4-11-2023

Teacher Perceptions of the Use and Implementation of Online Learning in Secondary Career and Technical Education Programs

Jared C. Morris
Rowan University

TEACHER PERCEPTIONS OF THE USE AND IMPLEMENTATION OF ONLINE LEARNING IN SECONDARY CAREER AND TECHNICAL EDUCATION PROGRAMS

by

Jared C. Morris

A Dissertation

Submitted to the
Department of Educational Services and Leadership
College of Education
In partial fulfillment of the requirement
For the degree of
Doctor of Education
at
Rowan University
March 10, 2023

Dissertation Chair: James Coaxum III, Ph.D., Associate Professor, Department of Educational Services and Leadership

Committee Members:
Jo Ann Manning, Ed. D., Assistant Professor, Department of Educational Services and Leadership
Dana Schaed, Ed. D., Principal, Monmouth County Vocational School District

Dedications

I dedicate this dissertation to my wife Dana and our children George, Joseph, Milly, and Cecilia. Dana, your steadfast love, drive, enthusiasm, encouragement, and support are the reason that this dissertation was undertaken and completed. I cannot express my gratitude and love for you!

To my children, George, Joseph, Milly, and Cecilia! Thank you for helping me strive to be the best that I can in every facet. I hope that you know that you can do anything you set your mind to and you can accomplish all things! I love you all!

I dedicate this dissertation to my parents, Karen and Dave Morris. Thank you for instilling the love of learning in me at an early age. Your encouragement, guidance, and support have allowed me to achieve many goals and I hope that I am able to further instill these things in my own children.

Acknowledgments

The completion of this dissertation would not have been possible without the guidance and support of my dissertation committee and for all that you have done I would like to thank you! I would like to express my gratitude and thanks to Dr. James Coaxum III, Dr. JoAnn Manning, and Dr. Dana Schaed. For my dissertation chair, Dr. James Coaxum III, I would like to extend a very special thank you for your continuous support and guidance throughout this entire process.

Abstract

Jared C. Morris
TEACHER PERCEPTIONS OF THE IMPLEMENTATION AND USE OF ONLINE LEARNING IN SECONDARY CAREER AND TECHNICAL EDUCATION PROGRAMS
2022-2023
James Coaxum III, Ph.D.
Doctor of Education

The Covid-19 pandemic fundamentally altered the course of education and this is no more evident than in the world of Career and Technical Education (CTE). When the education world was thrust into the remote learning environment, CTE instructors were forced to discover ways to provide students in their programs with high-quality learning experiences without the ability to conduct the hands-on learning experiences that are the hallmark of CTE programs. Now in an endemic stage, a significant opportunity exists in finding ways to create improved methods of instruction in CTE programs that provide students with enhance learning experiences and the best way to understand these opportunities is through examining and understanding the experiences of those instructors that have taught CTE prior to, during, and after the Covid-19 pandemic. The purpose of this qualitative research study was to understand the perceptions of secondary CTE teachers as to the implementation and use of online learning and educational technologies in traditional CTE programs. Through teacher interviews, documents, and classroom observations this research has yielded understandings in how CTE instructors can use digital tools to support classroom management, CTE instructional strategies as well as support ways to expand experiential learning in CTE programs and the need for continual professional development to support the implementation and use of instructional technologies by CTE instructors.

Table of Contents

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

List of Figures

List of Tables

Chapter 1

Introduction

Throughout the United States, employers have reported issues with labor shortages with particular focus being placed on skilled labor. Cappelli (2015) notes that employers continually report that they are unable to fill job vacancies and that the shortage of a supply of skilled labor is widespread. Many of the vacant positions are in what Nielson (2016) describes as "skilled trades" which include electricians, plumbers, carpenters, painters, and heating and cooling laborers (as cited in Toppin, 2018). The skilled labor market in 2016 contained 600,000 jobs with estimates that by 2020 the need would be for 10 million skilled employees (Renze-Rhodes, 2016, as cited in Toppin, 2018). Schwartz (2015) contends that skilled labor positions were the most difficult to fill both nationally and internationally (as cited in Toppin, 2018). Throughout the United States, there are numerous programs that provide students with the requisite training and preparation to enter the skilled worker vocational fields. These programs are included in Career and Technical Education (CTE) schools that are often referred to as vocational education programs (Schulte et al., 2005). CTE programs were referred to as vocational education up until the reauthorization of the Carl D. Perkins Act in 2006 (Dougherty & Lombardi, 2016). This change in name was significant in that one of the goals of the reauthorization of the Carl D. Perkins Act of 2006 was to move away from the negative connotations of lower ability students entering CTE programs that were associated with the vocational education delineation, as well as to demonstrate the focus of CTE programs to prepare students for post-secondary opportunities (Dougherty & Lombardi, 2016). Stone (2017) explains that CTE programs provide labor markets with a workforce

that is highly skilled in a wide variety of trade, technical, and professional areas. It is imperative for educators within the field of vocational education to have an understanding of the needs of the workforce as well as the areas in which there are current and predicted labor shortages. Lambeth et al. (2009) explain that the knowledge of the issues facing the workforce are paramount for the success of both workforce initiatives and career and technical education programs.

CTE programs are instrumental in educating and training the future workforce. These programs provide students with the knowledge and skills needed to prepare them for entering the workforce and have served as a major element of American secondary schools (Spring, 2014). Manly (2011) explains that CTE programs have been vital in the development of the American secondary school system since the early 20th century. Stone (2017) furthers that CTE programs play a key role in the economic competitiveness of the United States. CTE programs have the potential to enhance the competitiveness of the United States, with respect to labor costs, by providing highly skilled workers in a range of trade, technical, and professional vocations (Stone, 2017). These arguments are supported by Jocson and Martinez's (2020) contention that CTE programs provide the requisite training grounds for the development of a workforce that is able to meet the economic needs of our country as well as the shifting labor markets. CTE programs provide benefits to students as well as the surrounding communities through the provision of a workforce that has the necessary skills and knowledge to meet the ever changing needs of the labor markets.

"CTE should be seen as a vital component of all students' experiences in high school, in which students take a wide variety of courses in different amounts that suit

their personal interests - whether the courses are mainly academic, primarily CTE, or a combination of two (Aliaga et al., 2014, p. 138)." CTE programs provide students with the hands-on vocational training needed to pursue a career in a chosen field. Ohanu and Chukwuone (2018) explain that CTE programs provide students with the skill acquisition needed to prepare for careers. The overarching goal of CTE programs is to provide students with the ability to move to the workforce or continue onto post-secondary education when they complete high school (Castellano et al., 2003). Scott and Sarkees-Wircenski (2008) further that CTE programs provide learning experiences that allow students to explore career possibilities and to prepare for employment. The United States Department of Education (2019) explains that secondary CTE programs are designed to connect students with and lead to post-secondary programs of study or additional training following high school. Students participating in CTE programs benefit not only from the acquisition of the requisite knowledge and skills associated with a particular career but through the increased potential to graduate high school and to obtain employment following the completion of their secondary schooling. Dougherty (2016) found that students taking a single CTE course increases the probability of a student to graduate as well as the probability of a student to be employed following graduation, which supported Plank et al.'s (2005) findings that students taking CTE courses were less likely to drop out of school. Furthermore, Aragon et al. (2013) found that students participating in CTE programs experience benefits above those that are offered through general education alone. Secondary students that participate in CTE programs are provided with an important opportunity to gain the skills needed to fill the more than 30 million jobs in the United States that do not require a bachelor's degree (United States

Department of Education, 2019). The benefits of CTE programs are well noted with respect to providing students with the requisite training and skills needed to both enter the workforce and fill the well documented labor market opportunities. Through the understanding of the benefits of CTE programs for students and the workforce, it is imperative to examine the methods by which CTE instructors provide learning experiences for their students to obtain the knowledge and skills needed for a particular vocation.

Teaching and Learning in CTE Programs

CTE instructors typically implement direct instruction on theoretical components of their vocation in conjunction with the use of hands-on lab experiences that serve to further develop students' knowledge and skills. Stone (2017) explains that robust and rigorous CTE programs have the potential to address many of the educational challenges that face education. CTE programs have the ability to provide the labor market with a workforce that is highly skilled in a myriad of trade, technical, and professional skills that are typically associated with an education that is received from post-secondary institutions (Stone, 2017). Jocson and Martinez (2020) contend that CTE programs continue to emphasize the use of hands-on learning experiences as they relate to specific career clusters of the labor market. Snyder (2009) explains that authentic, collaborative, and active student-centered learning environments are supported by the constructivist learning theory and are furthered through the use of teaching methods that utilize cooperative, problem-based learning experiences. Doolittle and Camp (1999) further that authentic, cooperative, and problem-based learning experiences allow students to construct their knowledge through their experience and build upon the students ability to

utilize their knowledge and skills to adapt to different situations. Providing students with authentic learning experiences in real-world applications allows for greater understanding of the knowledge and skills needed as well as the development of work-based experiences that are transferable to the selected vocation and beyond.

From a pedagogical standpoint, CTE programs allow students to construct their learning through the use of authentic, real-world learning environments, navigating social interactions, relevant content and skills, learning that builds upon prior knowledge, formative assessments, encouragement of learners to become self-regulated and self-aware, and teacher facilitation (Doolittle & Camp, 1999). These authentic learning experiences align with Stone's (2017) discussion that CTE teachers need to focus on 21st-century skills through the use of problem based, real-world learning experiences. Clark et al. (2010) contend that the use of problem based learning experiences are rooted in experiential learning and is found at the heart of CTE. Boone (1990) found that when teachers employ problem based learning, students experienced significant content retention as opposed to being taught in a subject matter approach (as cited in Clark et al, 2010). Thomas (2000) posits that when instructors implement problem based learning experiences they are focusing student learning on problems that encourage encounters and struggles with curricular concepts, the creation of a constructive investigation, and are realistic in their application (as cited in Knight, 2013). By employing problem based and real-world learning experiences, instructors are focusing student skill acquisition on the 21st-century skill areas including the use of technology associated with the vocational pathway, taking on leadership roles, and engaging in productive struggle (Stone, 2017). Lai et al. (2017) explain that authentic, real-world learning experiences bring complex

challenges of professional practice to the learning experience. Knight (2013) contends that authentic learning engages students in work that is real and genuine, allows for the creation of a real product, is assessed based on real-world standards, and engages students through its relevance and importance. Furthermore, the concept of productive struggle provides students with an opportunity to engage in deep learning that results in transfer to long term memory through the use of struggling through a learning experience during their initial exposure (Lai et al., 2017). These pedagogical methods align with experiential learning theory in that students are actively participating in the learning process (McCarthy, 2010) and as Doolittle and Camp (1999) contend experiential learning is constructivist in nature due to the fact that students are creating meaning from their learning experiences. Additionally, Clark et al. (2010) discuss that through the use of hand-on learning experiences, students are able to learn theories and concepts of a given field in an authentic environment.

While the benefits of traditional methods of CTE instruction are widely understood, CTE programs have been slow to change the instructional delivery approaches despite advances in technology. Metz (2010) contends that CTE programs should examine the possibilities for increased participation that are afforded by the implementation of online learning elements. Additionally, improvements in student achievement have been found through the use of hybrid learning models that support students with extensions of learning outside of the classroom in conjunction with teacher interactions, student collaboration, problem solving opportunities, and inquiry learning (Carver & Kosloski, 2015). Through gaining and understanding of the positive impacts

that can be made through adjustments in pedagogical practices, CTE teachers and administrators will better be able to support their students.

Problem Statement

In March 2020, education in the United States experienced a fundamental shift in the way that teachers delivered instruction and students participated in learning. The COVID-19 pandemic caused the majority of education in the United States to move to online platforms as schools and businesses were shut down and families were asked to stay home in order to help prevent the spread of the virus. In the state of New Jersey, the stay-at-home orders meant that nearly 1.4 million students were participating in the educational process virtually (New Jersey Department of Education, 2020). Of the nearly 1.4 million students in New Jersey, more than 10% complete CTE programs each year (NJDOE). These programs allow students to acquire the requisite skills and knowledge while completing their required high school courses to meet their graduation requirements. However, with the move to online learning, CTE programs were unable to provide the direct hands-on training for students in all programs. Mitchell, Etshim, and Dietz (2016) explain that despite advances in technology, the majority of CTE programs are not conducted online, especially for programs that are skill driven. The United States Department of Education (2019) furthers that only thirty percent of secondary schools offered students online CTE programs. Additionally, many schools in New Jersey completed the 2020-2021 school year with a hybrid schedule in which students participated in programs in-person for a specific number of days per week with the remaining days conducted through online learning. Hybrid learning opportunities can enhance the online learning experience by providing students with hands-on guidance

and practice for specific competencies (Carver & Kosloski, 2015). This use of hybrid schedules further highlighted the need for CTE instructors to be able to effectively deliver elements of their programs online. The shift to virtual learning profoundly altered the delivery of CTE instruction for both teachers and students. With students learning at home, CTE instructors were no longer able to provide students with the hands-on learning components that are traditionally associated with the experiential learning process that takes place in CTE programs. Therefore, CTE programs were unable to provide students with direct hands-on, active learning experiences which result in optimizing student learning and leads to positive outcomes (McCarthy, 2010). Additionally, Bird et al. (2020) explain that the majority of instructors did not have the requisite experience and knowledge with respect to implementing online learning. These shifts created significant challenges for CTE programs to provide the requisite training needed to prepare students for entering the workforce.

CTE instructors typically provide students with a direct instruction segment to cover theory elements, demonstration, and hands-on lab experiences. Clark et al. (2010) explain that the experiences of students in CTE programs are mostly referred to as the hands-on application of learning. Kennis and Green (2013) explain that the vocational background that CTE instructors bring to the teaching and learning that occurs in their classrooms builds strong relationships with students. Many CTE instructors employ a work based learning pedagogy, in which classroom experiences are designed and implemented to prepare students for the real-life encounters that would be found within the specific vocational pathways (Green, 2015). In an effort to support student learning with real-world experiences, CTE instructors often assume the role of facilitator, which is

based on their work experiences (Kennis & Green, 2013). Green (2015) found that CTE instructors work to support and scaffold student learning to provide the environment in which students can create their own learning based on their prior knowledge and experiences. Through the implementation of partial online, or the integration of online instruction, CTE teachers need access to the best practices for providing students with online learning to attain the competencies of their programs. Carver and Kosloski (2015) contend that by combining CTE programs with online learning it is possible to provide greater support to students through the use of a wider range of learning style options. The research of this study provides CTE teachers and administrators with best practices in implementing and using online learning as a means to enhance learning opportunities within CTE programs.

