b) successfully completing all classes but one; (c) completing a specific math sequence; (d) 3.0 or higher GPA; (e) score 4 or higher on an AP test; (f) completion of a dual enrollment course; (g) passing state assessments; (h) completion of the FAFSA; (i) minimum scores for national exams; and (j) participation in bridge and college and career programs or study (Hein et al., 2013).

3. Describe the steps you recommend schools take to improve the awareness of post secondary opportunities and careers of students?

The open-ended question allows the participant to identify problems from their perspective and provide ideas in order to move the study forward. Several researchers have studied the grounding of efficacious CCR and found successful interventions were vital in training students to be ready for the 21st century global economy (Bouffard & Savitz-Romer, 2012; Carnevale, Smith, & Strohl, 2010; Conley, 2010; USDOE, 2010; Villares & Brigman, 2019).

4. How would you envision a partnership between your business and the CTE center with a mission to increase CCR and awareness?

The question incites the leaders' thoughts about partnering with the school to increase students' CCR and awareness. A report indicated that in 2010 the U.S. Department of Education broadened a model provided to school districts with 10 support components recommended to meet Perkins IV mandates related to a program of studies and the first one is business partnerships (Castellano et al., 2016).

5. Describe the preparation of high school students entering into the labor market directly after graduation?

The question probes to determine the opinions, values, and perceptions of student awareness and readiness for post-secondary opportunities and careers. A report reflected almost 50% of students who graduate high school in the U.S. are not ready for college or a career (Santelises, 2017).

6. How do high school graduates describe their level of preparation when entering the workforce after graduation?

The question queries the opinions, values, and perceptions of student awareness and readiness for post-secondary opportunities and careers. A report reflected almost 50% of students who graduate high school in the U.S. are not ready for college or a career (Santelises, 2017).

7. Describe students understanding of the local post-secondary technical schools and colleges that align with their career interest?

This question offers whether the student created a plan to reach the student's goal of going to college and/or enter a career after graduation. Studies show that students who plan for

after graduation and recognize the link between high school and college and careers will stay involved and earn a high school diploma (Gibbs, 2016; Vilhjaldsdottir, 2010)

8. Discuss the skills needed to write a cover letter to apply for a position in your company?

This question investigates to determine if the student has gained skills in creating a cover letter to use to apply for a job and/or college. According to Hernandez-Gantes et al. (2017), in an academy setting, teachers had students create cover letters and resumes and then worked with businesses to have them come in and assist with mock interviews in order to help students become CCR. Hernandez-Gantes et al. (2017) assert the academy's resume, cover letter, and interviewing activities addressed student CCR weaknesses.

9. Describe the students understanding of the skills needed to write a resume to apply for a position in your company?

This question asks if the student has created a resume to apply for a job and/or college. Partnering with businesses and community leaders provided innumerable benefits to students by helping educators connect with the real-world in their lessons and by providing novel concepts (Mailin, 2018).

10. Describe the skills needed to appropriately interview for a position in your company?

This question examines whether the student has learned about the do's and don'ts of interviewing to apply for a job or college. Hernandez-Gantes et al. (2017) worked with employers and academy staff to give students feedback on shaking hands and on their performance during the mock interview.

Creswell (2008) described a qualitative study as evolving because the academic sets out to explain the participants' awareness of careers and postsecondary educational opportunities and

CCR. The scholar will need to look upon their own experiences and be cognizant of how it may impact the study and themes throughout the research (Creswell, 2008). Removing bias is the goal and the researcher's reflection is crucial throughout the study.

Survey

The third sub-question of this study investigated how quantitative survey data of CTE students would inform the problem of the lack of awareness of post-secondary education and career opportunities for students in a rural CTE center in Virginia? The researcher will conduct a student survey and once administered will collect quantitative data. The survey will be in the format of a Likert scale and was created using a Google Form. The survey questions in a Likert scale will be analyzed using descriptive statistics: median, mode, and standard deviation. The survey questions are adapted from a validated college and career readiness survey (Lovelace & Brickman, 2013).

The CTE student interviews will be conducted through a web-based survey. There are advantages to the web-based survey, Google Form, as the data is collected and recorded simultaneously, students input their own data, there is no cost incurred for the data collection, time is saved for collection and recording, and data is immediately available to the researcher (Bickman & Rog, 2009). Using a web-based survey provides a reduction in the possibility in data collection errors. All students are assigned individual Chromebooks and have access to the computer at home.

The questions placed in a Google Form for delivery of the survey are as follows:

Demographic Data:

1. Gender:
 Male

Female

2. Ethnicity:

African American

Asian/Pacific Islander

Hispanic/Latino

Native American

White (Non-Hispanic

Other

3. Grade Level:

10th grade

11th grade

12th grade

4. CTE Program of Study

Auto Body

Auto Technology

Building Trades

Cybersecurity

Nursing

5. I know where I am going to go to college or work after graduation?

5

4

3

2

1

Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

Successful transition from high school is important for student success. In 2015-2016, 84% of students graduated high school, but most fail to make successful transitions, especially low-income students (Rosen et al., 2016; Carnevale et al., 2013).

6. I have a plan to attend a technical school/college after I graduate?

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

Setting goals is an important antecedent of attaining goals. Studies show that students who plan for after graduation and recognize the link between high school and college and careers will stay involved and earn a high school diploma (Gibbs, 2016; Vilhjalmsdottir, 2010).

7. I am aware of partnerships between my school and local businesses?

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

Students should have opportunities to work with businesses in order to explore career pathways. Research has established that businesses should work with schools to mentor students in career pathways (Broadbent & Cacciattolo, 2013).

8. I am aware of technical schools and colleges that have partnerships with my school?

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

Careers in demand today require some post-secondary education. CTE career pathways in schools were not intended to have students go straight into the workforce but plan for at least some post-secondary education upon graduation, but not necessarily a bachelor's degree (Rosen et al., 2018).

9. Business speakers have come to my school to discuss college(s) and career(s).

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

Business speakers in schools allows students to explore careers and offer application of CTE courses. If students are to have real-world authentic learning opportunities, businesses will need to be involved with providing context within the school (Broadbent & Cacciattolo, 2013).

10. I have attended a college and/or career fair at my school.

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

Businesses in the community expect schools to help them fill positions. Attending career programs in schools is one of the first occasions a student learns about CTE courses in their school (Rosenfeld, 2018). Employers are demanding schools help them in acquiring a talented workforce in order to fill jobs and help their business (Townesley, 2017).

11. I have gone on field trips to businesses while in school.

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

It is advantageous for students to attend field trips to businesses in the community to learn about the opportunities available to them after high school. A school's work to produce CCR students would not be genuine or worthwhile if students did not interact with those who are in the field (Malin & Hackmann, 2016).

12. I feel confident about writing an essay for college.

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

Colleges expect a first-year college student in English class to be able to write an essay with very few errors. When students enter a career, an employer would expect them to be able communicate effectively, learn skills, information, and instruments speedily (Conley, 2007; Lombardi et al., 2014).

13. I am confident in my skills to create a resume to give employers and/or colleges.

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

To apply for a job, resumes may be required for employers. Transition competencies laid out in Morningstar's et al., (2017) CCR framework include critical skills as completing college and job applications and writing a resume.

14. I am confident in my skills to create a cover letter to give employers and/or colleges.

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

To apply for a job, employers may require a cover letter. According to Hernandez-Gantes et al. (2017), in an academy setting, teachers had students create cover letters and resumes and then worked with businesses to have them come in and assist with mock interviews in order to help students become CCR. Hernandez-Gantes et al. (2017) assert the academy's resume, cover letter, and interviewing activities addressed student CCR weaknesses.

15. I am skilled in proper etiquette required of interviews.

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

Interviewing is an employers opportunity to ensure the candidate is a good fit for the position and is an important skill needed to apply for jobs. Hernandez-Gantes et al. (2017) worked with employers and academy staff to give students feedback on shaking hands and on their performance during the mock interview.

16. I feel confident in my skills to resolve conflict in a professional manner.

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

Skill in resolving conflict is necessary for success in a career and/or college. Rogers-Chapman and Darling-Hammond (2013) describe conflict resolution as a critical skill needed regardless of whether entering the workforce or college after high school graduation.

17. I feel confident in my skills to write a formal business letter.

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

Writing a formal letter is a necessary life skill. Stone (2017) discusses how CTE teachers teach writing in the context of technical writing and help to build foundational skills learned in core classes. A first-year college student in English class is expected to be able to write an essay with very few errors (Conley, 2007; Lombardi et al., 2014).

18. I feel confident in my ability to be successful in an AP course.

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

AP course enrollment aides in student CCR. Indicators of CCR were identified by and taking AP courses are one of them (Hein et al., 2013)

19. I feel confident in my ability to be successful in a dual-enrollment course(s).

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

Enrollment in dual-enrollment course(s) assists in students' CCR. This question asks whether students feel confident in their ability to be successful in dual-enrollment courses. Hein et al. (2013) determined indicators of CCR and taking a dual enrollment course are one of them.

20. I am aware of the benefits of my participation in a student organization/club at my school.

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

Participation in student organizations is linked to a better chance of attending college. ACTE (2011) presents research showing that students have higher grades and have a higher

probability to attend college by legal age if they are involved with school organizations in 10th grade.