The Covid-19 pandemic has shed light on the need to increase the capacities of instructors to deliver learning experiences through the use of an online platform. Pregowska et al. (2021) explain that the main reason for employing distance, or online, learning prior to 2020 was a means of connecting students to a campus when they were unable to be in-person or lived at too great of a distance from the institution. One of the greatest challenges that became apparent with the closure of school campuses was that many instructors were employing online learning experiences for the first time as a means to engage students and provide instruction (Bird et al, 2020). The shift to online learning created a great deal of confusion and frustration for educators and students alike due to varying degrees of online learning tools, regulations that were not specific, and instructors that did not have the requisite knowledge and training to successfully implement online learning experiences (Pergowska et al., 2021). Bird et al. (2020)

contend that online learning opportunities provided students with a greater amount of time to spend on their coursework, however, these shifts created a great deal of turmoil for students that led to decreased engagement and participation. The remote learning shifts created by the Covid-19 pandemic provided for a greater understanding of the need to provide instructors with the requisite training to implement and use online learning platforms. Bird et al. (2020) explain that instructors require guidance and training on best practices to create virtual learning environments that can provide similar support to students' as are found during in-person settings. Ohanu and Chukwuone (2018) further that technical education instructors need to be provided with continual support to develop and expand their knowledge and proficiencies in using online platforms for teaching and learning. Therefore, greater knowledge is needed to understand the best practices in the development, implementation, and use of online learning in a wide variety of educational settings in order to provide students with access to high-quality learning experiences regardless of the type of delivery.

Furthermore, the COVID-19 pandemic also highlighted the important role that CTE programs play with respect to developing the workforce for the county. CTE programs provide students with the necessary training for essential work that places these workers on the front lines working to maintain the infrastructure on a day to day basis all while risking their own well-being for the benefit of the general public (Jocson & Martinez, 2020). Jocson and Martinez (2020) explain that the coronavirus pandemic has highlighted the need for a continual training of a workforce that is needed in order to support society during times of crisis. Furthermore, while this shift in education brought to light many issues with respect to the educational process, including technology gaps

and inequities in preparedness of teachers and students, the change profoundly altered the way that Career and Technical Education (CTE) was provided.

Purpose of Study

In order to better understand the best practices for the integration of technology and online learning platforms into secondary CTE programs to support experiential, hands-on learning, a qualitative research approach will be implemented to investigate the perceptions of CTE teachers regarding the implementation and utilization of online learning strategies in secondary CTE programs. Research on these best practices and their implementation will provide CTE teachers with the requisite strategies to understand how to successfully deliver online segments of their programs. This research will assist with an understanding of the key question as to how can CTE programs be effectively delivered using an online learning platforms. As Castellano, Stringfield, and Stone (2003) explain, in order for CTE programs to create improvement the integration of technology must be facilitated and staff would require additional professional development focused on technology and best practices. Cannon et al. (2012) contend that it is imperative for CTE teachers to be able to provide students with learning experiences that take advantage of the technological advances that have taken place. Kentnor (2015) furthers that "it is necessary to investigate and understand the progression and advancements in educational technology and the variety of methods used to deliver knowledge to improve the quality of education we provide today and motivate, inspire, and educate the students of the 21st century (p. 21)." Understanding the experiences that CTE instructors have had, along with the best practices they have developed, in integrating online learning platforms into their instructional repertoire as a means of

supporting their CTE program is an imperative in order to further advance the reach and impact of these programs.

Of significant interest, is the potential for online learning strategies to be employed in a manner that can support the experiential learning environments of secondary CTE programs. Green (2015) contends that CTE instructors need to serve as the facilitator of learning for students as they construct their learning through knowledge and experience. Clark et al. (2010) explain that the utilization of experiential learning in secondary CTE programs is vital to student success. Additionally, as Kolb and Kolb (2005) further, experiential learning occurs in a cycle during which students participate in concrete experiences, abstract conceptualization, reflective observation, and active experimentation. While it is clear that experiential learning is imperative to the success of CTE programs, greater understanding needs to be gained as to how the integration of instructional technologies can support and enhance these specific types of learning experiences.

Despite the fact that online learning has been implemented in CTE programs at a much slower pace, there are a number of benefits that can be obtained through its use. To that end, it is imperative for research to be done that explores the integration of instructional technologies into secondary CTE programs. Carver and Kosloski (2015) explain that the use of online learning in CTE programs allows educators to meet a wider range of student learning styles, thereby providing greater support for students. Horvitz (2019) furthers that CTE programs employing online learning, "reach a much wider geographical student market, demonstrating what might become a different formula that technical education programs can use to help their programs grow and remain sustainable

(p. 534)." By implementing online learning in CTE programs there is the potential for reaching more nontraditional students, easing specific time constraints that may exist for certain programs, increasing access to academic programs (Garza Mitchell, 2017). Additionally, through the implementation of online learning in CTE programs, secondary schools have the ability to provide access to their programs to more students and to meet the individual learning needs of students. Additionally, the use of specific online learning strategies can allow for instructors to provide students with greater hands-on learning experiences in the classroom. The research in this study allows for greater support of teachers in their endeavors to utilize online learning elements in their CTE programs. Furthermore, the knowledge gleaned from this research can contribute to the successful delivery of CTE programs through the integration of online learning elements, which can further support students, their learning, and their achievement.

To accomplish these research purposes, a qualitative research study will be conducted in order to generate knowledge and learning to enhance and support the integration of instructional technology in secondary CTE programs. Denzin and Lincoln (2000) explain that the purpose and function of qualitative research is to generate an understanding of human actions through the description of essential characteristics of human experience (as cited in Jackson et al., 2007). Therefore, in order to better understand the experiences of secondary CTE instructors with respect to the integration of instructional technologies into their programs, qualitative research serves as the most appropriate methodological approach. Furthermore, this study focused on the use of naturalistic inquiry, which provides for the research to be conducted in the natural environment without any manipulation by the researcher (McInnes et al., 2017). These

qualitative approaches allow for the best representation of the learned experiences and best practices of CTE instructors that can allow for the potential to enhance CTE programs thus furthering student success.

Research Questions

In examining the perceptions of CTE teachers of the use and implementation of online learning in CTE programs, this research will be guided by the following question, how can educational technologies be utilized to enhance student learning in Career and Technical Education programs? This research will be further guided by the following subquestions:

1. In what ways can the integration of educational technology support experiential learning in CTE programs?
2. How can CTE programs benefit from incorporating educational technologies?
3. What types of supports do teachers need in order to better facilitate the integration of educational technology within CTE programs?
4. How has the integration of technology changed CTE programs?

Significance of Study

CTE programs are participated in at extremely high rates throughout the United States. According to the Association of Career and Technical Education (ACTE) nearly 94% of all high school aged students participate in CTE programs (Kunz, 2020). This aligns with the findings of Levesque et al. (2008) reporting that more than 96% of students in the United States complete at least one CTE credit (as cited in Aliaga et al., 2014). These findings are further supported through the results published by the United States Department of Education's National Center for Educational Statistics (2013)

reporting that 92% of United States public school students took CTE and CTE-related credits. Within New Jersey, 10% of the nearly 1.4 million school aged students participate in CTE programs (NJDOE). CTE programs serve as a major component of secondary schools throughout America through the development of student skills and knowledge within specific vocations that prepare them to enter the workforce and/or move on to post-secondary institutions (Spring, 2014). The COVID-19 pandemic has highlighted the importance of CTE programs with respect to developing the workforce for the county needed to supply frontline workers. Jocson and Martinez (2020) explain that CTE programs provide students with the requisite knowledge and skills for completing essential work. The experiences of COVID-19 have exacerbated the need for CTE programs to continually provide training in order to support society (Jocson & Martinez, 2020). While CTE programs traditionally offer hands-on vocational training to students along with instruction on the theoretical underpinnings of the vocation (Castellano et al., 2003), the shift to online learning due to the Covid-19 pandemic completely altered how these programs are conducted. Furthermore, with the majority of schools in New Jersey still participating in some degree of online learning for the 2020-2021 school year, it is an imperative that CTE teachers have access to the best practices in implementing their hands-on programs in conjunction with an online platform. The results of this research will provide the necessary knowledge to support the needs of CTE teachers in the use of online learning in conjunction with traditional aspects of vocational programs. These supports will allow CTE teachers and administrators to better understand the way to support their students and their programs through the

advancements and changes in instruction as well as technology that have begun and will continue in the future.

This research attempts to gain a better understanding of the perceptions of secondary CTE teachers as to the best practices in implementing and using online learning in their vocational programs. The furthering of this knowledge and understanding will allow CTE instructors and educational leaders to better implement online learning to support students through their educational experience. Additionally, this study may have ongoing implications in terms of teacher preparation and professional development. It is anticipated that the following stakeholder groups may have interest in and/or benefit from this research study: (a) CTE teachers; (b) CTE school and district leaders; (c) community colleges; and (d) CTE teacher preparation programs.

Definition of Terms

The following vocabulary is relevant to this study and has been defined by the researcher to establish a standardization of these terms.

Vocational Education

Vocational Education refers to the offerings of specialized training programs that provide students with the knowledge and skills to move successfully into the workforce. The 1917 Smith-Hughes Act explains that vocational education is an imperative as it provides students with utility in their education along with the requisite skills to complete work and fulfilling their individual learning needs (Spring, 2014).

Career and Technical Education

Career and Technical Education (CTE) refers to programs that were previously called vocational programs. Castellano, Stringfield, and Stone (2003) explain that the use of CTE represented a philosophical change in which vocational programs became infused with greater technology and the curricula was changed to focus on career clusters as opposed to singular vocations. Furthermore, the goal of CTE programs began to focus on the provision of students with the requisite knowledge and skills to enter the workforce or proceed to post-secondary institutions (Castellano, Stringfield, & Stone, 2003).

Career Cluster

Career clusters are the nationally grouped career pathways within CTE. Career clusters represent the framework that CTE programs are organized into in order to describe the potential career pathways that may be chosen (AdvanceCTE, 2021).

Distance Learning

Learning that is done away from a physical school campus. Distance learning is a modality of teaching during which the students and teachers are separated (Kentnor, 2015).

Online Learning

Online learning represents the use of technology for students and teachers to engage in modes of learning when they are not physically present in the same space. Moore, Dickson-Deane, and Galyen (2011) explain that online learning refers to the use of technology to gain access to learning experiences.

Hybrid/Blended Learning

Hybrid, or blended, learning refers to the use of technology to support student learning through a combination of synchronous and asynchronous learning experiences both in and out of the classroom. Xiao, Sun-Lin, Lin, Li, Pan, and Cheng (2020) explain that hybrid learning consists of a blurring of the boundaries between physical classrooms and online environments during which students and instructors are able to interact with each other as well as course content through mediums that use digital tools either synchronously or asynchronously.

Organization of Study

Chapter one discussed the introduction of this study as well as provided an overview of purpose, theoretical framework, significance, and limitations of this study. Chapter two will provide an outline of the relevant literature regarding Career and Technical Education, as well as how online learning has been employed in CTE programs. Additionally, literature will be presented on best practices in implementing online learning. Chapter three will explain the purpose of this research and present the research questions that will guide the research which will be followed by the presentation of the research methodology. The research methodology will contain discussions of the participant sample, as well as data collection and analysis. Chapter four of this study discusses the themes that emerged regarding teacher perceptions of the best practices with respect to using and implementing online learning in secondary CTE programs. Chapter five will examine the findings of this research study and the implications that these findings may have on the use and implementation of online learning in secondary

CTE programs as well as how these best practices may inform district policies and professional development plans.

Summary

CTE programs have an extensive history and place within society with respect to providing technical skills and knowledge for students as well as providing support to the growing workforce needs. Traditional CTE instruction is focused on hands-on authentic learning that occurs within the context of the "shop" classroom allowing students to participate in real-world, authentic applications of the requisite knowledge and skills of a particular vocational field. Despite the growth and benefits that are understood with respect to CTE programs, these areas have been slower to integrate technological advances in the application of instructor pedagogy. The use of online learning and technology integration has been expanding in K-12 education throughout the past few decades. However, despite the advances in technology and the expansion of the use of online learning, CTE programs have been slower to implement these platforms (Metz, 2010). The shifts to online learning in CTE programs, due to the restrictions that the COVID-19 pandemic has placed on schools, furthers the need for a greater understanding of the best practices in implementing and using online learning and the integration of educational technology in secondary CTE programs. This study aims to gain greater knowledge as to the perceptions of secondary CTE instructors as to the best practices when using online learning and integrating technology for these specialized programs. The researcher hopes to provide a stronger understanding of the how and why when using online platforms and integrating educational technology in secondary CTE programs as well as to identify and provide recommendations for areas of professional development

that current and future CTE instructors may need to expand and enhance student learning experiences.

Chapter 2

Literature Review

Career and Technical Education (CTE) has extensive roots in the workforce development of the United States. CTE programs have historically and continue to provide a highly skilled workforce to labor markets in a variety of areas (Stone, 2017). CTE programs provide students with hands-on, authentic learning experiences that allow students to obtain the requisite knowledge and skills needed in a given vocational field, as well as prepare them for the workplace environments that they will participate in following high school. The learning experiences provided by CTE programs allow students to both explore career interests and prepare for employment (Scott & Sarkees-Wircenski, 2008). From a pedagogical standpoint, CTE instructors utilize a combination of traditional classroom instructional practices along with the authentic, real-world laboratory experience to enhance student learning and outcomes. It is the real-world, workplace learning experiences that instructors provide that are the hallmark of successful CTE programs. The real-world laboratory experiences utilized by CTE instructors allows students to construct their own knowledge through experiential learning opportunities. Through the use of authentic, real-world learning experiences, CTE instructors are able to present students with the complex challenges of professional practice within specific vocations (Lai et. al., 2017). However, the impact of the COVID-19 pandemic has shed significant light on the need for the expansion of educational technology integration in all education settings, with particular emphasis on how to effectively incorporate these tools into the CTE setting.