21. I am knowledgeable about the benefits of taking two or more Career and Technical Education courses.

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

Students taking two or more CTE classes correspond to attendance in a post-secondary course. A large study of 6,000 students found that there was an array of one CTE course in high school to one course in post-secondary education (Plasman et al., 2019).

22. I have participated in a work-based learning experience (job shadow, internship, and co-op).

5	4	3	2	1
Strongly	Agree	Neither	Disagree	Strongly
Agree		Agree or		Disagree
		Disagree		

Student participation in a work-based learning experience provides rich education and industry learning opportunities. Student participation in a work-based learning experience provides technical course application and paves the way for CCR (Alfred & Bhattacharya, 2012; Malin & Hackmann, 2017).

Ethical Considerations

Ethical research is sound and trustworthy and reflects the ethics of the researcher themselves (Mirriam & Tisdale, 2016; Patton, 2015). The researcher's background, accuracy, plus schooling determines the credibility of the study (Mirriam & Tisdale, 2016; Patton, 2015). Because people are wary of studies completed without integrity, the researcher must practice integrity at all times (Bickman & Rog, 2009). Having integrity will bolster participant trust and willingness to participate in the study. A researcher should avoid "going native" is explained in qualitative parts of the study as siding with individuals in the study and only sharing positive information; "going native" is explained in quantitative areas of the study as throwing out data that is in line with the researchers hypotheses (Creswell, 2013, p. 94).

The researcher will save electronic files in multiple places, use the best possible audio tapes to record interviews, ensure the tapes are designed for the recorder being used, type a document with noted kinds of data types, keeping participants anonymous, and create a visual template for finding and easily seeing data (Creswell & Poth, 2013). For the listing of student names, a CTE aide will take the names made available and put them in an Excel spreadsheet. Randomization of students' names, based on the Excel spreadsheet row number, allows the researcher to assign the students to the survey without bias. This is important because the CTE administrator has information about all of the CTE students in the building which could cause bias.

To ensure security and confidentiality, the plan is to lock all materials in a filing cabinet found in a vault at the central office of the school. Selection of students for the survey will be random to remove the researcher from the selection of students. The researcher will take steps to ensure confidentiality of the site and participants with the use of pseudonyms throughout the

study so that the participants' names will not be seen. Before starting the study, the researcher will get IRB approval.

Summary

A multimethod design was used for this study. Research questions set out to solve the problem of a lack of post-secondary CCR and awareness among students in a rural CTE Center in Northern Virginia. Interviews, a focus group, and surveys were used with targeted members of the PLC. As an administrator for the CTE Center it is critical to practice bracketing in order to be unbiased and in order to not side with participants of the study. Further, the researcher will ignore data that favors the researcher's hypotheses. Data collection and analysis will involve descriptive statistics. For students to graduate high school and be ready for college or careers, they will need to have schools engage in DL to create environments and opportunities for students to become aware of college and career opportunities post-graduation. Students need to have several experiences with technical schools/colleges and businesses, inside and outside of the school, to gain the skills needed to meet the needs of the 21st century and the knowledge economy. In doing so, schools can increase the awareness of postsecondary college and career options and help prepare students that are CCR.

The literature review depicted a lack of evidence in students graduating high school being CCR, yet research is full of the indicators of CCR (Malin & Hackmann, 2017; Passarella, 2018). There are several studies describing CCR strategies implemented in academies in large high schools and STEM academies, stand alone, or within high schools, but missing is a body of research on meeting the CCR competencies for individual, stand-alone CTE centers. This author's research will bridge the gap using a DL framework to discover the best practices to increase student awareness of post-secondary education and career opportunities for students in a

rural CTE center, thus having students become ready for college and/or careers once they graduate.

For the study, the researcher will use deliberate practices to avoid potential biases and made decisions to prevent them from impacting the study. Businesses will be represented within the focus group. A multimethod research design will ensure a rich case with both qualitative and quantitative measures used through interviews, a focus group, and a survey and will confirm triangulation of data. IRB approval will be obtained by the researcher before beginning the study.

CHAPTER FOUR: FINDINGS

Overview

The purpose of this applied study was to solve the problem of a lack of post-secondary CCR and awareness among students in a rural CTE center in Northern Virginia and to formulate a solution to address the problem. The problem is a lack of post-secondary CCR and awareness among students in a rural CTE center in Northern Virginia. Consequently, the central question that steered this study was postured, “How can the problem of a lack of post-secondary CCR and awareness among students be solved at a rural CTE Center in Northern Virginia?” Chapter Four describes the results of the research including a description of the participants and a presentation of the results of the collected research data.

Participants

Educational investigators assert purposeful sampling creates a thorough knowledge of cases that include abundant subjective and objective facts and stories (Merriam, 2015; Patton, 2015). Purposeful sampling is defined as “a process in which data gathering is guided by the evolving theory and the aim is to develop categories in terms of their properties and dimensions and integrate those categories (i.e., relate them to each other within the theory being developed)” (Gentles & Vilches, 2017, p. 3). Participants in the study were chosen because they offer practice and perspective and will add rich information to the study. Administrators and business leaders have experience in working with students and schools to help prepare young adults for college and careers. Students have experience in attending school and gaining knowledge and skills needed to successfully transition after graduation.

Interview Participants

Four administrators were purposefully selected to participate in semi-structured

interviews regarding student CCR and awareness. The administrator participants included four chief administrators with an average age of 55-years-old. There were two females and two male participants. All administrators were Caucasians. Four administrators have master's degrees. The administrator participants have an average of 25.25 years' experience in education. In the study, each of the administrator participants were denoted by pseudonyms, Administrator One, Administrator Two, Administrator Three, and Administrator Four.

Table 1

Interview Participants

Administrator	Age (Standard Deviation = 7.51)	Years Experience (Standard Deviation = 4.16)
Administrator One	57	21
Administrator Two	63	30
Administrator Three	50	28
Administrator Four	50	22

Administrator One, was in her upper fifties and has worked in CTE for a little over 20 years. The CTE professional educator worked up the ranks in education to lead a VA recognized CTE program of excellence in the division. The administrator suggested the need for a division-wide plan to address CCR and awareness among students and stated, “there is a disconnect in preparing students to be CCR.” The leader spoke of the need for all students to have a WBL opportunity to explore career paths based on the students' interests.

Administrator Two was in the early sixties and has worked in education for 30 years. The principal started as a family and consumer sciences teacher and worked his way to head a large high school. The administrator stated, “there is a few examples of CTE and academic

integration, but there is a need to do more.” The administrator suggested the need to make a concerted effort to increase the opportunities for students to work on integrated academic and CTE projects. The principal is a huge proponent of the CTE student organizations as “it provides many leadership opportunities for the students.”

Administrator Three was in his early fifties and has worked in education for almost 30 years. The principal is endorsed in math and physical education. The administrator leads a large high school in the division. The principal declared the need for more partnerships with businesses and shared the school “has a great partnership with a large employer in the community that has benefited students and the school.” The administrator stated, “we have a lot of students participating in co-op programs in the school, but there is a need for more.”

Administrator Four was in the early fifties and has a little over 20 years of experience in education. The principal has worked as a special education teacher, special education coordinator and an administrator at placement schools in the commonwealth of Virginia. The administrator leads the CTE center and alternative education programs for the division. The leader asserted, “CTE courses offer the context and application of academic subjects for students.”

Focus Group Participants

Three business leaders were purposefully selected to participate in semi-structured interviews regarding student CCR and awareness. The business leader participants included industry fields in automotive, nursing, and building trades. The business leader participants included three primary leaders with an average age of 61-years-old. There were two male and one female participants. The leader participants have an average of 30 years experience in a CTE career field. In the study, each of the business leader participants were denoted with pseudonyms, Leader One, Leader Two, and Leader Three.

Table 2

Focus Group Participants

Business Leader	Age (Standard deviation = 2.12)	Years Experience (Standard deviation = 2.12)
Leader One	62	32
Leader Two	59	31
Leader Three	62	34

Leader One was 57 and has 32 years experience in the automotive industry. The leader serves on the CTE center’s automotive advisory committee. The automotive expert is a strong business partner and has facilitated support to include major donations from the organization to the CTE center’s automotive program. Leader One is adamant that students are not prepared for college or careers once they graduate from high school. The director provided an example and shared “a student that we interviewed by Zoom was laying in bed during the interview. I could not believe it.”

Leader Two was 59 years old and has 31 years experience in nursing. The leader has worked with the CTE center’s nursing program to provide co-op positions for students in an area hospital. The nursing instructor recently left the hospital to teach at the college level. The health care professional stated, “I am appalled at the writing I see of college freshmans.” Leader Two suggested that schools require writing of resumes and cover letters in English classes.

Leader Three is a project manager working in the electrical field. The project manager has 34 years of electrical experience. The electrician specialist’s organization is a sponsor of the The National Center for Construction Education and Research (NCCER) curriculum taught to the building trades students at the CTE center. The NCCER curriculum is also taught to the

employees participating in an apprenticeship program at the business. The project manager shared, “Interviewing of students is in a word awkward. It is difficult pulling information out of students.”