This qualitative study seeks to explore teacher perceptions of the best practices in implementing and utilizing online learning in secondary CTE programs. Traditional CTE programs provide students with hands-on learning experiences that prepare students to enter the workforce with the requisite knowledge and skills within a specific vocational field. CTE programs are sewn into the fabric of American education through the provision of human capital development (Spring, 2014). While traditional CTE programs have been offered in-person to provide students with the requisite knowledge and skills needed to pursue a career or post secondary options (Castellano et al., 2003) the COVID-19 pandemic has highlighted the need for further knowledge regarding the use and implementation of online learning in CTE. The current literature has been focused on the use of online learning in post-secondary educational institutions. While there has been some research done on the implementation and use of online learning at the secondary level, more is needed to better understand the best practices of implementing online learning for secondary CTE programs. Therefore, this chapter will focus on the following areas: (a) Career and Technical Education, (b) CTE Pedagogy, (c) Experiential Learning in CTE, (d) History of Online Learning, (e) Online Learning in CTE, (f) Educational Technology Integration, (g) Hybrid/Blended Learning, (h) Flipped Classroom, and (i) Theoretical Framework guiding the research.

Career and Technical Education in the United States

Career and Technical Education (CTE) has its roots in providing students with vocational training. On a global scale, Bennett (1937) contends that the development of vocational education was an evolutionary process working to ensure that students were able to gain skills in traditional academic areas as well as in a specific trade (as cited in

Dougherty & Lombardi, 2016). Spring (2014) explains that vocational education became an integral part of the education system through the development of human capital. Bennett (1937) furthers that a disconnect was recognized with the between the general skill training in common schools and the push for more technical training that was demanded by those in manufacturing and other trades (as cited in Dougherty & Lombardi, 2016). The demands for increasing educational opportunities that are linked to the development of skills and competencies related to specific trades provided the basis for manual arts or vocational education, which laid the groundwork for CTE (Dougherty & Lombardi, 2016). The United States Bureau of Education (1913) argued that students should be provided with vocational training during their secondary education period. Due to the fact that by providing specialized training after secondary schooling, students were then too old to begin an apprenticeship in a profession (United States Bureau of Education, 1913). The 1917 Smith-Hughes Act further explains that vocational education is an imperative as it requires students with utility in their education which provides them with skills to complete work and an ability to meet their individual learning needs (Spring, 2014). The passage of the Smith-Hughes Act provided continual funding for the establishment of vocational programs in agriculture, home economics, as well as trade and industry for secondary schools (Friedel, 2011). Friedel (2011) explains that the Smith-Hughes Act provided that students participating in vocational classes and that had not yet entered into employment would have, at minimum, half of their instruction time spent on "practical work of a useful or productive basis (p. 39)." Additionally, Dougherty and Lombardi (2016) point out that the Smith-Hughes Act provided that students would spend the time outside of vocational education developing

skills in citizenship, reading, and mathematics. Spring (2014) furthers that vocational education has served as a major component of American secondary schools by providing students with the skills and knowledge needed to prepare them for entering the workforce. The basis of vocational education was to enable students to gain the skills needed to be successful within a particular trade as well as the skills needed to serve as contributing members of a community.

Federal Support for CTE

The benefits of CTE programs have greatly served students throughout the years by providing the skills and knowledge needed to prepare them for entering and being successful in the workplace. Kunz (2020) furthers that 94% of all high school aged students participate in CTE throughout the United States. A major driving force in the improvement of CTE programs that are offered in secondary schools has been the passing of federal legislation that supports funding and program development. Friedel (2011) explains that throughout the years, federal legislation has been a major contributing factor of the changes that have been experienced in vocational education. From the Smith-Hughes Act, to the George Acts, the Vocational Education Act of 1963, and the multiple iterations of the Carl D. Perkins Act the goals and funding sources of vocational education have been shaped (Friedel, 2011). Friedel (2011) furthers that from 1929 to 1946 the four separate passages of the George Acts provided additional federal funding to vocational education programs thus furthering federal support for all of these programs. Following the George Acts, which served to provide justification for federal funding of vocational education, the Vocational Education Act of 1963 focused on social inequities that had been both identified and addressed in other federal reform efforts (Dougherty &

Lombardi, 2016). Friedel (2011) furthers that the Vocational Education Act of 1963 was the first federal legislation to focus on programming for students that experienced academic, socioeconomic, or other hindrances that negatively impacted their success in typical vocational programs. The Vocational Education Act of 1963, along with its additional amendments in 1968 and 1976, provided a further definition of vocational education that advanced vocational student organizations by expanding the types of occupational programs that could be funded by federal dollars and provided explicit understanding that vocational student organizations were a vital element of instruction (Friedel, 2011). Friedel (2011) describes that the George Acts served as providing a means of simply maintaining strong vocational programs while the Vocational Education Acts shifted the focus of federal funding to programming that served a wide variety of students.

Further Federal Support and a Name Change

Following the Vocational Education Act and its subsequent iterations, Bozick and Dalton (2013) explain that each subsequent passage of the Carl D. Perkins Career and Technical Education Act furthers the national commitment to preparing students for the ever-changing workforce. Through the passage of federal legislation, secondary schools have been able to better provide the requisite vocational training to prepare students to be successful upon entering the workforce or continuing on to post-secondary educational programs. Friedel (2011) contends that CTE has broadened its role to include the fundamental skills of critical thinking, employee and personal qualities, as well as the soft-skill competencies needed for individuals to be successful in the workplace. With the changes made to funding commitments, vocational education, as a

name, was changed to career and technical education as vocational education was typically viewed in a negative manner due to the perception that those participating in vocational programs were of lower ability levels (Dougherty & Lombardi, 2016). Despite the acceptance of the CTE name by the Association for Career and Technical Education (ACTE) earlier, the passage of Perkins IV was the first federal legislation that adopted CTE in an official capacity (Friedel, 2011). Castellano et al. (2003) explain that the use of the term CTE represented a philosophical change in which vocational programs became infused with greater technology and the curricula was modified to focus on career clusters as opposed to singular vocations. Additionally, the new focus on curricula encourages students persistence and engagement through assisting students to understand the relationship between academic and career endeavors (Lekes et al., 2007). Furthermore, the goal of CTE programs began to focus on the provision of students with the requisite knowledge and skills to enter the workforce or proceed to post-secondary institutions (Castellano et al., 2003). Friedel (2011) explains that the accepted definition of CTE serves as a reflection of the continued process of integrating academics along with CTE training as well as the further linkage between secondary and post-secondary institutions through articulations agreements. The support of federal legislation has been extremely beneficial in supporting CTE programs to provide students with the requisite knowledge and skills that they need to be successful in their future endeavors.

The COVID-19 pandemic has highlighted the benefits of and need for CTE programs. As Jocson and Martinez (2020) contend, CTE programs provide the requisite training to curate a workforce that meets the needs of an ever changing economic and labor market. The benefits that CTE programs have, not only for students, but for the

greater economy and workforce have been demonstrated throughout the COVID-19 response. Gordon and Xing (2020) explain that CTE programs face great challenges in response to the COVID-19 crisis in the areas of equity, distance learning, and work-based learning. Furthermore, CTE programs are challenged with developing and implementing high-quality CTE instruction in a virtual environment that contains meaningful training for students and instructors (Gordon & Xing, 2020). As Friedel (2011) contends, CTE programs will continue to change and enhance in response to new industries and technologies. Much like the changes that have occurred within the realm of CTE over the previous few decades, the changes that have been expedited by the COVID-19 pandemic will have lasting impacts on the future of CTE. As if staying current with the ever-changing trade industries wasn't challenging enough, the COVID-19 pandemic completely altered the delivery of CTE instruction and the pedagogical strategies employed by instructors.

Traditional CTE Pedagogy

CTE instructors enter the field of education with a background in their specific vocational field that is based on work experience. CTE instructors obtain state issued teaching certificates based on specific protocols. Wilkin and Nwoke (2011) explain that in order to obtain a teaching certificate, CTE instructors must meet a minimum work experience requirement that can be completed either through their own experiences or through a CTE teacher preparation program. In the State of New Jersey, CTE instructors that are utilizing minimum work experiences to obtain a teaching certificate must have verification of between 4,000 and 8,000 hours of work experience in order to qualify for the certificate (NJDOE, 2019). Kemmis and Green (2013) contend that the work

experience backgrounds of CTE instructors are utilized in a way that enhances relationships with students in the teaching and learning contexts of their programs. Additionally, the previous work experiences allow for CTE instructors to build classroom learning environments that are centered around the context of the workplace learning that provides for learners to "make meaning out of a complex context where the intersection of established practices, rules, and processes; individuals and groups; and objects and artifacts force the learner to constantly evaluate and reevaluate their responses and actions (Green, 2015, p. 53)". The use of workplace learning models as classroom pedagogy provides the opportunity for students to create meaning from their learning experiences. Billet (2011) contends that workplace learning environments aligns with constructivist learning theory in that conscious thinking is utilized to make meaning of the situations that are encountered (as cited in Green, 2015). CTE instructors' ability to utilize their work experience to create work based learning environments enhances the ability to provide students with authentic, real-world learning experiences.

In addition to the creation of workplace learning environments, CTE instructors utilize a variety of other instructional strategies to provide students with the requisite knowledge and skills needed for a given vocation. In all CTE courses, instructors cover theoretical elements of their respective field (Green, 2015). In many cases, as Fletcher, Djajalaksana, and Eison (2012) found, CTE instructors utilize questioning, whole group discussion, guided practice, interactive lectures, self-directed learning, and problem-based learning strategies to teach the theoretical competencies of their program. The use of these traditional strategies for direct instruction, in particular the questioning, interactive lectures, and guided practice strategies, are considered explicit instruction

(Fletcher et al., 2012). With the shift to online learning due to the COVID-19 pandemic, instructors were forced to utilize online meetings for lectures and whole group discussion which created significant challenges to ensuring an interactive learning experience.

Knight (2013) contends that explicit instruction is utilized to teach content in an effective and efficient manner, thus increasing the likelihood that students will master the content. Burden and Boyd (2007) further that explicit instructional strategies are teacher driven and provide opportunities for students to increase their active engagement (as cited in Fletcher et al., 2012). In addition to these direct instruction strategies, CTE instructors need to be able to provide students with a wide variety of knowledge and skills, prepare diverse student learners for the modern workforce, demonstrate current industry knowledge, provide for student safety, build industry partnerships, assess student skill and performance, evaluate instructional strategies, and facilitate student application of problem-solving skills (Kemmis & Green, 2013; Manly & Zinser, 2012). The use of traditional instructional strategies to provide students with the theoretical knowledge and skill needed within a particular vocational field is imperative to support the student as they prepare to move into the workforce. However, Green (2015), found that while instructors spent time covering the theoretical elements of their programs, a sense of urgency existed to move to the active learning tasks that are the hallmark of CTE programs. When instructors were operating in fully remote learning environments they were no longer able to utilize full hands-on learning experiences and instead supplemented these experiences with digital simulations where available. In schools that were able to shift to hybrid learning, CTE instructors focused the majority of their in-person learning experiences on the hands-on application of knowledge and skills.

At the heart of CTE programs and pedagogy are the hands-on experiences that students participate in while working in the lab, or shop setting. Clark et al. (2010) explain that "CTE instruction consists of classroom teaching, laboratory applications, and supervised work experience (p. 52)." Kemmis and Green (2013) further that creation of learning activities in CTE programs allows for students to gain the experiences of working in their particular trade in preparation for employment in the field following the completion of the program. While students are able to learn theory in the classroom setting, the participation in teacher designed work experiences during supervised laboratory instruction allows students to further their skills through hands-on learning experiences and problem-solving in applying the theoretical knowledge that has been obtained (Clark et al., 2010). The use of real-world, hands-on learning experiences in the shop setting allows for the development of work teams and provides for the instructor to serve as the facilitator of learning, in which they support and scaffold instruction in an effort to further student independence and motivation (Green, 2015). Furthermore, Clark et al. (2010) contend that CTE instructors believe the use of hands-on learning experiences in a shop setting allows for students to apply their theoretical knowledge through diverse learning opportunities. These applications allow for students to utilize their experiences to construct their own meaning through their learning, which is constructivist in nature (Doolittle & Camp, 1999, as cited in Clark et al., 2010). A CTE instructor's use of hands-on learning experiences in a lab setting allows for students to participate in real-world, workplace learning experiences that provide opportunities for the application of theoretical knowledge through obtaining practical skills and using problem solving techniques. It is through a combination of traditional instructional

methods and the real-world, authentic, experiential learning environments that are employed by CTE instructors that truly bring to life the vocational learning experiences within the shop setting.

Experiential Learning in CTE

The building blocks of successful CTE programs are established through the use of hands-on, active, and authentic learning experiences for students. Clark et al. (2010) explain that the use of real-world, authentic learning experiences provides opportunities for students to develop and perform specific skills and competencies while obtaining trade specific employment experiences. Doolittle and Camp (1999) contend that, from a pedagogical perspective, CTE programs should be developed around an organized and sequential hands-on approach to teaching and learning. The experiences that students have in a workplace learning environment, provide the opportunity for students to construct knowledge through their experiences and build upon the knowledge and skills that have been acquired. Kolb (1984) contends that learning in experiential learning theory is the "process whereby knowledge is created through the transfer of experience. Knowledge results from the combination of grasping and transforming experience (p. 41, as cited in Kolb & Kolb, 2005). Clark et al. (2010) further that the inclusion of experiential learning in secondary CTE programs is vital to student success. Kolb and Kolb (2005) describe the learning cycle for experiential learning as a process in which students participate in concrete experiences, abstract conceptualization, reflective observation, and active experimentation. McCarthy (2010) furthers that learners must move through each stage of the experiential learning experience in order to make meaning from these experiences. Clark et al. (2010) contend that "when learning stops at

the experience, it limits the learner's capacity to reflect on the experience and to acquire deeper understanding from it (p. 54)." Additionally, in order for the cycle of experiential learning to provide students with the necessary learning to link the experiences with future application of the knowledge and skills, the learner needs a valid context to allow for reflection on the experiences that have been navigated (Clark et al., 2010). Therefore, it is imperative for CTE instructors to include each phase of the experiential learning process into their instructional activities and ensure that students have the opportunity to reflect on their learning experiences in order to create meaning.

Experiential learning theory is rooted in constructivism. Doolittle and Camp (1999) explain that constructivism is focused on the construction of new knowledge throughout the learning process. Kolb and Kolb (2005) contend that experiential learning allows students to create their own knowledge through their experience. The process of constructing knowledge is found in the experiences of the four modes of experiential learning (Kolb & Kolb, 2005). McCarthy (2010) furthers that learners construct their knowledge through continually selecting the set of learning abilities needed within a given learning situation. Green (2015) posits that CTE instructors work to serve as the facilitator of learning for students as they construct their learning through knowledge and experience. It is through experience, that students are able to actively construct their learning and discover ways that learning can be applied in different situations. Doolittle and Camp (1999) conclude that students assume an active role in constructing their knowledge through their experiences and the realization that the newly constructed knowledge will have varying degrees of validity with respect to the realities of a workplace. The active role that students take in the learning process through experiential

learning serves as an optimization of student learning outcomes (McCarthy, 2010). CTE instructors work to develop learning experiences that will facilitate the application of knowledge and skills to the arenas of work and post-secondary educational opportunities. Guthrie and Jones (2012) explain that educators need to be cognizant of creating opportunities for students to construct meaning through both intentional and everyday life events within programs and daily interactions. It is the intentional use of learning experiences in an applied, real-world setting that allows for CTE instructors to create learning opportunities for students that are authentic and applicable to the workplace environments that they will encounter within their specific trades. With the authentic, real-world learning experiences being a mainstay in CTE programs, there has been a slower paced move towards a wide integration of educational technology to support online learning in these programs.

Educational Technology Integration

Technological advancements along with research and legislation has led to significant increases in the use of technology throughout education at all levels. Kentnor (2015) explains that with the advancements in technology, the methods by which knowledge is delivered and received will continue to evolve in both traditional and online classroom environments. Kotrlik and Redmann (2009) contend that the decade opening the 21st century demonstrated increased political, professional, and organizational support for the increased use of educational technologies. Rowston et al. (2020) further that the expectation for educators to integrate technology as a means to support teaching and learning is "omnipresent (p. 683)." This increased support for the integration of educational technologies has been supported through federal legislation. Within Title II,

Part D, of the No Child Left Behind Act of 2001, is found the Enhancing Education Through Technology Act of 2001, which provided resources for the integration of instructional technology in an effort to increase student achievement (Kotrlik & Redmann, 2009). Additionally, Crossland et al. (2018) explain that the Every Student Succeeds Act of 2015 provided for a renewed commitment from the federal government to allow educators to focus on expanding their technology initiatives to include greater accessibility, increased educational technologies, and greater access to assistive technology. With respect to CTE programs, funding has been established for technology integration through the Carl D. Perkins Vocational Education Acts. Kotrlik and Redmann (2009) explain that the Perkins Act reauthorization of 1984 established funds for new technology to address computer literacy in vocational education programs. More recently the 2006 reauthorization of the Perkins Act provides for funding to provide training and professional development to CTE teachers, faculty members, and administrators in the use of technology, including distance learning (Kotrlik & Redmann, 2009). The support of federal initiatives and funding have provided educators at all levels with the potential to further integrate instructional technologies into their classroom practices. However, the inclusion of instructional technologies have not been universally applied.

Fletcher et al. (2012) note that the inclusion of educational technologies should be for the enhancement of student learning and not simply just to implement additional tools. Davies (2011) contends that the ultimate goal of integrating educational technology is the "wise and competent use of technology to facilitate learning (p.50)." Additionally, Rowston et al. (2020) contend that educational technology pedagogy is the

crossover points of technological tools, instructional methods, and specific subject content in order to further the development of student's 21st century skills. Petko et al. (2018) further that teacher and school-wide readiness to integrate educational technologies must be addressed in order to foster the integration of educational technology in the classroom. The trends of educational technology expansion during the early parts of the 21st century have led schools to invest in greater use of instructional technology in classrooms as well as instruction transitioning from local classrooms to a more global classroom via distance learning through technology integration (Kotrlik & Redmann, 2009). Despite these advances and initiatives, Petko et al. (2018) explain that, with respect to frequency of use and pedagogy, the integration of instructional technology has been limited and that there are challenges in shifting from traditional instructional methods to a more instructor facilitated and student-centered classroom. While there have been significant shifts in educational initiatives to enhance the integration of technology use, the implementation of technology has not been universal and there are several barriers that may exist with respect to teacher implementation of technology in the classroom.

Petko et al. (2018) explain that the integration of educational technology has experienced "enablers and barriers (p. 2)." Ertmer (1999) identified teacher knowledge and skills as well as their beliefs, values, and attitudes as barriers impacting the integration of educational technology (as cited in Rowston et al., 2020). Petko et al. (2018) refer to teacher beliefs and skills regarding the implementation of educational technology in the classroom as teacher readiness. Additionally, Davies (2011) contends that while teaching and learning can be enhanced with the inclusion of educational

technologies, the effective implementation of these tools requires both an understanding of the learning goals as well as how technology can function to support those goals. Petko et al. (2018) further that teacher readiness is based on their beliefs that the integration of educational technologies is beneficial for their students' learning as well as their level of confidence with respect to their own skills in utilizing these technologies. Teacher readiness is supported by a school's readiness, which is based on the perceived importance of the technology, the clarity of goals for technology outcomes, supportive administration, strong technology infrastructure, as well as the ability to work formally and informally with colleagues (Petko et al., 2018). It is clear that providing teachers with the requisite knowledge, skill, and training is of the utmost importance to support the successful integration of educational technologies and pedagogy in the classroom. Within CTE specifically, Kotrlik and Redmann (2009) explain that CTE instructors integrate technology into the classroom practice based on the value that they place on the technology individually, the commitment of time in integrating the new technology, their willingness to change, and the previous technology training experiences (as cited in Fletcher et al., 2012). Rowston et al. (2020) found that for instructors that are moving to education as career-changers the confidence, knowledge, and skills that they have with respect to technology integration is based on those prior occupational experiences. According to the research done by Kotrlik and Redmann (2009) the majority of CTE instructors reported that their sources of technology training was sourced from their own self-exploration, colleagues, or from workshops. Additionally, while CTE instructors have increased their usage of educational technologies in the classroom, these tools are not utilized to their maximum potential nor do CTE instructors typically have access to

the same technologies that are available to other teachers (Kotrlik & Redmann, 2009). These findings lead to an understanding that it is imperative to provide instructors with the requisite training and continued support in order to successfully integrate educational technologies into their pedagogical practice and classroom environments. Bahcivan et al. (2019) contend that training educators, as well as those in pre-service settings, is crucial to the integration of educational technologies. Furthermore, technology integration increased when teachers were provided with more technology and training (Kotrlik & Redmann, 2009).

Online Learning in CTE

Online learning is not a new concept, however it is not a practice that has been widely implemented in CTE. Traditionally, CTE programs have been understood as vocational programs that provide students with the knowledge and hands-on skills needed to move on to the workforce or post-secondary institutions (Castellano et al., 2003). In order to obtain the requisite hands-on skills, students typically complete CTE programs in-person. As Ohanu and Chukwuone (2018) contend that the goal of providing students with CTE training is to assist students in the acquisition of the requisite skills needed to advance into careers. Metz (2010) explains that while there is greater interest in implementing online learning, many CTE programs have been hesitant in making these shifts. Garza Mitchell et al. (2016) further that despite advances in technology, the majority of CTE programs are not conducted online, especially for programs that are skill driven. Kotrlik and Redmann (2009) contend that the adoption of technology integration by CTE instructors is dependent on the value that the individual instructor places on the technology, their willingness to make a change in their pedagogy, and previous training

on specific educational technologies. Fletcher et al. (2012) explain that the integration of technology should be for the enhancement of student learning and not merely to implement something new.

The need for secondary CTE programs to expand their course offerings to include online learning elements have been better understood throughout the educational response to the COVID-19 pandemic. Lake and Dusseault (2020) explain that throughout the United States, the majority of school districts offered some type of remote instruction to students. However, Kuhfeld et al. (2020) contend that the effectiveness of remote instruction remains unclear, "given that most K–12 students and teachers had little experience with online instruction and that large gaps in technology access exist in many parts of the country (p. 549)." Additionally, as Harasim (2000) explains with respect to those implementing online learning for the first time, many were proceeding blindly without the necessary precedents, contexts, and knowledge of how to implement these processes with fidelity. Bird et al. (2020) further that one of the major challenges to implementing online learning during the COVID-19 pandemic was that while some instructors had experience implementing online learning, the majority were attempting this mode of instruction for the first time. Additionally, Ohanu and Chukwuone (2018) contend that CTE instructors need to be supported through the process of developing and refining the requisite knowledge and skills needed to use online learning platforms for teaching and learning. Furthermore, Lachlan et al. (2020) contend that online learning is a detractor for many teachers as the interactions with students is a driving force behind the motivation of completing their work. In order to successfully implement online learning experiences, instructors must be provided with the requisite knowledge, training, and

skills needed to design and provide students with high-quality and engaging online learning.

Digital Simulations and Virtual Reality. An expanding element of instructional technology usage in CTE programs is through the integration of digital simulations and virtual reality. Moyer et al. (2017) explain that in order to provide students with real-world work experiences, CTE programs utilize simulated work-based learning (WBL) experiences within educational settings. Realistic, work-based simulations have been increased through advances in digital technologies that include the use of virtual reality (Moyer et al., 2017). Hite (2021) contends that the use of digital technologies provides opportunities for increased learning in CTE programs through the use of realistic experiences that are within user-friendly interactive simulations. Wells and Miller (2020) further that virtual reality technologies have, "found useful roles in the teaching, learning, and assessment practices in various career areas (p. 94)." It was found by Ausburn and Ausburn (2008) that within CTE programs the use of virtual reality and digital simulations enhanced the recall and confidence of learners and is potentially a suitable medium for use within these programs. Moyer et al. (2017) contend that the use of digital simulations and virtual reality provide opportunities to "sharpen students' technical competence through repetitive practice of core skills. It allows students to think critically and safely engage in high-risk, potentially life-threatening situations (p. 7)." The incorporation of virtual reality and digital simulations can have multiple benefits on CTE program offerings as well as providing students with additional learning opportunities and experiences that otherwise may not be available.

Advantages of Online Learning. There are numerous advantages to utilizing online learning platforms. Colorado and Eberle (2010) explain that online learning provides increased accessibility and flexibility along with increased student enrollment possibilities as well as greater efficiency. The United States Department of Education (2012) contends that the popularity of online learning has increased because it creates flexibility in accessing content and instruction by,

> 1) increasing the availability of learning experiences for those who cannot or choose not to attend traditional schools, 2) assembling and disseminating instructional content more efficiently, and 3) increasing student-instructor ratios while achieving learning outcomes equal to those of traditional classroom instruction (USDOE, 2012, p. 2).

Khan (1997) furthers that online learning programs can create instructional and learning opportunities that address technological, pedagogical, and ethical issues (as cited in Colorado & Eberle, 2010). Jones (2015) explains that online learning increases access to educational opportunities that may not have been afforded to students without the use of these platforms. Additionally, Alexander et al. (2012) found that online learning presents greater convenience and flexibility, the opportunity to view and review course material as needed, decreased stress, and the ability to move at a desired pace. In a 2011 study, Thompson found that instructors believe that online learning environments provide an easier means to meet individual student needs, greater flexibility for students and teachers, stronger student-centered environments, and a better position to provide resources that meet the learning styles of students. Furthermore, Fatonia et al. (2020) found that online learning provided a comfortable learning environment, greater time

utilization, as well as streamlined interactions. Through the use of online learning, instructors are able to create greater learning opportunities for their students and provide flexibility in order to meet the student needs.

Challenges of Online Learning. While online learning has a number of advantages there are still challenges brought forth by several factors that impact the success of implementation and use. Jones (2015) identifies several areas that create challenges when utilizing online learning including, "student access, curriculum quality, degree of interpersonal interaction, and clinical skill development, in addition to upholding gatekeeping and academic integrity standards, the effects of dependence on technology, and appropriate use of resources (p. 228)." Ohanu and Chukwuone (2018) cite several challenges to online learning that have been found in research studies that include additional workloads, lack of support and professional development, technical issues, and time constraints. With respect to technical education instructors, Stevens (2001) identifies challenges in content and curriculum, the quality and promotions of technical education programs, the appropriateness of the use of technology, the digital divide, and resistance to innovation by stakeholders (as cited in Ohanu & Chukwuone, 2018). Thompson (2011) found in her study that teachers found challenges in communication with students, fewer personal interactions with students, frustrations over technologies not working, fewer student collaborations, and challenges in self-motivation of students to complete work. As with any "newer" modality of instruction, there are challenges that must be addressed in order to support the needs of the instructors facilitating these types of learning experiences. Despite its challenges, the use of online learning provides unique opportunities to expand the learning experiences of students.

School leaders need to have an understanding of the needs that instructors have in order to provide the requisite training and continuous professional development to successfully implement online learning platforms. The research from this study focuses on methods to employ and integrate educational technologies to support the teaching and learning in secondary CTE programs. Additionally, while the integration of educational technology has been a major initiative both locally and nationally over the past few decades, the recent situations and reliance on technology brought on by the COVID-19 pandemic has led to revitalized efforts in understanding the best practices in incorporating educational technologies across all levels of educational institutions. However, research is needed to understand the best practices in implementing educational technologies to support the theoretical underpinnings of CTE programs and the pedagogical strategies of CTE instructors.

Conceptual Framework

There are several guiding theories and concepts that have served to design this study. These theories will examine specific pedagogical practices within CTE that are inclusive of traditional practices as well as online learning practices.

Constructivism

The first theory is the constructivist perspective of education. Constructivism is typically a perspective that is seen in qualitative research (Creswell & Creswell, 2018). Bryant and Bates (2015) explain that constructivism focuses on building upon knowledge through the furthering of developing connections and new pathways to discovering new ideas. Creswell and Creswell (2018) furthers that individuals desire to "understand the world in which they live and work (p. 8)." Additionally, Doolittle and Camp (1999)

explain that from the constructivist perspective, learners actively create knowledge which is encompassed in the experience of the individual. With the majority of instruction moved to an online platform due to the COVID-19 pandemic, instructors of CTE programs were forced to find the methods and benefits of online learning while facing the challenges head on without much prior direction or experience. Maxwell (2013) contends that one of the goals of qualitative research is to contribute an understanding of meaning, experiences, and events that study participants have engaged in previously. Providing CTE instructors with an understanding of best practices in online learning for secondary CTE programs can better facilitate the implementation of these platforms. As Patton (2002) explains, constructivists believe that knowledge is created through experience, therefore the most trustworthy way to understand the best practices of implementing a secondary CTE program using an online platform is through the experiences of instructors who have accomplished this task.

Constructivism is focused on supporting authentic, collaborative, and active student-centered learning environments (Snyder, 2009). Therefore, Snyder (2009) contends that

> As we continue to move further into the information age, new competencies are required such as the ability to innovate and create and to solve ill-defined problems. Constructivism helps to develop these skills through such teaching methods as group-based and cooperative work, problem-based activities, and discovery learning (p. 50).