Student Participants

The student participants of this research were purposefully selected from students enrolled in a CTE course at the CTE center. Forty-two males and eight females participated in the survey. Eighteen were seniors, 18 were juniors, and 14 were sophomores. Of the student participants sampled 34 were Caucasian, 13 were Hispanic/Latino, two were African Americans, and one identified as Other. Students were between 15 and 18 years of age (see Table 3). Students were surveyed using an anonymous online Google Form with a Likert scale.

Table 3

Student Participants

Demographic Characteristics of Students		
Gender	Male	42
	Female	8
Race/Ethnicity	White	34
	Hispanic/Latino	13
	African American	2
	Other	1
Age	15 years old	4
	16 years old	13
	17 years old	27
	18 years old	6

Results

Data for this research were collected through one-on-one open-ended interviews with four administrators, an open-ended interview with three business leaders, and a survey of 50 CTE students of the CTE center in Northern Virginia. The administrator open-ended interviews were conducted to identify themes related to their experience in administering educational programs. The business leader open-ended interviews were conducted to identify themes related to their experience in partnering with schools and students entering the labor force after graduation. Several themes emerged from qualitative analysis. The student Likert scale survey was conducted with students to measure their preparedness to enter college and a career and was used to corroborate the themes.

Sub-question 1

Sub-question one for this study was, “How would administrators in an interview solve the problem of a lack of post-secondary CCR and awareness among students at a rural CTE Center in Northern Virginia?” Interviews were conducted with administrators of two high schools, one division CTE supervisor, and one administrator of the CTE center to find themes related to CCR and awareness and the problems and potential solutions which may improve student CCR and awareness. Interview responses were coded for themes.

Table 4

Subquestion One Frequency of Codes

Codes	Frequency
Academics & CTE Pathways/CTE provides essential skills for life/Authentic Learning	64
Soft skills/Technical skill/Marketable skills/Workplace Readiness Skills/Executive Functioning skill/Application Skill	42
Business partnerships/Automotive/Nursing/Careers/jobs/Awareness Administrators, Guidance Counselors, and Teachers	31
Post-secondary/Articulation - k-12 and post-secondary	29
Remediation/No remediation	26
	2

Theme #1

Academic and CTE courses provide essential skills for life for students to be college and career ready and aware. One hundred percent of the administrators recognized that CTE course curriculum facilitates skills for life. The interview participants provided comments related to CTE offering authentic learning and skills for life, providing relevancy and context, and

facilitating authentic learning experiences unlike that of academics with a frequency of 64 unique responses. Administrator One commented that the 22 Workplace Readiness Skills in every CTE class are skills essential for life. Administrator Two stated, “the vast majority of the CTE courses teach kids how to collaborate and problem-solve probably more than any other courses.” The same administrator shared, the co-curricular clubs of CTE courses give students life skills that help them be “a better citizen.” Administrator One relayed, “The CTE student organizations promote career and leadership development.” When asked why CTE courses were for all students, Administrator Four shared “Because they are the skills that are absolutely fundamentally necessary to be successful in life.” An example of a CTE course participants building flower boxes to hang on a wall was provided by Administrator Three to describe the students’ learning lifelong skills that they enjoy and can share with others.

Administrator Four indicated that “CTE provides an opportunity to have students’ experience authentic learning that’s contextual.” One hundred percent of administrators spoke to the authentic learning that CTE provides. Administrator Three commented, “Hands-on experience for example if you are into a computer-automated drafting and design class or any engineering class they’re building and constructing and creating everything every single day and you don’t necessarily get that in core classes.” Administrator Four stated, “I think that our CTE teachers work very closely to try to ensure that the skills that have been previously taught in a more academic setting are applied within the classroom giving them real contextual opportunities to practice those skills.”

The integration of academic and CTE courses was discussed to improve CCR and awareness of students. Administrator One remarked, “It’s not normal business for us to have science and agriculture working on and collaborating on a project. We should be doing that a lot.

Our tech ed and math, tech ed, and trade and industrial, and science and those sorts of things. Theoretically academics and CTE are integrated but specifically Project Based Learning (PBL) and collaboration, there is not a lot of it.” Administrator Four provided one example of a math and CTE course collaborating and providing students the opportunity to gain two CTE credits and two math credits. Administrator Three shared that an AP CTE course and math teacher began discussions for collaborating to allow students to be awarded both CTE credits, math credits, and dual enrollment credit. The administrator commented “I wish I could say that there was a bigger effort to team up some of our core areas with some of our non-core CTE areas, but we definitely have some examples of that taking place.” Administrator Three expressed, “Nowhere near where I think the opportunities are there to use. Only on a few occasions will these courses overlap.”

Theme #2

Soft skills, technical, marketable, and Workplace Readiness Skills were found to be important for students to be CCR. One hundred percent of administrators relayed it is the soft skills that are most important to teach students to be college and career ready. Administrator Three stated, “I think the biggest piece that students need to have when they go out from our schools, they need to have people skills, a level of resilience, grit, and determination. They need to know how to interact with others again whether it is an academic setting or a career setting they need to have those skills first.” Administrator Two asserted, “A big part is for students to have kind of I guess you might call them soft skills, the responsibility type skills of I can be on time, I can come to work, I can work on my own, and I don’t need a lot of guidance.” Another administrator shared, “Dealers told me that you send me someone who is coachable I’m going to send them to GM school or Toyota school and we are going to get them that specific content

knowledge that they need but send me somebody who can communicate, can work with other people, who is open to new learning, and that is career ready.”

Theme #3

Business partnerships are important to improve student CCR and awareness. Seventy-five percent of the administrators discussed specific examples of businesses they partner with for the benefit of the school. Administrator Two discussed there are businesses that financially support school clubs and financially needy families in the community. Further, the businesses serve as guest speakers and “resources for job placement.” Administrator Three shared the businesses working with students in school are the CTE students with cooperative work agreements as well as “intellectually disabled students go out to volunteer into the community.” Administrator One mentioned advisories “counseling on our curriculum, our courses, our pathways. We partner with businesses to place students in work-based learning. We partner with businesses and industry to help us with the awareness piece so that we provide the whole spectrum of career awareness to career preparation.”

Theme #4

Administrators, guidance counselors, teachers, and parents are responsible for the CCR and awareness of students. Administrator One stated, “It is incumbent upon us to be doing that as instructors and administrators again bringing in guest speakers, virtual field trips, actual field trips, discussions with counselors and career coaches because we do have a career coach in each of the high schools that should be working with students on making presentations and taking them on field trips to let them know what those post-secondary options are.” Administrator Three commented “I think we need to have a concerted effort to make sure that students are not only aware of opportunities in either the academic or career related lanes, but that we need to do

a good job here of explaining the pros and cons of each so that they can make a decision.”

Administrator Two shared, “Students meet with their counselor every year to go over their four-year high school plan, they talk about their interests, do interest surveys, they look at what colleges they may want to go to, and what areas that may be of interest. We have comprehensive CTE programs that help kids make decisions in what they may be looking for with a career after high school.” Administrator Four declared, “They would use their guidance counselors. I think it’s important to have guidance counselors be as interested, not so much as interested, in representing opportunities in CTE beyond the high school level as much as they focus on just colleges.” Administrator Two discussed, “I think the teachers in the CTE classes need to teach that we do have a career coach that works with students and promotes it. Promoting those through all different ways to your announcements and within the class.” Administrator One asserted, “The teachers are primarily responsible for giving us some ideas about what possible technical training programs are out there.” Administrator One asked, “What are we doing as teachers, counselors, and administrators to help students be aware of what opportunities are and to be aware of what career readiness is.” Administrator Three stressed, “Parents are responsible for helping their kids be college and career aware and ready.” Only 25% of the administrators shared that parents should play a huge role in ensuring their kids are college and career aware and ready.

Theme #5

Post-secondary articulation and awareness is important for student CCR and awareness. Administrator One declared, “Two year and four year I know are working on articulations and transfer agreements where their courses matchup but our courses do not match up very well to those college courses and so I think that is where we have a real problem and disconnect and that

may be part of the reason students are not college-ready because of that disconnect.”

Administrator Three at one high school mentioned a Computer Science and a math teacher working together to have the classes dual enrolled at a local community college.

Administrator Three stated “If there is an expectation at a building level, at the secondary level, where those conversations are facilitated by teachers and all classes then I think that is probably the most efficient way to make an effort like that. So, you know design lessons to instructionally incorporate things that students will be able to apply with core classes is probably the best way to do that.” Administrator One asserted, “We are starting to address it instructionally, but I am thinking strategically we need to look at it and have a really developed plan and I don’t think we have that. So, we have the pieces and the parts but is it put together and running smoothly? I am not quite sure. I think there are some gaps and again I think having discourse across grade levels elementary, middle, and high that we could have a better running machine for that purpose.”

Sub-question 2

Sub-question two for this study was, “How would businesses in a focus group solve the problem of a lack of post-secondary CCR and awareness among students be solved at a rural CTE Center in Northern Virginia?”