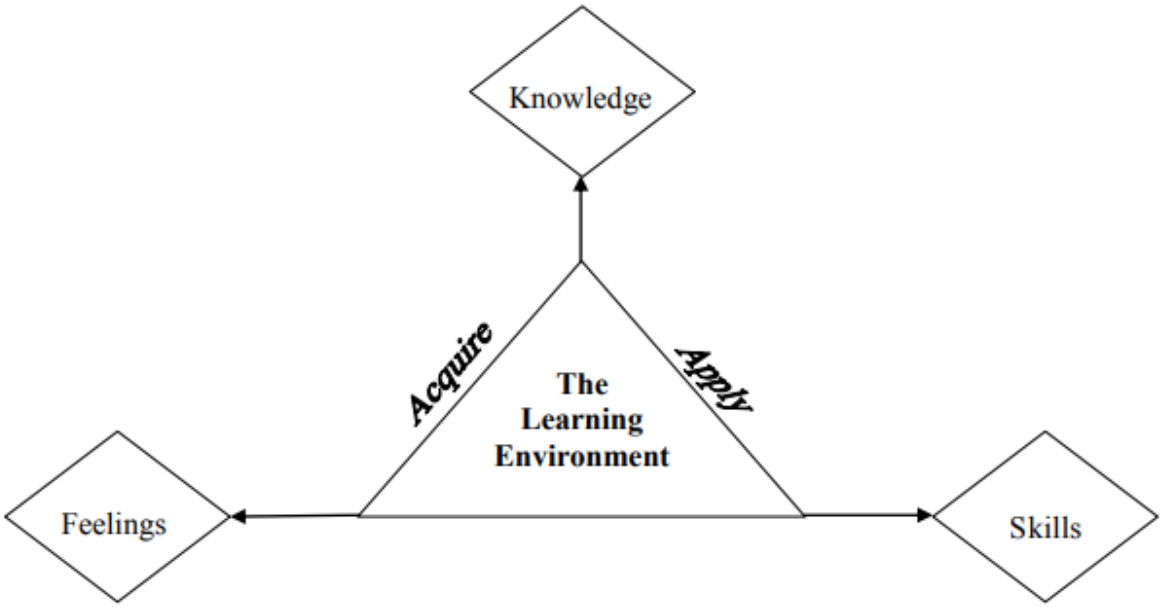
The use of a constructivist approach will allow for online CTE learning environments to be focused on developing the necessary knowledge and skills for teachers to successfully implement their programs utilizing this mode of instruction.

Experiential Learning

Additionally, CTE programs are guided by the experiential learning theory. Kolb (1984) explains that in experiential learning students create knowledge through the transformation of their experiences and that knowledge is created through both understanding and transforming experience. McCarthy (2010) furthers that experiential learning requires the active involvement of students in the learning process. Within experiential learning, students learn theories and concepts in conjunction with hands-on learning experiences in an authentic environment (Clark et al., 2010). Clark et al. (2010) further that the authentic learning experiences that take place in CTE programs allow students to apply their knowledge and skills in real-world experiences that support students in gaining experiences that promote employability. Borzak (1981) explains that within experiential learning, the direct experience of the student with the learning is more important than the thought process associated with the learning (see Figure 1). Figure 1 demonstrates that in experiential learning, students will have their individual knowledge, skills, and feelings which they are able to develop and further through acquisition and application in the learning environment.

Figure 1

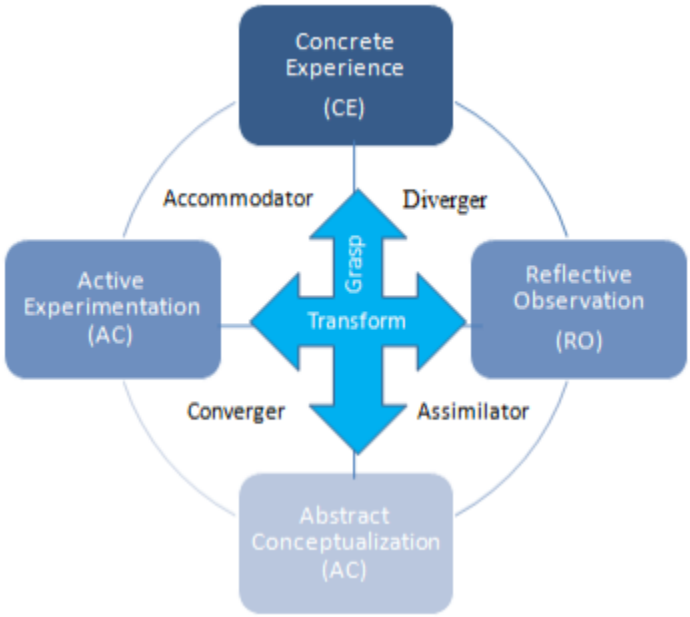
Borzak (1981) Experiential Learning through Direct Experience



Furthermore, McCarthy (2010) explains that experiential learning is a convergence of experience, cognition, perception, and behavior in which students must complete the four stage cyclical process in order for effective learning to occur. The experiential learning model includes four stages, the concrete experience and abstract conceptualization within the experience of grasping, and reflective observation and active experimentation within the transforming experience (McCarthy, 2010) (see Figure 2). In order for learning to occur, the learner must experience, reflect, think, and act in any order throughout the process (McCarthy, 2010).

Figure 2

Kolb (1984) Experiential Learning and Learning Styles



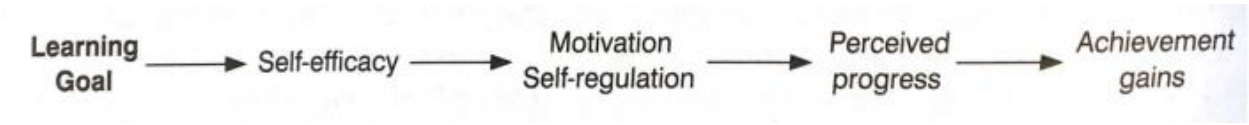
Motivational Theory

Motivational theory is a driver for this research in that CTE teachers must be able to motivate students, however many CTE instructors have not had the needed preparation to effectively motivate students (Kroth, 2007). Self (2001) furthers that one of the many challenges that face secondary teachers, in particular, is that they may not have received any training on motivating students prior to entering the workforce. Schunk (2012) explains that motivation and learning affect each other and that student motivation impacts both what and how they learn. Without an understanding of how to motivate students, the challenges presented to working with students in CTE programs that have an online component become greater.

Of the utmost importance to CTE teachers is the ability to utilize goal theory in the programs. Schunk (2012) explains that goal theory encompasses the relationships between "goals, expectations, attributions, conceptions of ability, motivation orientations, social and self comparisons, and achievement behaviors (p. 374)." Paramount to goal theory is the idea of goal orientation which is focused on the individual's engagement in activities to reach their purpose (Schunk, 2012). Anderman et al. (2002) further that goal orientations can be viewed as a student's reason for participating in a learning task. Schunk (2012) explains that there are two types of goals that fall under goal orientation. Learning goals refer to the knowledge, skill, behavior, or strategy that students obtain, whereas performance goals denote the tasks that students complete (Schunk, 2012). Ames (1992) contends that learning goals provide students with the focused attention on strategies and processes that will assist them in acquiring the abilities and furthering their skills. Student learning motivation and enhanced skill performance is sustained through their perceived progress in the acquisition of skills and self-efficacy (Schunk, 2012) (see Figure 3). Schunk (2012) explains that when students are driven by learning goals that there are increases in self-efficacy, motivation, skill, and task orientation whether or not self-evaluation is completed in the learning process.

Figure 3

Schunk (2012) Learning Goals Impact on Motivation



The use of online learning platforms can provide a greater sense of autonomy and independence as well as a means of providing students with self-regulated instruction (Crotty, 1995). Furthermore, self-regulatory activities as well as self-efficacy, motivation, and achievement can be enhanced through the provision of feedback that focuses on a learning-goal orientation (Schunk, 2012). Lepper and Malone (1987) explain that learning on computers has the ability to focus attention on tasks through motivational elevation, assist students in engaging in task-directed information processing, and maintain arousal levels at the optimum capacity (as cited in Schunk, 2012). However, as Bird et al. (2020) explain, few instructors have had experiences implementing online learning while the majority have not engaged in these activities. The use of synchronous and asynchronous learning can provide a method for students to engage in real-world problems to assist them in developing meaningful educational experiences (Lynch, 1997). Additionally, Doolittle and Camp (1999) contend that students in CTE programs must be able to construct knowledge in a relationship that is reciprocal with the instructor. Furthermore, Huang (2002) explains that constructivism is facilitated in online learning through the creation of interactive and collaborative learning experiences, as well as authentic, learner-centered experiences to build student knowledge and skills. Therefore, the most appropriate frameworks to best understand how secondary CTE teachers can successfully implement online learning platforms into their programs are the constructivist and experiential learning theory. Anderson (2004) explains that there is no one best mode of instruction for educating all students using an online platform. Rather, teachers must learn to develop their skills so that they can respond to student and curriculum needs by developing a set of online learning activities

that are adaptable to diverse student needs (Anderson, 2004, p.54)." Therefore, research must be conducted on the experiences of secondary CTE instructors during the implementation of online learning in order to provide the best practices needed as CTE programs progress further into 21st century learning.

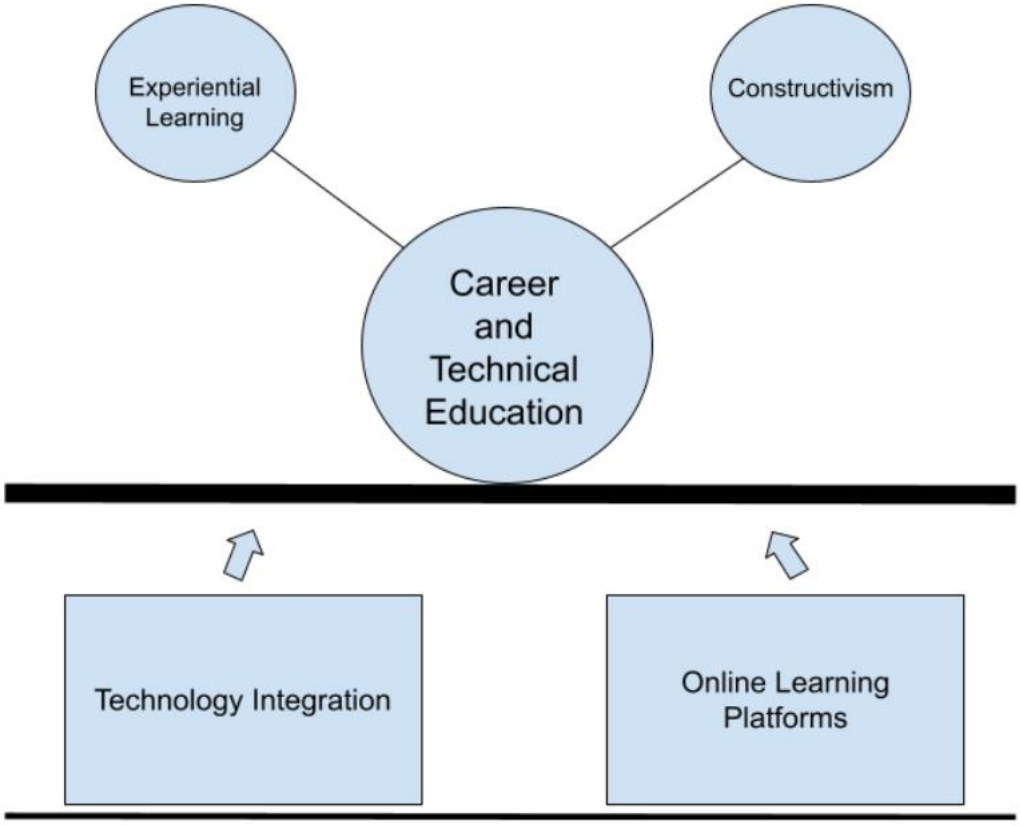
Online Learning Concepts

Within the scope of this study, there will be three specific online learning concepts that will be examined. Each of these concepts have been experienced by the participants of this study. With respect to delivery, the implementation of online learning can take a number of different forms. Croxton (2014) contends that online learning holds a significant appeal in that it provides flexibility in terms of access, convenience, and participation. Harasim (2000) explains that there are three main modes of delivery with respect to online learning. In the adjunct mode, computer networks are utilized to enhance components of course activities (Harasim, 2000). When utilizing the mixed mode, technologies are completely integrated into the curriculum and can be used to facilitate major course activities, such as group projects (Harasim, 2000). Both the adjunct and mixed modes would fit within the pedagogical approach of blended, or hybrid learning. As Watson (2008) explains, blended learning is the application of online and face-to-face learning in some type of combination. Lastly, Harasim (2000) expounds that online learning can be conducted in a fully online mode in which all course activities are presented and completed in an online environment. Each mode of instruction can be delivered either in either a synchronous or asynchronous mode. Synchronous learning is conducted in real-time with students and instructors interacting through an online platform (Pregowska et al., 2021). Asynchronous learning, on the other hand, involves

flexibility of when the interactions occur between instructor and student, while the student completes work within a timeframe that can fit their schedule (Pregowska et al., 2021). Outside of fully online instruction, there are two major online learning concepts that have significant value in this study. The use of blended, or hybrid, learning as well as the concept of a flipped classroom are methods that instructors can utilize to enhance their instruction and the student learning outcomes. Figure 4 demonstrates the goals of this research to understand the best practices for how the integration of technology and online learning platforms can support the facilitation of experiential learning and the constructivist hallmarks of secondary CTE programs.

Figure 4

Integration of Technology and Online Learning Supporting Secondary CTE Programs



Hybrid (Blended) Learning. Hybrid learning presents a unique opportunity for CTE programs. Xiao et al. (2020) explain that hybrid learning is a blurring of the boundaries between the physical classroom and online environments where students and instructors can interact with each other and course content either synchronously or asynchronously through the use of digital tools. Watson (2008) furthers that blended learning combines the online delivery of instruction and content with the best features of face-to-face instruction in which students are afforded the opportunities to experience

thoughtful reflection, personalized learning, and differentiation. The use of blended learning models can provide instructors with greater opportunities to focus on hands-on, experiential learning activities during face-to-face meetings. Carver and Kosloski (2015) contend that hybrid learning can provide improved learning experiences through the use of a combination of learning approaches that are supported with hands-on guidance. Metz (2010) furthers that the use of a hybrid learning model allows for students to complete their learning of course theory online while completing the hands-on application of their learning in the classroom. Tucker (2013) adds that the use of hybrid learning allows for students to take some control over the learning process. The use of blended learning enhances the opportunities for students to operate in a self-regulated manner when working online and allows teachers to greater support students during face-to-face learning opportunities. Flynn (2020) contends that the use of hybrid learning provides teachers with a method of maintaining the classroom environment that can be adapted to the many contingencies that teachers are currently facing. By maintaining a classroom environment that is supportive and allows for greater application of hands-on learning, instructors are able to support student learning while maintaining the workplace learning environment that is the hallmark of CTE programs. The greatest challenge presented when employing a blended learning model is that there are typically fewer face-to-face meetings between students and instructors, which can be prohibitive in certain learning situations.