Table 5

Subquestion Two Frequency of Codes

Codes	Frequency
College and Career Ready, k-12 preparation, and CTE classes	51
Students and parents' involvement	48
Soft skills/technical skills needed	33
Business/School Partnerships, apprenticeship/job shadow, career exposure needed	28

Theme #1

K-12 preparation and CTE courses preparation of students to be CCR. One hundred percent of the business leaders in the focus group insisted that students are not college and career aware or ready. Business Leader Three relayed, “It’s the intent for them to be college and career ready but I do not think the vast majority get there yet for multiple reasons”. Leader One agreed, “The culture has shifted so dramatically that no they are not ready”. Business Leader Two echoed, “I think the maturity, responsibility, and accountability as well as the motivation is sadly part of the barrier for these students to be college and career ready” Business Leader One asserted, “To sum it up, ill-prepared.” Business Leader Three repeated, “Ill-prepared.”

Business leaders offered ways K-12 could help students be college and career ready. Business Leader Two addressed student CCR and shared, “Try to focus on public speaking and basic writing skills to get the job.” One hundred percent of business leaders stated that an English assignment should be to write a cover letter, resume, and to practice interviewing. Business Leader Two shared, “The cover letter and resume are really your best introduction to who you are. These are students ready to graduate from college and I am appalled at the lack of grammar, proper sentence structure.” Business Leader Two shared that the school system should continue their “partnering with businesses.” Business Leader One asserted, “It has to be the parents, educators, and let’s not forget the businesses too to help students become CCR.” Business Leader Two shared, “I think visioning, I think high school CTE envisioning of what does your career look like.”

Theme #2

Students and parents’ need to be involved in the awareness of awareness CTE and in

student CCR. One hundred percent of the business leaders felt that parents need to be involved in the CCR and awareness of students. Business Leader One reported, “Number one, the teachers have to model the behavior they want their students to have in the workplace.” Business Leader Two agreed “Educators modeling the behavior and hopefully the parents modeling the behaviors.” Administrator Two argued, “They have to help that young, immature student ok, well, you have got to show up, you have got to show up on time and ready to go, and you must want to do a good job at whatever it is. That concerns me when there is a lack of motivation for success and teaching students' what success looks like. I hope that our middle schools and high schools are talking to students about what success looks like for you.” Business Leader One declared, “You got to find their passion, get the parents involved. It can't all be the school.” Business Leader Three shared an experience in attending a career fair and proclaimed, “Student participation was zero when I asked if there were any questions. Silence, dead silence.”

Theme #3

Soft skills/Technical skills are needed for a student to be CCR. One hundred percent of the business leaders agreed soft skills are critical for a student to gain while in school. Business Leader Two asserted, “Employers want to see that fire in your belly, that high motivation, that you want to do your best.” Business Leader Three declared, “We don't care what you know or what you don't know that doesn't matter because the part of being in an apprenticeship program is we teach you. What's important to us is your attitude.” Leader Two contended, “Teaching successful communication skills and self-awareness” is happening in the CTE department. When discussing students interviewing with a business, Business Leader One claimed, “It's like you have to pry everything out of them. They just clam up. I find it awkward trying to interview some.” Business Leader Two proclaimed, “You want to excel and you want to grow and learn

and you are open to growing and learning.” In the context of student attributes needed to be CCR, Business Leader Two declared, “Trying to focus on public speaking and basic writing skills to get the job is necessary.”

Theme #4

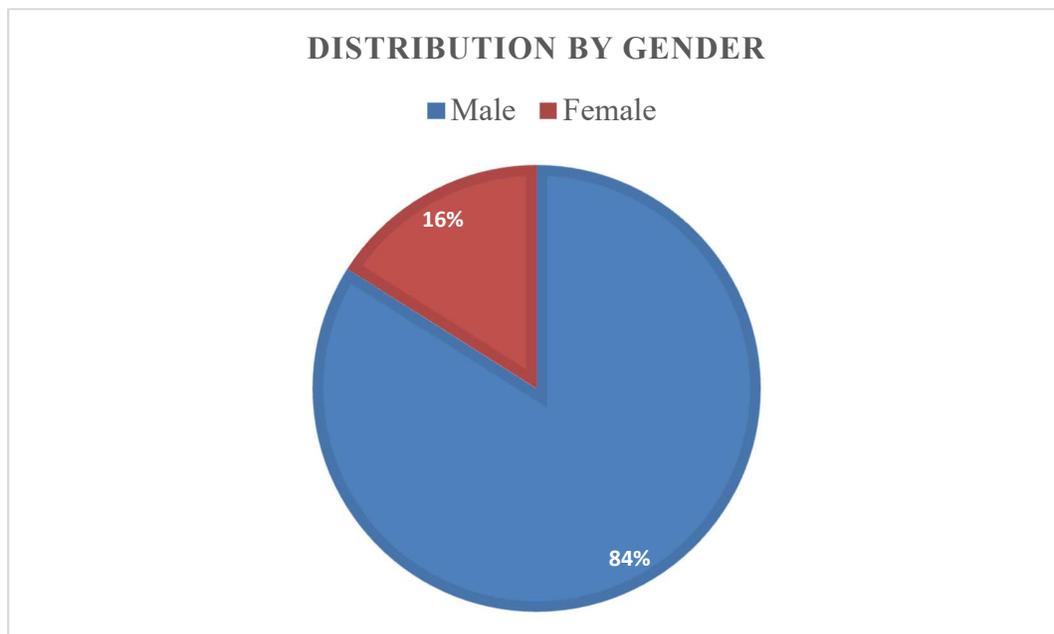
Business/school partnerships, apprenticeship/job shadow, and career exposure is vital to student CCR. When discussing business partnerships, Business Leader Three avowed, “It’s an investment, they are investing in us as an employee and as an employer were investing in them.” Business Leader One emphasized that businesses should continue “to grow the students through co-opting the apprenticeship program, providing assistance, training, coming to the schools, providing equipment, and tools. There is so much of that I think we can do.” Business Leader Two declared, “I do believe in job shadowing and having folks come into the classrooms.” Business Leader Three avowed, “Partnering with industry professionals to get in front of students to talk about this stuff and what their options are, the good and the bad they need to know everything.” Business Leader One, “Administrators you’ve got to get out to the businesses and do that. They’ve gotta be more invested in their community.” One hundred percent of the business leaders discussed the importance of partnerships that provide students an opportunity to experience a career of their interest.

Sub-question 3

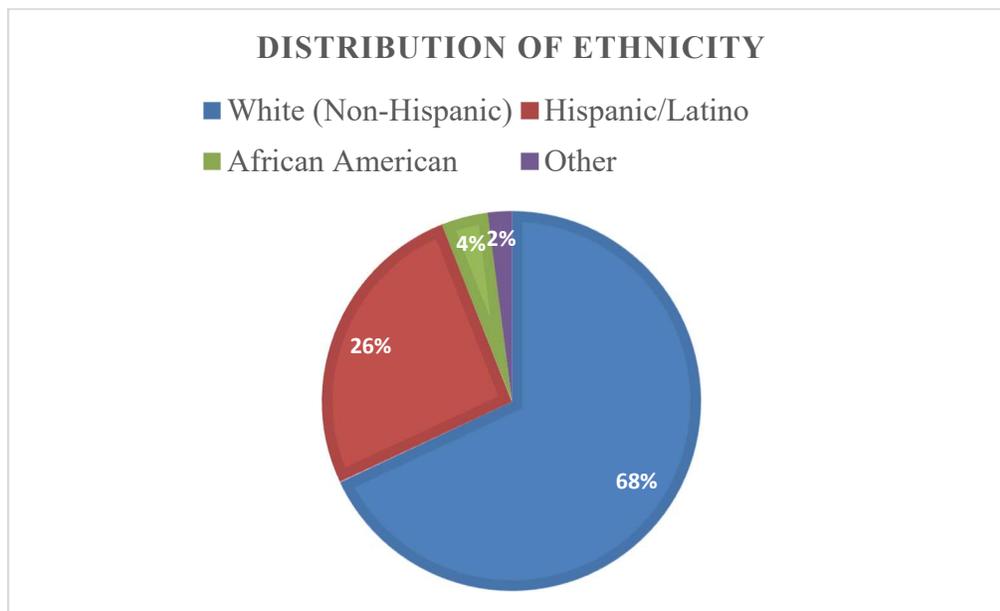
Sub-question three for this study was, “How would quantitative survey data of CTE students inform the problem of a lack of post-secondary CCR and awareness among students at a rural CTE Center in Northern Virginia?” There were 50 complete student responses to the college and career ready survey. Figure 1 shows the survey respondents by gender and Figure 2 shows the survey respondents by race.

Figure 1

Survey Distribution of Respondents by Gender

**Figure 2**

Survey Respondents by Race



A survey was conducted of 50 students of a CTE center to compile quantitative data associated with CTE students' perceptions of personal CCR and awareness. Table 6 shows the the descriptive statistics (minimum, maximum, mean, and standard deviation) of each of the 17 survey questions.

Table 6

Descriptive Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Q1	50	1	5	3.84	.946
Q2	50	1	5	3.22	1.083
Q3	50	1	5	3.25	1.146
Q4	50	1	5	3.14	1.327
Q5	50	1	5	3.33	1.438
Q6	50	1	5	3.33	1.479
Q7	50	1	5	3.02	1.225
Q8	50	1	5	3.55	.945
Q9	50	1	5	3.43	1.082
Q10	50	2	5	3.82	.842
Q11	50	2	5	4.06	.645
Q12	50	1	5	3.37	.979
Q13	50	1	5	3.27	1.358
Q14	50	1	5	3.59	1.134
Q15	50	1	5	3.63	1.148

Q16	50	1	5	3.75	1.017
Q17	50	1	5	3.31	1.208
Valid N	50				

Table 7 displays the likert scale used to evaluate student survey responses. The table contains the value (one to five) with limits and verbal interpretations of each value.

Table 7

Likert Scale to Evaluate Student Survey Responses

Value	Limits	Verbal Interpretations
5	4.21 – 5.00	Strongly Agree (SA)
4	3.41 – 4.20	Agree (A)
3	2.61 – 3.40	Neither Agree or Disagree (NA) or (D)
2	1.81 – 2.60	Disagree (D)
1	1.00 - 1.80	Strongly Disagree (SD)

Table 8

Descriptive Statistics for How Students Perceive CCR

Items and Descriptions	1	2	3	4	5	Mean	SD
1. I know where I am going to go to college or work after graduation.	11	27	9	1	2	3.88	.918
2. I am aware of partnerships between my school and local businesses.	3	22	13	7	5	3.22	1.093

3. I am aware of technical schools and colleges that have partnerships with my school.	5	21	12	7	5	3.28	1.144
4. Business speakers have come to my school to discuss college(s) and career(s).	9	13	13	7	8	3.16	1.330
5. I have attended a college and/or career fair at my school.	14	13	8	7	8	3.36	1.439
6. I have gone on field trips to businesses while in school.	16	10	8	8	8	3.36	1.481
7. I feel confident about writing an essay for college.	5	15	14	8	8	3.02	1.237
8. I am confident in my skills to create a resume to give employers and/or colleges.	7	20	18	3	2	3.54	.952
9. I am confident in my skills to create a cover letter to give employers and/or colleges .	6	22	13	5	4	3.42	1.090
10. I am skilled in proper etiquette required of interviews.	10	25	11	4	0	3.82	.850
11. I feel confident in my skills to resolve conflict in a professional manner.	11	32	6	1	0	4.06	.652
12. I feel confident in my skills to write a formal business letter.	5	19	17	7	2	3.36	.985
13. I feel confident in my ability to be successful							

in an AP course.	10	16	9	7	8	3.26	1.367
14. I feel confident in my ability to be successful in a dual-enrollment course(s).	13	14	14	7	2	3.58	1.144
15. I am aware of the benefits of my participation in a student organization/club at my school.	10	24	7	5	4	3.62	1.159
16. I am knowledgeable about the benefits of taking two or more Career and Technical Education courses.	11	23	10	4	2	3.74	1.026
17. I have participated in a work-based learning experience (job shadow, internship, and co-op).	8	17	15	4	6	3.34	1.206

The researcher computed descriptive statistics of the Likert-survey on a scale of one to five. One was rated as strongly agree and five was rated as strongly disagree to detect similarities in themes connected to the student survey. The researcher identified patterns from the Likert scale questions as follows: (a) opposing perceptions of students being CCR, (b) students lack of awareness of business partnerships, post-secondary schools, and WBL, and (c) recognition of the benefit of participating in a student organization and enrollment of two or more CTE courses.

Theme # 1

Opposing perceptions of students being college and career ready and aware between the interview and focus group respondents and the students. There were opposing perceptions between the business leaders of the focus group and students on students' skill in writing a resume, cover letter, and interviewing. Statistically, 54% of students agreed that they were confident in their skills to write a resume, 56% were confident in their ability to write a cover

letter, and 70% were confident in interview etiquette. Students agree in confidence that they are able to create a resume, cover letter, and interview. Students agree to some extent that they are equipped to write a formal business letter.

Theme # 2

Some students lack the awareness of community businesses, technical/schools, colleges, job shadow, internship, and co-op. Fifty percent of students lack the awareness of community businesses, technical/schools, colleges, job shadow, internship, and co-op. Fifty-two percent of students agree to some extent they are aware of community businesses, technical schools, colleges, field trips, career fairs, and guest speakers. One hundred percent of administrators and business leaders believe there is growth needed in this area.

Theme # 3

All interviewees, the focus group respondents, and students agree on the benefits of participation in school organizations and enrollment in two or more CTE classes. Sixty-eight percent of students agree that there are benefits of participation in school organizations and enrollment in two or more CTE classes. Administrators interviewed agree in the benefits of student participation in school organizations and enrollment in CTE courses. Business leaders agree there are benefits in students attending CTE classes to find their interests and passions.

Discussion

The data gathered supports the inferences drawn by former researchers related to the body of career awareness and readiness. The results both corroborate and validate examined empirical and theoretical research.

Empirical Literature

The researcher examined the findings and discovered four major themes. Each of these themes and prospective solutions may be established in previous research. The themes enhance CCR and awareness with improved CTE course and academic integration; business partnerships involving all stakeholders: business leaders, administrators, teachers, counselors, students, and parents; student soft and workplace readiness skills; and K-12 and college/technical school articulation and awareness.

Theme #1

CTE course and academic integration was found to be a quality intervention in preparing students for college and careers. Some interventions included CTE and academic integration, school counseling, and new school models. Researchers found that one intervention -- career academies -- greatly diminished dropouts, improved attendance, boosted earned high school credits, and raised the probability of high-risk students submitting applications to postsecondary schools (Castellano, Richardson, Sundell, & Stone III, 2016). Scholars advocated for CTE and academic integration as research has found this reform to benefit students; CTE students were found to perform as well as or surpass students who were studying curricula designed to prepare students for college (Hernandez-Gantes, 2016; Pierce & Hernandez-Gantes, 2015).

STEM-focused CTE academies have brought the integration of rigorous academics, technical training, and business partnerships to fruition to meet the goal that all students be CCR for the 21st century, even those students in underrepresented groups (McKinstry & Stockdale, 2016). Gibbs (2016) suggests research proves students who take CTE courses integrated with academic courses are less likely to drop out of school and are more likely to set up career goals. CTE curricula has focused on rigor and academic integration and initiatives to progress CCR (Stone, 2013; Symonds et al., 2011). The ESSA focused on workplace readiness and

accountability, academic and CTE integration, and students receiving career services (Coppes, 2016). Businesses and college graduates concur students need technical and academic skills and application to be successful in careers and college (DiBenedetto & Myers, 2017; Hart, 2015).

The IB created the CP for high school students wanting career-themed programming along with academic thoroughness. Eighty-nine percent of the IB programs in the U.S. are in public schools. Schools that offer IB pay yearly fees to IB. IB programs in a particular secondary school's POS have shown a connection to accomplishment in post-secondary education (Bergeron, 2015; Hill, 2018).

Theme #2

Business partnerships involving all school and family stakeholders should be utilized to help prepare students for college and careers. The use of an advisory committee, apprenticeships, PLC partnerships, and CTE have been found to be essential in helping students transition from high school to careers and college (Burton et al., 2014; Gibbs, 2016; Passarella, 2018; Plasman et al., 2018; Rosen et al., 2018; Rosenfeld, 2018; Stone, III, 2017). Teaching and learning in CTE focused on career context and active learning with the ability to transfer the knowledge to other contexts are needed for all students (Bransford, Brown, & Cocking, 2010; Prince, 2004; Schonfeld, 1991). Partnering with businesses and community leaders provided innumerable benefits to students by helping educators connect with the real-world in their lessons and by providing novel concepts (Mailin, 2018). There is evidence from the data that some students lack awareness of business/school partnerships, apprenticeships, job shadowing, and internships. Administrators and business leaders spoke of the importance of partnering with schools.

Theme #3

Soft and Workplace Readiness Skills are important in preparing students for college and careers. Transition competencies laid out in Morningstar's et al., (2017) CCR framework include critical skills as completing college and job applications and writing a resume. Hernandez-Gantes et al. (2017) assert the academy's resume, cover letter, and interviewing activities addressed student CCR weaknesses. Business leaders asserted students do not have the skills to write a resume or cover letter or have the proper etiquette needed to effectively interview. On the student survey, students agree they have the skills needed to write a resume or cover letter and are aware of the etiquette needed to interview successfully.

Many high school graduates do not have entry-level skills and 40% of students who graduate take remedial courses before taking courses that will count toward their majors and college degrees. CTE students should be prepared for local college degrees and careers (Northern & Petrilli, 2019). The CCR body of research does not align with responses from the student survey as students reported they agree in their ability to successfully complete a dual-enrollment class or AP course. A report reflected almost 50% of students who graduate high school in the U.S. are not ready for college or a career (Santelises, 2017).

Theme #4

Articulation and awareness of college/technical schools is crucial in preparing students for success in school beyond high school graduation. CTE centers that partner with colleges to provide dual credit opportunities have been found to decrease the time needed for students to complete a program in college; increase student access to colleges; advance the STEM curriculum in secondary school; support the consistency in curriculum between secondary school and college; assist postsecondary schools in enlisting students (including nontraditional students); facilitate the move to colleges after graduation; and decrease post-secondary expenses

(Izzo et al., 2010; Morningstar, 2015). Many studies found that CTE courses taken in high school often equates to increased student achievement at both the secondary and postsecondary level across the U.S. (Gottfried, 2015; Plasman et al., 2019). Administrators, business, leaders, and students agree in the benefits of student enrollment in CTE courses. Researchers had identified CTE as a catalyst to the incorporation of technology into career readiness exploration (Izzo, Yurick, Nagaraja, & Novak, 2010; Morningstar, 2015).