Flipped Classroom. The flipped classroom provides a means for CTE instructors to present the theory portions of their courses online and may create the opportunity for greater hands-on instruction during in-person learning. Song and Kapur (2017) explain

that the flipped classroom provides a model where teachers invert their instruction using out of class time for new material and class time for active engagement in knowledge construction. Additionally, the use of the flipped classroom allows for students to participate in the passive learning of new material online with class time devoted more to learning experiences that are collaborative and interactive (Mok, 2014). The use of the flipped classroom instructional model provides for a greater amount of classroom instruction time to be focused on student problem solving where teachers can serve as facilitators of learning (Trogden, 2015). In CTE classrooms, the more time students have to spend on hands-on learning and problem solving, the potential exists for further developing the requisite vocational skills that are needed for students to be successful when transitioning to the workforce or post-secondary institutions. As Boucher, Robertson, Wainner and Sanders (as cited in Wu et al., 2017) explain, the more opportunities students have to participate in meaningful active learning experiences, the greater the potential for increased student achievement exists. By implementing a flipped classroom, instructors have the opportunity to create a student-centered learning environment that provides students with the opportunity to participate in active collaboration in the classroom and interactive learning experiences outside of the classroom (Wu et al., 2017). Flipped classrooms in CTE programs provide opportunities for students to spend more time acquiring hands-on skills while furthering their theoretical knowledge outside of the classroom with expanded opportunities to understand the links between theory and practice. The use of flipped classrooms can serve as an online learning platform that builds upon student theoretical and practical

knowledge through increasing the amount of time that students and instructors can interact with hands-on learning experiences in workplace learning environments.

Summary

It is clear that CTE programs have an extensive history and strong impact with respect to the workforce development of the United States. Additionally, there are established practices of CTE instructors that allow for the creation and implementation of experiential learning situations in which students can apply their acquired theoretical knowledge and skills in real-world, authentic learning experiences. The use of traditional instructional methods along with the creation of workplace learning environments that are focused on delivering real-world, authentic application of knowledge and skill create the basis for strong CTE programs. Conversely, the COVID-19 pandemic has highlighted the need for CTE instructors to be provided with best practices, training, and continued professional development in the area of educational technology integration. While the use of educational technology has been a significant initiative over the previous few decades, the integration of these tools has not been universally applied and has not been the select method of instruction to enhance student learning in CTE. The conceptual underpinnings of constructivism, experiential learning, and motivational theory drive the basis for instruction in CTE. Additionally, the focus of educational technology integration that is driven by blended learning and flipped classrooms can present the needed practical shifts to guide further integration of online learning elements in CTE programs. The literature presented will further guide the research surrounding secondary CTE teacher's perceptions of online learning. Rossman and Rallis (2017) explain that previous literature helps to establish a study in a continuous conversation

around the topic. This literature will provide insights into the methodological approach to understanding this phenomenon as well as direct the research questions that will drive the research. While there is a large body of research surrounding the use of online learning and integration of educational technologies, the previous literature will allow for an understanding of the need for further research on teacher perceptions of online learning in secondary CTE programs.

Chapter 3

Methods

Purpose

Career and Technical Education (CTE) plays a vital role in the development of student knowledge and skills as well as in providing a trained workforce to assist with the labor shortages that exist in many vocational fields. CTE programs provide highly skilled workers to labor markets in a variety of professional, trade, and technical fields (Stone, 2017). Jocson and Martinez's (2020) contend that CTE programs provide the requisite training for workforce development that is able to meet the economic needs of both the country and the ever-changing labor markets. Traditionally in secondary CTE programs, instructors employ classroom experiences that are designed to provide students with the real-world encounters that they will experience in work-place settings (Green, 2015). Kennis and Green (2013) explain that in order to support real-world learning experiences, CTE instructors take on the role of facilitator. A significant challenge to traditional, hands-on CTE learning experiences was felt with the onset of the Covid-19 pandemic and the resulting remote instruction that had to be moved to. CTE instructors were forced to change their instructional approaches to support work-based learning experiences using online learning platforms. Many instructors, however, did not have the requisite experiences to quickly make these instructional changes (Bird et al, 2020). The experiences that secondary CTE instructors had due to the move to online learning present opportunities to further the pedagogical strategies utilized in these programs. Carver and Kosloski (2015) contend that implementing online learning strategies in CTE programs provides opportunities for educators to meet a wider range of student learning

styles and providing greater support for students. Garza Mitchell (2017) adds that online learning in CTE programs creates an environment that can reach a greater number of nontraditional students, ease time constraints within CTE programs, and provide greater access to academic programs. Furthermore, Horvitz (2019) posits that the use of online learning in CTE programs can expand the growth and sustainability of programs moving forward.

The purpose of this qualitative study is to examine and understand the perceptions of CTE instructors with respect to the best practices in implementing and using online learning in secondary CTE programs. The goal of utilizing qualitative research methods is to create knowledge and learning (Rossman & Rallis, 2017). Additionally, as Denzin and Lincoln (2000) contend, qualitative research provides the basis for generating an understanding of the experiences and actions of the research participants by way of describing the essential characteristics that are presented (as cited in Jackson, et al. 2007). Therefore, when examining the use and implementation of online instruction in secondary CTE programs, the best way to understand these practices is through the perspectives of the instructors participating in these environments.

While the typical theoretical lens that CTE programs are viewed through is that in-person, hands-on instruction is the best instructional approach, this study focused on the idea that online learning can provide enhanced learning experiences for students through the combination of multiple learning approaches with the hands-on guidance needed for specific competencies (Carver & Kosloski, 2015). At this stage in the research, the implementation and use of online learning in CTE programs will be generally defined as the methods that teachers can successfully implement online theory

learning with hands-on, in-person instruction to enhance student learning. The goal of the research study is to provide a set of best practices for secondary CTE instructors to refer to when implementing and using online learning platforms for their programs.

Research Questions

Through the examination of the perceptions of CTE teachers of the use and implementation of online learning in secondary CTE programs, this research will be guided by the following question, how can educational technologies be utilized to enhance student learning in Career and Technical Education programs? Further guiding this research will be the following subquestions:

1. In what ways can educational technology support experiential learning in CTE programs?
2. How can CTE programs benefit from incorporating educational technologies?
3. What types of supports do teachers need in order to better facilitate the integration of educational technology within CTE programs?
4. How has the integration of technology changed CTE programs?

Research Design

This research study will be conducted using qualitative research methods. Rossman and Rallis (2017) contend that the goal of qualitative research is to generate knowledge and learning and as such qualitative research is utilized to generate an understanding of human actions through the description of essential characteristics of human experience (Denzin & Lincoln, 2000, as cited in Jackson et al., 2007). In the context of this study, the knowledge that is generated through qualitative research can serve to inform individuals in the secondary CTE educational realm of the best practices

in implementing and employing online learning strategies in these programs. Maxwell (2013) adds that qualitative research allows for flexibility and inductive, as opposed to fixed, methodology and initial assumptions that are strict with respect to the phenomenon being researched. Additionally, Corbin and Strauss (2015) contend that qualitative research approaches allow for the opportunity to examine the internal experiences of participants, along with the exploration of how participants form and transform their individual meanings. Toma (2006) furthers that the data collected in qualitative research can provide insights that are linked to the larger picture of the setting in which the research is conducted. With respect to the examination of teacher perceptions of the implementation and use of online learning methods in secondary CTE programs, the research is beginning with specific questions that are geared toward the development of a product that can be used in the future (Rossman & Rallis, 2017). Additionally, as Corbin and Strauss (2015) contend, qualitative research allows for the researcher, "to connect with their research participants and to see the world from their viewpoints (p. 5)." Rossman and Rallis (2017) further that the use of qualitative research is a means of utilizing applied research in which the researcher is providing research that will assist with the decision making that must be done by practitioners in order to improve experiences. Through the use of qualitative research, the researcher will be able to better understand the true experiences and perceptions of participants in order to shed light on the implementation and use of online learning strategies in secondary CTE programs.

One of the strongest points of strength for utilizing qualitative research is the rich data that can be collected. Guba and Lincoln (1982) explain that qualitative research provides the opportunity to demonstrate transferability through the use of "thick

description" that allows for judgements to be made regarding the phenomenon being explored that can be employed and understood in different contexts (p. 248). Furthermore, Montrieux et al. (2015) contend that qualitative research serves as an extremely strong method of gathering information regarding the in depth perceptions of individual participants. By employing qualitative research strategies, the opportunity exists to discover more about the individual experiences, perceptions, and responses of participants (Corbin & Strauss, 2015). The use of qualitative research will allow for the researcher to construct knowledge alongside the research participants and produce a product that will allow the participant practitioners, as well as other practitioners, to develop strategies to enhance the process and procedures of employing online learning methods in secondary CTE programs.

Research Approach

This research study will employ naturalistic inquiry as the research will be conducted in natural rather than controlled settings (Rossman & Rallis, 2017). Therefore, naturalistic inquiry will be the qualitative design that is focused on for this research. Guba and Lincoln (1982) contend that naturalistic inquiry occurs within the natural setting and is heavily reliant on qualitative methods. McInnes et al. (2017) explain that naturalistic inquiry does not contain any manipulation of the research setting by the researcher and is not based on knowledge that has been obtained through previous experience. Within the use of naturalistic inquiry, there are multiple realities that are studied through a holistic lens with an interaction that is continuous between the researcher and those participating in the research (Guba & Lincoln, 1982). Bowen (2008) furthers that in naturalistic inquiry, the researcher examines real-world situations

as they play out in their natural context with an understanding that there exists the construction of multiple realities in the same scenario. Beuving and de Vries (2020) continue that naturalistic inquiry is focused on the point of view of the participants and presents their perspectives of their lived reality. Naturalistic inquiry will provide this qualitative study with a research approach that allows for the deeper understanding of the lived perspectives of secondary CTE instructors when implementing and using online learning platforms in their programs. Agostinho (2005) explains that, unlike a positivist perspective in which all participants experience a phenomenon in a similar way, the naturalistic inquiry approach allows for the individual perspectives of participants to be brought to the forefront and allows for their constructed learning to change over time. Additionally, the goal of the research is to generate new knowledge that is established through the inferences derived in the patterns that are found throughout the study (Guba & Lincoln, 1982). With this understanding, the use of qualitative research will provide insights into the perceptions of secondary CTE teachers as to the best practices when implementing and using online learning within these specialized programs.

Beuving and de Vries (2020) explain that "naturalistic inquiry rests on a direct engagement with society by doing fieldwork: studying people in everyday circumstances by ordinary means (p. 50)." Through employing naturalistic inquiry, the researcher is able to understand the naturally occurring daily lives of participants through unobtrusive methods (Beuving & de Vries, 2020). The use of naturalistic inquiry is based on strong data collection methods as well as a thorough explanation of the research procedures (Bowen, 2008). Data will be collected through the use of semi-structured interviews with ten CTE instructors. Semi-structured interviews provide for a limited number of

questions that are prepared in advance with the plan for follow-up questions to be asked in order to learn about the perceptions of the CTE instructors (Rubin & Rubin, 2012). Rapley (2007) contends that interviews are an appropriate means of data collection in that they provide data as a resource that reflects the reality of the interviewee outside of the interview. Furthermore, Adams (2010) explains that by using a semi-structured interview process it creates an openness in which participants feel more free to share their experiences. The data collection methods satisfy the robust nature of naturalistic inquiry and provide a strong rationale for the use of qualitative research. Additionally, the use of naturalistic inquiry will provide credible knowledge through the internal validity measures, as well as transferability to other practitioners and confirmability through the objectivity placed on the data (Guba & Lincoln, 1982). The use of these research methods will allow for the researcher to generate new knowledge that will assist practitioners in enhancing their instructional methods when implementing and using online instructional technologies in secondary CTE classrooms.

Sampling

Setting

This research will be conducted at a secondary vocational school district in the Eastern part of the United States that provides a variety of CTE programs in which students can participate. Within this particular secondary vocational school district, schools range from high performing, competitive entry, and thematic, comprehensive high schools to shared-time vocational schools at which students participate in CTE training, while completing their academic course work at their "home" schools. Nearly 3,000 students participate in CTE programs across fifteen schools throughout this

secondary vocational school district. The students attending the vocational programs offered come from more than thirty-five different resident school districts throughout the county. The full-time, thematic high schools typically are ranked in the top performance categories both across the state of New Jersey as well as nationally on an annual basis. While students that attend shared-time programs complete their respective programs with numerous vocation-specific credentials that assist them with entering the workforce. Throughout this secondary vocational school district a wide range of CTE programs are offered including automotive services, horticulture, cosmetology, certified nursing assistant, carpentry, culinary arts, dental assisting, commercial art, and advanced manufacturing. In order to maintain confidentiality throughout this study, the school district will be referred to as Vocational High School District (VHSD). This will allow for both the researcher and the participants to operate with both freedom and integrity (Rossman & Rallis, 2017).

Sampling and Participants

Qualitative research is focused on small, in-depth samples, which are selected with purpose (Patton, 2002). Patton (2002) explains that purposeful sampling provides power and logic because the selection of participants provide "information-rich cases" that allow for in depth study (p. 230). The use of purposeful sampling will provide data that will provide significant insights into the questions being examined (Patton, 2002). Throughout VHSD, there are roughly fifty instructors that teach traditional CTE programs. The use of purposeful sampling will allow for the selection of participants that can provide the researcher with a better understanding of the problem at hand and the experiences of those participants (Creswell & Creswell, 2018). Therefore, with VHSD as

the selected research setting, ten interview participants will be selected from a pool of instructors that have diverse backgrounds, work experiences, years of service, and who teach different CTE programs. All participants selected for this study experienced full-time instruction prior to the Covid-19 pandemic, the full online instruction from March 2020 through June 2020, as well as the hybrid instruction of the 2020-2021 school year. By utilizing this sampling strategy, a homogeneous sample was created that provides for a more in-depth description of the perceptions and practices of the teachers of VHSD (Patton, 2002).