Theoretical Literature

The study also validates or confirms the theoretical literature related to student CCR and awareness. The theories denoted of CCR and this research were distributive leadership theory, social cognitive theory, and social learning theory.

Distributed Leadership Theory

According to many investigators, DL theory fits within a systems perspective whereby a collective social process emerges from the interactions of multiple actors (Malin & Hackmann, 2017; Bolden, 2011; Uhl-Bien, 2006; Supovitz, Auria, Spillane, & Auria, 2019). To improve CCR among students' business partnerships with all school and family stakeholders is imperative. These partnerships will help students and parents become aware of soft and WRS needed in the workplace. The business partnerships will provide opportunities for students and parents to become aware of careers, opportunities for students to engage in training programs offered through employers. Business leaders coming into the classroom can provide instruction on up-to-date interviewing, resume writing, and soft skills expected of students by employers. Although every CTE course in VA includes WRS as part of the curriculum, the teachers in the CTE center in Northern Virginia do not feel equipped in the skills to teach students how to create a resume, cover letter, and/or proper interview etiquette. The school leader needs to collaborate

with businesses and families to ensure all students are provided opportunities to gain employment skills. An idea constructed from the research which enhances the body of CCR research is the importance of parents' engagement with businesses and school stakeholders and breaking through the traditional brick and mortar school and engaging with business and community organizations in improvement of CCR of students in a CTE Center in Northern Virginia (see Appendix A).

Social Cognitive Theory

Many precepts found in the SCT also mirror social constructivism. Social constructivism proclaims that individuals construct cognition through social engagement, translation, and comprehension (Page, 2007; Vygotsky, 1962). Gaining knowledge of these skills and behaviors are due to observations and models of others' behavior and the consequences of the behavior (Bandura, 1999). If school leaders work with businesses and plan deliberate guest speakers, college/career fairs, field trips, resume/cover letter/interviewing workshops, and real-world application projects, students will gain skills and behaviors needed to be CCR.

Social Learning Theory

Bandura's social learning theory (SLT) explained how we learn from persons with whom we interact within a social setting by watching, duplicating, and modeling (as cited in Stone, 2017). People change and arrive at a new efficiency for learning through watching and the activity helps them to expand their knowledge and abilities with the information conveyed by the modeling influences (Bandura, 1999; Rosenthal & Zimmerman, 1978). Schools working with businesses and community organizations on real-world problems will provide the social setting in which to watch, duplicate, and model. Interactions in the social setting will provide students

the ability to expand their knowledge and skills from the real-world application activities with businesses and community organizations.

Summary

This applied research study sought to solve the problem of a lack of post-secondary CCR and awareness among students at a rural CTE Center. In the beginning, the researcher identified data from WRS exams and identified areas needed for improvement of CTE student WRS directly related to CCR. The research began with the central question, “How can the problem of a lack of post-secondary CCR and awareness among students be solved at a CTE Center located in Northern Virginia?” Chapter Four disclosed the results of a study to include administrator interviews, business leader interviews, and the reactions to questions in a student survey. Four themes emerged from examination of the data. The four themes found a need to improve CTE course and academic integration, students and parents’ involvement and awareness of CTE and CCR, student WRS and soft skills, business partnerships involving all school and family stakeholders, and articulation and awareness of college/technical schools. Proposed solutions aligned with the themes included creating a STEM academy with structures, strategies, and goals that align with the themes identified in the study. The themes and proposed solutions corroborate discoveries found in the theoretical and empirical literature.

CHAPTER FIVE: CONCLUSION

Overview

The researcher of the applied research study sought out to detect problems in CCR and awareness of students in a Northern Virginia CTE center. The purpose of this applied study was to solve the problem of a lack of post-secondary college and career awareness and readiness among students in a rural CTE center in Northern Virginia and to formulate a solution to address the problem. The problem is there is a lack of post-secondary college and career awareness and readiness among students in a rural CTE center in Northern Virginia. Chapter Five details the funds and resources needed to implement the solutions, the strategies, goals, and persons' responsible, and a proposed timeline required to solve the problems. The researcher linked potential social implications and created a plan to evaluate the effectiveness of the proposed solution to solve the problem.

Restatement of the Problem

Students are leaving high school without being CCR and aware. A report reflected almost 50% of students who graduate high school in the U.S. are not ready for college or a career (Santelises, 2017). CCR is defined by the U.S. Association for Career and Technical Education's (ACTE) as three sets of skills with the first being the core academic skills that allow students to enter postsecondary education without the need for remedial courses.

A DL systems perspective is identified to create a collective social process emerging from the interactions of multiple actors to solve college and career awareness and readiness among students. (Malin & Hackmann, 2017; Bolden, 2011; Uhl-Bien, 2006; Supovitz, Auria, Spillane, & Auria, 2019). The systems thinking model aligns with the school division's systems thinking school improvement model.

In the WRS test data areas of weakness identified were (a) organizations, systems, and climates: Identifies the big picture issues and his or her role in fulfilling the mission of the workplace (63.8%), (b) lifelong learning: Continually acquires new industry-related information and improves professional skills (60%), and (c) job acquisition and advancement: Prepares to apply for a job and to seek promotion (72.31%). The one-on-one administrator interviews, the business leader focus group interviews, and the CTE student survey supported the areas of weakness identified in the WRS exam results. The problem stated in Chapter One rests in setting up a system and structure that assures to improve the college and career awareness and readiness of students in a northern Virginia CTE center.

Proposed Solution to the Central Question

Solutions proposed to answer the central question were derived by four administrator interviews, interviews with three business leaders in a focus group, and the 50 responses in the CTE student survey. The themes provided a guide to developing solutions. It is recommended the CTE center apply to become a Governor's Stem Academy in Virginia. The goals of the STEM academy would be to improve academic and CTE integration through authentic real world application projects; to improve business and school partnerships; to improve college and career awareness and readiness among students and parents; to improve high school and post-secondary integration, and to improve the service of underrepresented students.

STEM-focused CTE academies have brought the integration of rigorous academics, technical training, and business partnerships to fruition to meet the goal that all students be CCR for the 21st century, even those students in underrepresented groups (McKinstry & Stockdale, 2016). Goals of STEM academies were found to be similar across studies and involved problem-solving; the process of engineering design; and soft skills of cooperation, interactions,

collaboration, communication, demonstration abilities, and organization of schedules (Holmlund, Lesseig, & Slavit, 2018). The goals of STEM academies align with the school division's strategic plan and the Portrait of a Graduate (POG) competencies.

CTE Course and Academic Integration

It is more likely that CTE course students set up career goals (Gibbs, 2016). CTE courses are adept in helping students meet the POG competencies. CTE courses integrated with academic courses provide the “why” for learning and foster real-world learning. For example, students see how academic courses like geometry and algebra are relevant to building and home ownership. CTE and academic integration allows CTE teachers and academic teachers to team together to provide students with problem-based, PBL opportunities in the community and globally in order to gain skills needed for the 21st century.

Students and Parents' Involvement and Awareness of CTE and CCR

Parents made aware of college and career awareness and readiness impact students' CCR (Cabrera & LaNasa, 2000; Mwangi, Cabrera, & Kurban, 2019). Parents may not have attended college or technical school and do not have the social capital to help the student plan and attend post-secondary schools, which is especially true for underrepresented groups. Parents may not be aware of the potential for students to have a great career in a trade or technical skill. The thought remains by some that CTE is for the students that will not be going to college. The workforce today requires at least some technical or post-secondary education. It is incumbent upon the PLC to educate parents on the college and career opportunities available to students and the financial aid process.

Student WRS and Soft Skills

CTE program courses have provided students with technical and WRS (Balfanz, Bridgeland, Bruce, & Hornig Fox, 2013; Brand et al., 2013; Castellano et al., 2016; DiBenedetto & Myers, 2016; Hyslop & Imperatore, 2015; Valent & Browning, 2013). Employers want employees to have WRS and POG competencies today. Job openings today and in the future require more than a high school diploma. Employers seek out potential employees that have soft skills and WRS. Business leaders express the willingness to train employees on the technical skills if the potential employee possesses the soft skills.

Business Partnerships Involving All School and Family Stakeholders

STEM-focused CTE academies have begun to help all students become CCR by integrating academics, building business partnerships, and training in technical and soft skills (McKinstry & Stockdale, 2016). The problem is school principals were found to understand the importance of business partnerships in meeting the school's strategic goals, but approximately one in seven created them (Kaufman, 2015). Business and community partnerships and education working together is a win-win. The partnerships provide financial and human capital exchanges that cannot be provided by just one of the entities. Students need opportunities to receive real-world application, engagement, and involvement in the community to gain skills needed to be CCR.