Institutional Review Board

Prior to contacting participants and beginning the data collection, the researcher will seek approval by the Institutional Review Board (IRB) at Rowan University. All required CITI training has been completed by the researcher, as outlined in the IRB requirements. Students will not be interviewed during classroom observations. Nor will the names of students be collected or disclosed in order to protect their rights. Participants will be assured that they are voluntarily participating and that they can withdraw from participation at any time with no adverse consequences. Prior to the beginning of the interview process, participants will complete a signed consent form and will be reminded that they are able to withdraw from the study at any point. All names of participants will be kept confidential and will not be disclosed in the study.

Data Collection

To conduct this qualitative research, data will be collected through the use of interviews, document collection, and observation of recorded online and live in-person class sessions. Interview (Appendix A), document collection (Appendix B), and

observation (Appendix C) protocols will be developed by the researcher, which will serve as a guide to the data collection process. The use of protocols will provide guides to each element of the data collection that will maintain predictability throughout the process (Rubin & Rubin, 2012). Triangulation of the data will be conducted through the review of data from the interviews, observations and document collection in order to find justifications of the themes that were derived from the data (Cresswell, 2018).

Interviews

Rubin and Rubin (2012) explain that the utilization of qualitative interviews serve as a key in naturalistic inquiry. The interview process will be conducted using semi-structured interviews that will include ten questions, prepared in advance by the researcher, with the plan for follow-up questions to be asked as a means of gaining more insight into the perceptions of the teachers (Rubin & Rubin, 2012). The selection of interviews as an appropriate means of data collection is based on the understanding that the data collected from interviews is a reflection of the reality of the interviewee outside of the interview (Rapley, 2007). Rubin and Rubin (2012) further that the use of qualitative interviews provides opportunities to understand the "experiences, motive, and opinions" of participants in order to better understand their perceptions of the lived experience (p. 3). Each interview will consist of ten main questions and will last approximately 45 minutes. Through the data collected during interviews, the researcher will have a better understanding of the implementation and use of online learning in secondary CTE programs that will help further the discussion of best practices when employing these pedagogical strategies.

Prior to the interview, verbal consent was obtained from each participant to proceed with the interview and to have the interview audio recorded. Interviews will take place, when practical, in the instructor's classroom to maintain the natural setting in which the research is looking to understand. During the interview, the researcher will provide background information to participants about himself and information will be provided regarding how the data will be used. Interview participants will be asked if audio recording would be permissible. The researcher will take notes in addition to the audio recording during the interview process. Following the interview, the audio recording will be transcribed and coded. Throughout the data review process, member checking will be conducted in order to continue the dialogue with participants and to garner understanding as to the interpretations gained by the researcher from the data collected (Cresswell, 2018).

Documents

Document collection provides opportunities to explore the material culture of VHSD and to examine the different voices and interactions of the people represented throughout the district (Hodder, 2013). Additionally, documents will be collected and reviewed that include, curricula, lesson plans, district technology plans, district strategic plans, as well as building and district level professional development plans and offerings. Prior to beginning the document collection, a document collection protocol (Appendix B) will be developed as a means of providing a method to ask questions of the documents (Altheide, 2011). The collection of documents provides a means to understand the social relationships that exist within the VHSD environment as well as a demonstration of a common identity (Hodder, 2013). The collection of these documents will provide

insights into the individual instructors' pedagogical decisions, the district's goals and objectives, as well as the approaches that have been taken to support teachers in their instructional practices. This will help to further the understanding of teacher perceptions of the best practices with respect to the use and implementation of online learning in CTE programs.

Observations

Based on the data collected from interviews, specific participants will be selected to participate in classroom observations that will provide insights into the integration of instructional technologies in CTE classrooms. The researcher will request the contact information from the building principal for each participant. The researcher will contact each participant prior to the classroom observation to schedule the visit. The researcher will be focused on specific items during the observations including, curricula, teaching, learning, and classroom strategies. In the event that recorded online classroom sessions are available, the researcher will utilize those recordings for additional data collection.

Data Analysis

The interview data, documents, and observational data will be analyzed using coding. In qualitative research, codes are words of phrases that assign a summative quality to particular data (Saldaña, 2016). Each piece of data will be coded using two cycles. The first cycle of coding will be completed using process coding, which allows for the codes to examine routines and habits of human interactions as well as to determine the actions that are utilized over time (Saldaña, 2016). Process coding is the most appropriate coding method for the first cycle as it helps to determine the actions and strategies that have been implemented by teachers throughout the hybrid instruction

mode. Saldaña (2016) explains that since coding looks for actions, its usage provides for interpretations of other meanings that are implied in the data.

In the second coding cycle, pattern coding will be employed to identify themes or interrelated data points that can result in explanations (Saldaña, 2016). Saldaña (2016) explains that pattern coding allows for the researcher to take first cycle codes and condense them into a smaller number of categories that can describe interrelationships and patterns of action. By condensing the first cycle codes into larger, more categorical codes that have similar attributes, the researcher can further explain the data. Additionally, the identification of patterns builds greater trustworthiness in evidence (Saldaña, 2016). Furthermore, analysis that is done through constant comparison of similarities and differences in data provides researchers with data that is both supportive and goes against evidence (Brod et al., 2009). Understanding the perceptions of teachers as to the best practices in implementing and utilizing online learning in secondary CTE programs will be strengthened by data that is more trustworthy. Following the second coding cycle, themes will be identified from the data. Creswell and Creswell (2018) explain that themes present the perspectives of the individuals participating in the study and represent the major findings of the study. The themes will be represented through the use of narrative writing to report the findings (Creswell & Creswell, 2018). A thorough data analysis will allow for the research findings to be understood and generalized across other institutions and applied by CTE instructors in different settings.

Rigor

Based on the design of this study, the criterion have been met to ensure that a rigorous and valid research study has been undertaken. Lincoln and Guba (1982) contend

that naturalistic, qualitative inquiry can be deemed trustworthy if the research design promotes credibility, transferability, dependability, and confirmability. As a means to ensure credibility, or validity, triangulation using multiple data sources will be utilized in order to remove the imprecision of specific data gathering tools (Toma, 2006). Lincoln and Guba (1982) explain that credibility can be furthered through the use of triangulation and member checking, in which the data and interpretations are presented to participants to ensure the data represents their experiences. Additionally, the use of triangulation allows for confirmability within naturalistic qualitative research studies (Lincoln & Guba, 1982). The use of thick descriptions of the findings and purposeful sampling serve to ensure that there is transferability, or generalizability, in this study (Lincoln & Guba, 1982). Toma (2006) furthers that generalizable findings ensure the external validity of the research in that they can extend to those outside of the immediate research participants. The dependability of the study is impacted by the naturalistic approach of emergent designs in that after removing the conscious and unpredictable changes that may occur in the research design there is general stability throughout the process (Lincoln & Guba, 1982). Through the conscious decisions made in this research design, the rigor has been established to ensure that the findings meet the criterion outlined for trustworthy and rigorous qualitative research.

Positionality

As a principal in the Vocational High School District, efforts have been made to remain impartial during the research process in order to develop a personal profile for the researcher as it relates to this study (Rossman & Rallis, 2017). When the researcher was a social studies teacher, the majority of the classroom was conducted through digital tools

and the integration of educational technology. The researcher believes that in order to meet students "on their playing field" that instructional strategies must be adapted to fit the learning preferences of students. In moving to administrative positions, the researcher has worked to provide instructors with the requisite supports and professional development opportunities to further integrate technologies into classrooms to further enhance student achievement. Data will be collected and analyzed with specific focus on the profile of the researcher as well as the researcher's worldview. Member checking will be done in order to validate the themes that emerge from the data (Lincoln & Guba, 1982). Efforts to maintain an unbiased report of the data that emerges will be followed based on the worldviews and profile of the researcher (Rossman & Rallis, 2017).

The researcher approaches this research with a postpositivist and constructivist worldview. Toma (2006) explains that postpositivists see qualitative research as being something that is imperfect and therefore believe that there is a degree of probability within the findings. Additionally, the postpositivist worldview follows the typically accepted benchmarks of qualitative research for validity, reliability, generalizability, and objectivity (Toma, 2006). From the constructivist worldview, the researcher is seeking to understand the world in which participants work (Cresswell & Cresswell, 2018). Therefore, in seeking to understand the perceptions of secondary CTE instructors regarding the implementation and use of online learning platforms the researcher is working to understand the experiences of these individuals and to construct knowledge based on those lived experiences.

Chapter 4

Results

The Covid-19 pandemic turned the world of education on its head. This was particularly true for instructors of traditional Career and Technical Education programs. CTE programs are known for the hands-on, experiential learning opportunities that are provided to students. CTE instructors had to alter the manner in which they conducted their classroom experiences, in order to provide students with the best learning experiences possible under the constraints of virtual learning. Bird et al. (2020) explain that the shift to virtual learning during the Covid-19 pandemic created a great challenge for instructors as many of them were attempting to implement this type of instruction for the first time. Pergowska et al. (2021) furthered that the move to virtual learning caused educators and students alike to become frustrated and confused due to a variety of digital learning tools, unspecified regulations, and a lack of needed knowledge and training for instructors to successfully implement learning in an online environment. These challenges led to a better understanding of the need to further implement and integrate educational technologies in secondary CTE programs. While many educational technologies were in place and available prior to the pandemic, their utilization was not fully realized due to the nature of CTE programs and the experiential learning opportunities that are completed on a daily basis.

The purpose of this qualitative study was to explore the perceptions of CTE instructors as to the implementation and use of online learning platforms in secondary CTE programs. Instructors need to be provided with the requisite guidance and training regarding the best practices for creating virtual learning environments in order to provide

the necessary support to students that will allow for successful implementation (Bird et al., 2020). Through qualitative research an understanding was derived based on the experiences of CTE instructors that implemented instructional technologies and online learning platforms in order to support the hands-on, experiential learning that is the hallmark of secondary CTE programs. As more and more instructional technologies become available to CTE instructors, a tool kit is needed in order to provide instructors with possible classroom solutions to support their instructional practices and the learning outcomes of students. This study aims to provide CTE instructors with specific strategies and tools that they can implement to support the experiential learning in their classrooms and the learning outcomes for their students. Therefore, the goal of utilizing qualitative research methods for this study was to create knowledge and learning (Rossman & Rallis, 2017) about the potential best practices on the implementation and use of educational technologies in secondary CTE programs based on the views of the instructors that have been tasked to accomplish this end. As industry continues to change and expand, it is imperative that CTE instructors have the requisite knowledge and tools to support the changes that will be facilitated in CTE classrooms to maintain industry standard and provide students with the necessary knowledge and skills needed to be successful in the workforce. This chapter will focus on a review of methodology, including teacher interviews, document collection data, and classroom observations, as well as the emergent themes and sub-themes that were derived through the analysis of the data.

Study Overview

Vocational High School District (VHSD) is located in Mars County, New Jersey and provides Career and Technical Education to roughly 3,000 full and shared-time

students from multiple municipalities throughout the county. This qualitative dissertation study was conducted within traditional shared-time CTE programs across multiple locations in VHSD, as VHSD is comprised of fifteen locations at which traditional CTE programs are conducted. A wide range of CTE programs are offered throughout VHSD including automotive services, horticulture, cosmetology, certified nursing assistant, carpentry, culinary arts, dental assisting, commercial art, and advanced manufacturing.

Purposeful sampling was utilized to allow for the selection of ten participants from a pool of nearly fifty instructors that provided the researcher with a better understanding of the implementation and use of online learning platforms and the experiences of the participants (Creswell & Creswell, 2018). Each participant in this study had experience as an instructor prior to the Covid-19 pandemic, during the full online instruction from March 2020 through June 2020, as well as the hybrid instruction of the September 2020 - June 2021 school year. Patton (2002) explains that the use of purposeful sampling allows for the creation of a homogeneous sample that provides descriptions of the perceptions and practices of the teachers at a more in-depth level.

Teacher Interviews

Ten teachers were selected to participate in semi-structured interviews out of a pool of nearly fifty instructors throughout VHSD. In addition to the previously mentioned criterion, all ten participants were selected based on recommendations of their building principal with respect to their experiences with the integration of instructional technology. Building principals provided their recommendations based on the consistency of instructional technology integration in the classroom as well as staff members who were sought out by others for information regarding the use of these

technologies. Seven of the fifteen VHSD locations were represented in the pool of study participants. A profile of study participants can be found in table 1 below.

Table 1

Study Participants

Participant Name (Pseudonym)	Number of Years Teaching	Subject Area
Mary	16	Dental Assisting
Jorge	12	Carpentry
Annie	7	Cosmetology
Sue	5	Applied Mechanical Engineering
Kyle	15	Auto Mechanics
Dylan	20	HVAC
Brad	25	Plumbing
Maria	18	Commercial Art
Trevor	9	Building Trades
Laurie	7	Floriculture

The semi-structured interview consisted of ten main questions with follow-up questions that were based on the responses of the individual participant. Rubin and Rubin (2012) explain that semi-structured interviews, prepared in advance by the researcher, with the plan for follow-up questions provides the opportunity to gain more insight into the perceptions of the teachers (Rubin & Rubin, 2012). Each interview lasted approximately thirty-five minutes. The interview protocol (see Appendix A) was

designed to elicit an understanding of the experiences and perceptions of each interview participant with respect to the implementation and use of educational technologies in secondary CTE programs. The data gathered from these interviews allowed for an understanding of the best practices when utilizing educational technologies as well as the needs of the instructors with respect to support and continuous professional development. Prior to each interview, verbal consent was obtained from each participant to participate in the interview as well as to have the interview audio recorded. The data collected during the interviews provided significant insights into the experiences and perceptions of each CTE instructor regarding implementing and utilizing online learning in their respective programs. Follow-up interviews were conducted through email communication with participants allowing for further explanation of topics that were discussed.