Articulation and Awareness of College/Technical Schools

Communities moved to improve CCR and awareness, but there remain chasms in the students' transition from high school to technical school (Kannapel & Flory, 2017; Malin & Hackmann, 2017). Some solutions are to provide dual credit courses; increase student awareness and access to colleges; get students interested in STEM while in high school by offering STEM courses; team with postsecondary schools to enroll more nontraditional students; and to help

students transition to college (Izzo et al., 2010; Morningstar, 2015). There is a need to build partnerships with surrounding technical schools and colleges to provide a pipeline of dual-enrollment opportunities. PLC members need to provide opportunities for students and parents to learn about the technical and college programs related to the students' career interests and the financial aid process. STEM opportunities should be offered to students as the U.S. identified STEM as a critical need for global competitiveness as well as there being a workplace need for STEM trained employees. A focus on providing supports needed to help nontraditional and underrepresented students enter technical schools or colleges is imperative of localities.

Resources Needed

Beginning a Governor's STEM Academy would require staff, supplies, and resources. The CTE center would apply to become a STEM academy focused on transportation, distribution and logistics and information technology. Existing staff could be used to begin the Governor's STEM Academy. The academy would serve 10-12th graders from the three high schools in the division. The students from all three high schools would apply to attend the academy. The CTE students would need to be enrolled in morning CTE automotive, information technology, and cybersecurity classes and would attend academic courses in the afternoon with existing core academic teachers that serve other students in a program within the school. The core teachers serve students who need to make up credits for a variety of reasons. The CTE center houses core academic teachers as well as CTE teachers. There would need to be a minimum of four core teachers and one each of a CTE automotive, information technology, and cyber-security teacher.

Funds Needed

Proposing the use of existing staff would require additional funding for extra periods to be taught by the teachers and for a common planning period for the teachers to integrate

academics with CTE curriculums and to create real world, project-based learning opportunities. The overall structure recommended is three CTE teachers (automotive, cybersecurity, and information technology) and five core teachers (English, two math, social studies, and science). Two math teachers are proposed as this is an area that students struggle and would meet the needs of extra support for the students.

According to the U.S. Bureau of Labor Statistics (2021), the median secondary teacher salary in our area is \$75,460.00. Budgeting \$100,000 for a teacher's salary plus benefits, would equal \$25,000 for a $\frac{1}{4}$ full-time equivalent (FTE) and \$50,000 for an $\frac{1}{2}$ an FTE. Recommended is a $\frac{1}{4}$ FTE per core teacher ($\$25,000 \times 5 \text{ teachers} = \$125,000$) and $\frac{1}{2}$ an FTE per CTE teacher ($\$50,000 \times 3 \text{ teachers} = \$150,000$). Also proposed is an afterschool planning for academy staff at a cost of approximately \$60.00 per hour for 2 hours per week per instructor ($\$60.00 \times 8 \text{ teachers} \times 2 \text{ hours} = \$960.00 \times 36 \text{ weeks} = \$34,560.00$). These funds would be proposed to the local school board and board of supervisors. Possible barriers would be budget constraints placed on the school system from state and local budgets.

The STEM Academy would need to upgrade equipment annually to meet industry's changing needs. New equipment is purchased through local and Perkins funds every school year in the CTE programs. A CTE budget request would need to be submitted in January for the next school year. To integrate academics and CTE there will be funds needed for supplies to encourage Project-Based Learning with real-world application projects. A possible barrier would be CTE monies allocated by state and local budgets and division CTE priorities.

Roles and Responsibilities

To help with applying and becoming a STEM academy, there would need to be additional periods allocated for the existing eight teachers and afterschool common planning for

the staff. The existing structure could accommodate the STEM academy. There are three administrators, a lead instructor, eight teachers, and a special education CTE aide. Roles and added responsibilities would need to be assigned to existing staff. The CTE aide would spend more time serving the academy; therefore, responsibilities related to the other CTE programs would need to be absorbed by other aides in the building. The principal would be accountable for distribution of duties among the aides and overall management and coordination of the STEM academy. The other two administrators and lead teacher would be responsible for assisting in the coordination and management of the STEM academy.

Timeline

A proposal to begin a Governor's STEM Academy would need to be provided to the Assistant Superintendent of Instruction and Assistant Superintendent of Administration for approval. Other members of the executive level team would be needed for approval. The proposal may need to be presented to the school board. If school board approval is granted, there would be the need to apply to become a Governor's STEM Academy. First, an intent to submit form must be completed and sent to the VDOE. Next, five copies of a proposal would need to be submitted six months before the projected start of the academy. According to the guidelines set up by the VDOE, another six months would be needed to put systems in place before sending the proposal to the VDOE. A planning committee would need to be created with membership of educators, the superintendent or designee, business and industry, and higher education. An additional advisory committee is required with signed certifications of intent to serve. Written memorandums of agreements with business and industry, school division, and colleges would need to summarize how PLC members will impact the Governor's STEM Academy to expand the opportunities of students' learning practices. Finally, a pledge of the planning committee to

follow the *Administrative Procedures Guide for the Establishment of Governor’s STEM Academies* is required when submitting the proposal.

Table 9

Implementation Timeline

Activity	Timeline
Propose any new courses to be added to the Program of Studies	September 2022
Present STEM academy proposal to executive leaders.	September 2022
Set up a planning committee and advisory committee	December 2022
Complete CTE equipment budget requests for new equipment/curriculum	January 2023
Present staffing/funding needs	Mid November 2023
Apply to the VDOE to become a STEM Academy	December 2023
Market and accept applications for academy students	December 2023
Review student applications	January 2024
Provide professional development to teachers	March 2024
Schedule students in academy courses	March 2024
Set teacher schedules and after school common planning	April 2024
Start first year of STEM academy	August 2024

Solution Implications

The positive benefits derived by creating a Governor’s STEM Academy outweighs the negative implications of the creation of the academy. The Governor’s STEM Academy would align with the divisions strategic plan’s vision and mission to have students’ college and career ready when they graduate high school, to have students involved in meaningful and authentic learning, to innovate, and inspire students. CTE encompasses all the POG competencies and has

a history of providing relevant and authentic learning experiences. Integrating academics and CTE has proven to provide gains in math and science in existing STEM academies.

Negative implications could be existing staff resistance in working an additional period and the time to plan after the school day for two hours a week. Another consequence could be the strain of reallocation and the addition of staff roles and responsibilities. Some negative consequences could be enrollment numbers as the school has a long-standing community perception of the school being “where the bad kids go.” Enrollment in the CTE programs continue to suffer because of the perception. Becoming a Governor’s STEM Academy and rebranding the school could turn the perception around. Parent nights/weekends should be held to share potential careers and salaries associated with the CTE and STEM fields. Another strategy to debunk the perception of the school being where the bad kids go is to create separate areas of the building. One area and entrance could be for the STEM academy, and one entrance and area could be for the alternative education programs. Having separate areas and entrances would also allow for different student expectations for the different programs. At present, CTE students feel as if the school is “like a prison” due to expectations that are imposed that are very different than expectations in the home high school.

Funds for the Governor’s STEM Academy could be an issue among policy makers at the local level. If the budget would not allow for the funds for the STEM academy, the timeline would be pushed out. The budget for implementation of the academy may not be approved based on state and local budgets. There are budget priorities that may prevent the school board from approving the STEM academy. The local board of supervisors could prevent approval of funding for the school system’s budget priorities.

Evaluation Plan

There are required elements of a Governor's STEM Academy and the evaluation should be goal-based (see Appendix D). Goal based evaluation fits into the division's existing systems' thinking approach where data is used to examine practices to identify what is working and what is not, and to create systems to help attain desired outcomes. Outside of the VDOE's required goals, the Governor's STEM Academy's Planning Committee should work to create metrics upon which to evaluate the academy. Once the Governor's STEM Academy is created, the advisory committee would be responsible for the monitoring and evaluation of the academy's goals during on-going meetings, at least once a month. The team should prepare a report at the end of each academic year. Teachers would be evaluated using the existing Virginia Teacher Evaluation System's Standards 1-7 and using walk-through observations. The evaluations would be conducted with respect to division policies. Teacher pacing and lessons will be planned intentionally and will be monitored by administration and curriculum specialists in the division.

The delimitations of the study were the setting and persons involved in the study. The research was focused on a rural CTE center in Northern Virginia and surrounding businesses to determine college and career awareness and readiness of students. The persons interviewed and surveyed were school administrators, business leaders, and students. The purpose of the delimitation of the study was to have leaders inside and outside the school focus on college and career awareness and readiness of students and compare it to the students' survey responses related to college and career awareness and readiness. Teachers and parents were not included in the study; however, further research would be advantageous to include teacher and parent perceptions of college and career awareness and readiness of students enrolled in the center.

The applied research study was limited in its scope and would require further research

and study to be generalized to other populations. The inquiry unveiled themes within the data and there were shared perceptions among the leaders but a discrepancy in perceptions between the school and business leaders and the students. The themes can be utilized to discern the shared perception of CCR and awareness of students reported by school administrators, business leaders, and students. The perceptions of teachers and parents were not captured in the study. The professional development needed to disrupt teaching practices and focus on STEM were not examined in this study.

Further study is needed in the efficacy of professional development in authentic learning/PBL to aid in the change of teaching practices, specifically STEM. Further research is needed in the effectiveness of strategic programming to involve parents in all aspects of the students' preparation in CCR and awareness. Parents need to learn about the technical schools, college, and career opportunities available to the students as well as the financial aid process to help students make informed decisions based on the students' career interests. There was consensus of the school and business leaders of the need for parental involvement in students' CCR and awareness. An investigation of parent and teacher perceptions of student CCR and awareness would be germane to the study.

Summary

Students are graduating high school without being CCR and aware. Our nation and global economy require that students graduate CCR and aware and with math and science aptitude. Too many students are having to take remedial courses when they enter college. More students should be purposefully working toward technical schools and college credits while attending high school. The administrator and business leader interviews reflect potential similarities to the national issues of the lack of student CCR and awareness.

The data collected for this applied study revealed that school administrators and business leaders agree that there is a need to improve student authentic learning experiences integrating both academic and CTE courses, work-based learning experiences, and WRS. Administrators and business leaders agree that soft skills are as important as technical skills and, in some cases, they believe soft skills are more important. Administrators and business leaders shared that every student should be involved in work-based learning experiences so they can see all aspects of a career. Business leaders were adamant that students are not graduating college and career ready and aware. Students' perceptions were opposite of the business leaders and some of the administrators interviews. For most survey questions, the students responded as likely or most likely as being CCR and aware

A proposed solution to solve the problem of a lack of college and career readiness and awareness is to create a Governor's STEM Academy. The proposed STEM academy would integrate CTE and academic courses and focus on PBL with an emphasis on science and math. Automotive and Cybersecurity CTE students will have the opportunity to apply to attend the STEM academy. Upon selection, students will take a chosen CTE course in the morning and will attend core classes with existing teachers in the afternoon. Academy students would attend the academy all day.

The STEM academy's vision and mission will align with the divisions and school's vision and mission. The academy will integrate the division's focus on POG competencies and goals within the division's strategic plan. The POG competencies are communication, collaboration, learning how to learn, social and cultural empathy, flexibility, adaptability and resilience, creativity and innovation, and critical thinking and problem solving. Integrating CTE and academic courses will address the need to create opportunities for students to develop the

POG competencies. The STEM academy will aim to meet goals of student success, awareness of culture and a global society, strategic partnerships, and high-quality staff. After school common planning will aid in meeting the goals (see Appendix D).

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APPENDIX A

LIBERTY UNIVERSITY
INSTITUTIONAL REVIEW BOARD

March 1, 2021

Janet Pack
Barry Dotson

Re: IRB Application - IRB-FY20-21-610 Improving post-secondary college and career awareness and readiness at a rural career and technical center in Northern Virginia.

Dear Janet Pack and Barry Dotson,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study does not classify as human subjects research. This means you may begin your research with the data safeguarding methods mentioned in your IRB application.

Decision: No Human Subjects Research

Explanation: Your study is not considered human subjects research for the following reason:

(2) Your project will consist of quality improvement activities, which are not "designed to develop or contribute to generalizable knowledge" according to 45 CFR 46. 102(I).

Please note that this decision only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued non-human subjects research status. You may report these changes by completing a modification submission through your Cayuse IRB account.

Also, although you are welcome to use our recruitment and consent templates, you are not required to do so. If you choose to use our documents, please replace the word *research* with the word *project* throughout both documents.

If you have any questions about this determination or need assistance in determining whether possible modifications to your protocol would change your application's status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office

APPENDIX B

REQUEST TO COLLECT DATA FOR EDUCATIONAL STUDIES

Name Janet Pack School [REDACTED]
 Home Address [REDACTED]
 22630
 Phone [REDACTED]
 Current Teaching Assignment or Credentials Administrator
 Course and instructor/advisor Dr. Barry Dotson
 Organization/university Liberty University
 Topic of Research Applied Dissertation: Improving Post-Secondary College and Career Awareness and Readiness at a Rural Career and Technical Center in Northern Virginia.
 Reason for Data Collection To conduct a study for completion of a dissertation in an education doctoral program. The dissertation is an applied research study intended to solve an identified problem and to offer solutions to solve the problem.

Specific Data To Be Collected Interviews with a total of five administrators (targeting three HS administrators from the three HSs that the [REDACTED] serves, the supervisor of CTE, and the [REDACTED] principal); a focus group of business leaders in the community; and a survey to be completed by CTE students enrolled in classes at [REDACTED]

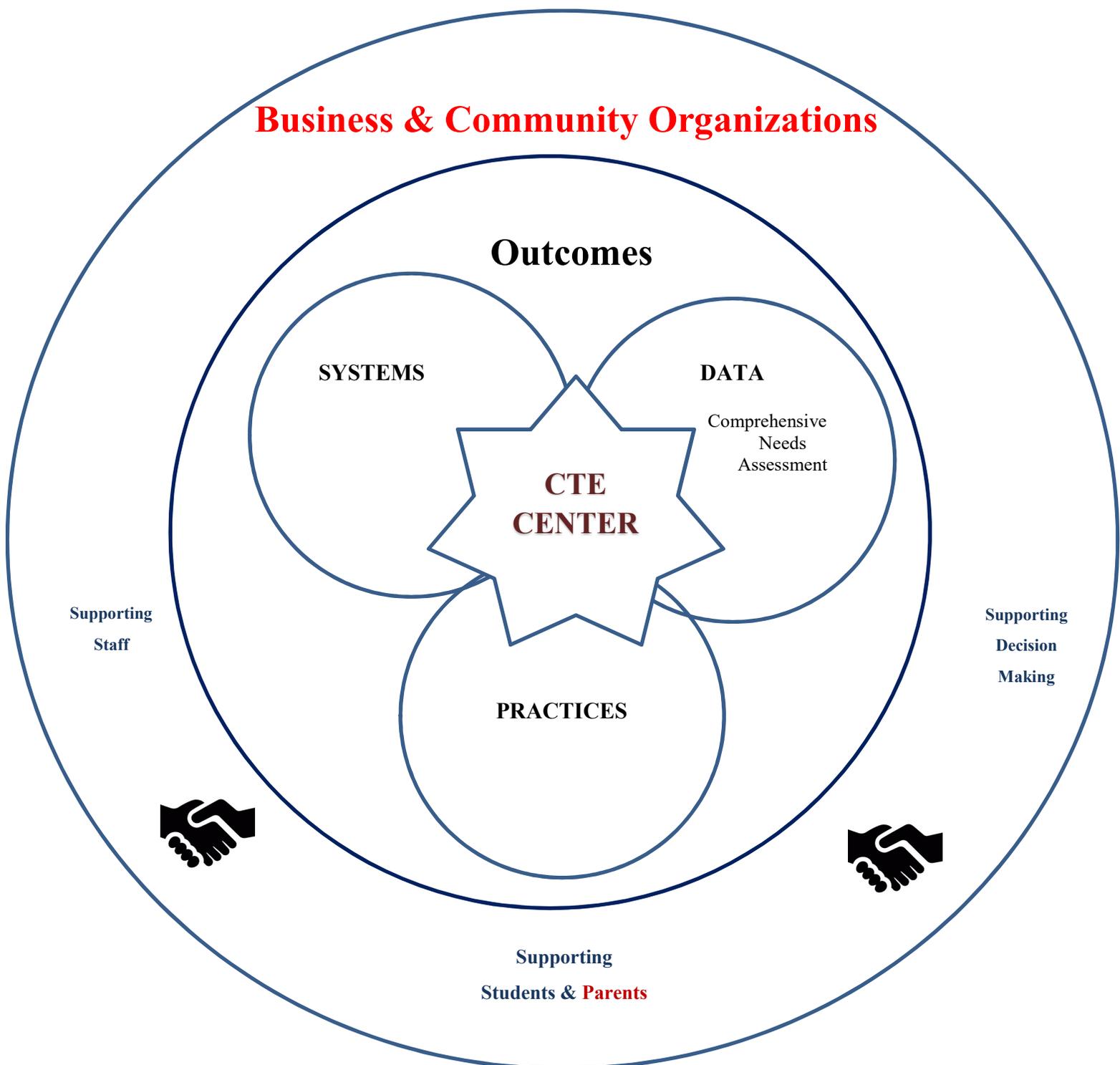
Data Will Be Collected From: Records Employees Students* Parents

*Attach required Parental Notification/Permission form.

Description of Data Gathering Techniques Interviews with five administrators, conduct a focus group with five business leaders and survey all CTE students at [REDACTED] (upon assent).

Description of Data Use Transcripts of interviews with administrators and the focus group will be used to develop codes and themes. The data from the CTE students' survey will be used to create descriptive statistics: frequencies, percentages, mean, and standard deviations.

APPENDIX C



APPENDIX D

GOVERNOR'S STEM ACADEMY GOAL ORIENTED EVALUATION				
Team Members:				
District Goal(s):				
School Goal(s):				
SMART Goal	Strategies & Action Steps	People Responsible	Target Date	Evidence of Efficacy
100% of academy students will improve in academic achievement.				
100% of academy students will complete dual enrollment courses.				
100% of academy students will have a Work-based Learning experience.				
To increase high school graduation rates.				
To reduce dropout rates.				
To increase participation and success in postsecondary education.				
To increase the ratio of students engaging in CCR curriculum.				
To reduce the percentage of students needing to take a remediation course in college.				

To increase students' attainment of industry certifications.				
To improve students' employment in STEM related careers.				