Document Collection and Analysis

Documents from VHSD were collected and analyzed in order to better understand the expectations as well as the support that had been provided for the implementation and use of educational technologies in CTE programs. The document collection was based on the document collection protocol (see Appendix B) which was developed as a means of creating a method to ask questions of the documents (Altheide, 2011). The document collection provided a means to understand the social relationships within the VHSD environments as well as a demonstration of a common identity (Hodder, 2013). Understanding the social relationships within VHSD is an important data point in that this common identity can support the process and procedures that have been put in place to provide the needed training and resources for implementing instructional technologies

in the classroom for instructors. The understandings gleaned from the documents provided insight as to the relationships between district planning documents, curricula, lesson planning, and instructional practices. As such, a better understanding was developed as to how VHSD has provided resources, training, and support to instructors on their journey to implement educational technologies in their classroom. During the document collection phase, VHSD district level documents were analyzed including district professional development plans, technology plans, and strategic plans. District level documents provided an understanding of the values of the district with respect to technology integration as well as the time, resources, and training that was devoted to further this integration. Additionally, curricular and lesson plan documents were analyzed to further understanding at more detailed levels. Curricular documents were collected for each of the ten different programs that interview participants serve as instructors and twenty lesson plans documents were analyzed throughout the document collection. The documents collected provided insights into the individual instructors' pedagogical decisions, the district's goals and objectives, through the articulation of resources, training and support to instructors for the integration of educational technologies, as well as the approaches that have been taken to support teachers in their instructional practices to integrate educational technologies within their CTE programs.

Classroom Observations

Following the data gathered during the interview and document collection phase, classroom observations were conducted. The completion of classroom observations allowed for the data gathered from the interview process to be triangulated with the documents that had been collected. Of the ten interview participants, five were selected

to participate in one, two hour and forty minute classroom observation based on their responses to the interview questions. In order to determine which study participants to select for classroom observation, data from each interview was analyzed and specific look-fors, including daily use of educational technologies, descriptions of learning experiences rooted in educational technology integration, and descriptions of different types of technology integration, such as flipped learning, were highlighted in order to make participant selections. Additionally, data collected through teacher lesson plans allowed for an understanding of the integration of instructional technologies. The classroom observations focused on curricula, teaching, learning, technology, and teaching strategies (see Appendix C) in order to gather a strong understanding of the frequency, types, and specific implementation and use of educational technologies, such as Google Classroom, YouTube as well as specific strategies such as flipped learning, in the selected CTE classrooms. The focus of classroom observations allowed for the discovery of patterns that were found across classrooms as well as patterns between document and anecdotal data that provided insights into the daily practices of individual instructors as well as across the district.

Emergent Themes

As a result of the data collected and analyzed through the teacher interviews, documents, and classroom observations four themes emerged. The emergent themes were rooted in the experiences of VHSD CTE instructors and were supported by the data collected in the documents and the observations. Based on the data, the emergent themes were (1) digital tools to support classroom management, (2) digital tools to support instructional strategies for CTE, (3) expansion of student experiential learning, and (4)

continual programmatic professional development and training. Additionally, several sub-themes were identified within a few of the major themes. Each theme as well as their respective sub-themes are represented in Table 2. Within the theme of digital tools to support classroom management, the sub-theme of usage of time in planning and instruction was identified. Flipped learning along with virtual reality and digital simulations were identified as sub-themes under the theme of digital tools to support instructional strategies for CTE. Furthermore, with respect to the theme expansion of student experiential learning, the sub-themes of increased kinesthetic engagement and shop time along with individualized learning were understood. Each theme will be discussed in detail with the supporting data in the sections that follow. The data gleaned from this study can serve as a support for CTE instructors, administrators, and teacher preparation programs as to the best practices that can be employed when implementing and using educational technologies in secondary CTE programs.

Table 2

Emergent Themes in Findings

Themes	Digital Tools to Support Classroom Management	Digital Tools to Support Instructional Strategies for CTE	Expansion of Student Experiential Learning	Continual Programmatic Professional Development and Training
Sub-Themes	Usage of Time in Planning and Instruction	Flipped Learning Virtual Reality and Digital Simulations	Increased Kinesthetic Engagement and Shop Time Individualized Learning	

Digital Tools to Support Classroom Management

The participants in this study provided insights as to how the implementation and use of instructional technology tools created improvement for themselves individually as instructors as well as for their instructional practices. It is noted that the use of digital tools served as a support mechanism for classroom management in that greater organization was realized along with a better usage of time with respect to planning and instruction. As Wong and Wong (2014) explain, classrooms that are well managed have numerous activities occurring at the same time including the preparation and availability of materials. Through the analysis of the data it was understood that throughout the implementation process of educational technologies, which included the use of digital tools and the use of devices, teachers found that they were able to better deliver their programs and therefore were able to improve the outcomes of students completing their programs. While many of the educational technologies that were employed by CTE instructors were available prior to the Covid-19 pandemic, many were underutilized as the value added had not been realized until these methods had to be used to provide continuity of learning. The improvement of classroom management due to the implementation of digital tools was seen through better organization as well as usage of time for planning and instruction.

Participants reference a number of different digital tools that included the Google Classroom, Kahoot, Screencastify, YouTube, EdPuzzle, and SmartBoards. Google Classroom is a digital classroom space that allows instructors to infuse digital documents and tools from the Google Suite including Google Docs, Google Sheets, and Google Slides. Kahoot is an interactive game that allows instructors to provide students with

questions that can be responded to in real time utilizing devices. Screencastify operates as a system in which individuals can utilize a screencast, either live or recorded, to disseminate information and provide additional learning opportunities outside of the classroom. YouTube is a digital video platform in which instructors can find and create demonstration videos to support student learning. EdPuzzle is an instructional tool that instructors can use to support student knowledge and learning by creating videos with embedded questions and visual supports. SmartBoards are a classroom technology that allows for the projection of materials in a large format to be viewed in the classroom which can also be manipulated through interaction at the board. The implementation of these digital tools allowed instructors to experience greater control over the management of their classrooms and student work. The use of instructional technologies created the ability to leverage information and demonstrations for students to improve instructional practices as Jorge explained

> For the instruction end of it, I think it's helpful, I think the kids are able to have the information there… you know, you're breaking your own kind of mold… I think it has been helpful… having the ability to go onto YouTube and, and showing something that I can't do myself, I think is a big deal.

Trevor further supported the improvements in planning, instruction and organization that were brought about by the integration of instructional technologies stating

> I found a lot of value in technology [that] I didn't see prior to... some good, some bad.. in our school you get a log of diverse kids so you have to figure out ways and you have to pull from different areas and technology has proven to reach a

> student body population that maybe we didn't reach as well as we used to and maybe we found a kid that was like, 'oh, this is great.'

Additionally, participants noted classroom management improvements due to an increase in access to curricular content, their individual balance and flexibility, and their organization. Kyle provided insight as to how the implementation and use of instructional technology created improvement in his classroom management, planning, and instruction by stating

> I think the overall result has been positive. I can't say that it wasn't negative sometimes, especially, when your students have gone months without getting hands-on [experiences]… That's not how we wanna go into the future, but out of that experience, I think overall the program is better for it… I think I'm better for it [integrating educational technologies]. And I think some student learners, most student learners, are better for it [integrating educational technologies] too… which is nice because there has been so much negativity about this period. The truth is if you look for it, there are things we did learn that I think I want to take with me in my program.

Participants also noted that their experiences with integrating instructional technologies had changed their pedagogical approach despite the challenging circumstances of the Covid-19 pandemic that brought about these changes. Brad explained that through integrating educational technologies additional instructional pathways were discovered stating, "I think that it actually opened up an avenue that I probably wouldn't have considered in the past." Dylan furthered that "I'm also going to see how I can integrate it [instructional technologies] moving forward, not just for

myself, but for the students." These experiences opened doors to leverage the instructional technologies that may have not been known or available prior.

Study participants experienced multiple benefits to the overall management of their classrooms through the implementation of digital tools. The use of digital tools such as Google Classroom, Kahoot, Screencastify, Youtube, and Smartboards provided instructors with more control over the materials used in the classrooms, both in-person and online, as well as allowed instructors to experience greater organization and usage of their time, which provided more opportunities for instructors to focus on teaching and learning. These findings align with the findings of Saphier et al. (2008) who explain that classroom management is enhanced through maintaining momentum through having materials ready to go in order to predictably move through the day's activities. As instructors are able to utilize digital tools to enhance their organization, they are better able to provide for stronger classroom management as well as improve the use of their time with respect to lesson planning and instruction.

Usage of Time in Planning and Instruction

Furthermore, study participants described the benefits of increased organization with respect to classroom management, as it relates to their time spent on planning, instruction, and assessment, as an impact from the inclusion of instructional technologies. The organizational benefits were linked to instruction being more cohesive and the planning process being improved that allowed for better workflow in and out of the classroom. The increased organization for instructors, through the use of digital tools, provided opportunities to focus more time on instructional planning, instruction, and assessment. Participants noted that improvement in organizational practices led to better

classroom management, instruction, and student learning. Mary described that "I would have to say that I believe my lessons are more organized." This idea was furthered by Kyle who stated, "Google Classroom became very essential for organizing the class, assigning work, keeping track of what work was done." Jorge noted the organizational benefits of instructional technologies reflecting

> I think that end of it is probably the most beneficial… it's helped me to create a plan, and maintain that plan year over year, as much as it changes every year it's still, it's easier to look back and say, all right, well, I don't like this part or this worked, this didn't work, I think that's really beneficial.

Participants noted that the more organization of classroom materials and student work that they were able to derive from instructional technologies helped improve their instructional skills, student learning, and their classroom management.

Lastly, with respect to improvement in planning, management, and instruction, Mary explained that "I think I became better" while Mary summarized their experience stating "I just think we're so much more comfortable with it… it's just part of now instead of there's some things we'll never go back to." The benefits derived from the implementation of digital tools for CTE instructors allowed for gains to be made in the outcomes of their individual programs and could be found in the manner in which they were able to improve their usage of time when planning, teaching, and assessing students. As Kyle explained the usage of digital tools provided greater opportunity for students to obtain industry certifications and improve program outcomes stating

> that's [the use of technology] gonna help them move along, but an almost equal measure to that worth is the industry certificates that they can leave here with,

> when a student earns 5, 10, 20, 40 different certificates or more from Mercedes or Ford, no matter where they choose to work, that's an impressive resume for a young person to have coming in the door.

One of the benefits of integrating instructional technologies is that the process of using these tools can lead to shortening the time needed to develop learning experiences as well as the time it takes to provide instruction on a specific topic and a variety of record keeping requirements, such as grading, that must be completed in a timely manner. Study participants noted that the use of instructional technology allowed for a better usage of their time in both planning and instruction. With respect to planning, instruction, and assessment, the integration of instructional technologies can lessen the amount of time needed to plan and prepare for a given lesson or unit as well as can increase the speed at which material is taught to provide students with access to greater amounts of time experiencing hands-on learning opportunities. Laurie explained that the integration of instructional technologies provided more time for teaching and learning stating, "there's a lot less making paper copies of everything, which saves us a lot of time, honestly… and a lot of headache in collecting them… it was so much easier to get our grading done… so yeah, I just see continuing using the tools that we used in the future." Through saving time there is also greater opportunity for more shop time as Kyle explained, "So it's been, as I said earlier, a great time saver, and it helps us maximize shop time." Jorge furthered that, "I've certainly used a lot more technology since… it certainly takes time away from me grading everything." The added benefit of the creation of more time provided teachers with instructional tools that allowed for shorter periods of directed instruction as noted by Mary in that, "I feel like the amount of

time that it takes to teach that skill is a bit shorter" which can provide for a shorter didactic instructional period that allows for a greater amount of time spent with hands-on learning experiences. Through the integration of digital tools, CTE instructors noted that they were better able to use their time with respect to planning, instruction, and record keeping which was accomplished not only through the integration of the digital tools but through the application of targeted digital instructional strategies through these tools. Additionally, the integration of digital classroom tools also served as a method to provide for a greater opportunity to allow students to participate in more hands-on, experiential learning opportunities in the shop setting. It is imperative for CTE instructors to be able to effectively utilize the tools that are available in order to maintain momentum and management of their classrooms. Furthermore, the digital tools that support classroom management are a significant contributor to effective instructional strategies in CTE classrooms. Through the integration of these digital tools, CTE instructors have the ability to enhance classroom instruction as well as student learning experiences. The use of instructional technologies can greatly support these efforts and as Marshall (2016) contends

> It is futile to bring technologies and other resources into the classroom without thinking carefully about who they will meld with the strategies used. When united, strategies and technologies can greatly enhance learning experiences by enhancing intentionality (p. 27).

Digital Tools to Support Instructional Strategies for CTE

Integrating instructional technologies provides an opportunity to integrate digital tools to support learning and student outcomes. The use of digital learning tools allows

for multiple instructional strategies to be utilized to support student learning. Digital tools may include items such as Google Classroom and other Google Suite products as well as the use of strategies such as flipped learning, where students participate in learning outside of the classroom either prior to beginning a new unit of supporting current learning, as well as the use of virtual reality and digital simulations to support student engagement and targeted learning outcomes. The integration of digital instructional tools serve as the mechanism for delivering instruction and integrating instructional strategies that allow for student participation in learning to be done outside of the traditional classroom setting which can allow for greater hands-on, experiential learning to occur in the classroom.. Study participants noted that the integration of instructional technologies provided them with a greater ability to utilize targeted digital instructional strategies in order to meet the needs of their students. Participants described how the use of these targeted instructional strategies were utilized to support the daily instruction of their programs as well as the individual learning needs of students. The use of targeted instructional strategies allowed CTE instructors to employ several different digital tools as well as specific teaching and learning strategies, such as flipped learning and digital simulations, to support the hands-on aspects of their respective programs. The VHSD Professional Development Plan noted that there was a goal to highlight, "the importance of technology to improve instruction in a remote learning environment." Mary explained that the integration of targeted instructional strategies with technology created significant change in that created novelty for students and increased engagement by

> Changing up the day for the students is one of the most important things you can do to keep them engaged. So I think technology brings excitement to the classroom when they are able to do something different than maybe a typical demonstration and shop practice.

These experiences were supported through the classroom observations of each participant that demonstrated student engagement through the integration of instructional technology as well as creating additional learning pathways. Additionally, the use of digital tools were noted in classroom observations on both May 5th and May 15th in that "instructors incorporated Kahoot to review and Google Forms to assess student learning." On May 5th the observer noted, "Kahoot was used as a review at the beginning of the class period and the Google Form was used as a summative assessment following." It was observed on May 15th that, "The Google Form was used as a pre-assessment on student background knowledge and Kahoot game was formative assessment on the days learning." On May 11th, the researcher noted that "video was used to support the demonstration and was linked on Google Classroom." Annie furthered that the use of targeted instructional strategies integrating instructional technology allowed for greater engagement stating

> I was using Google Classroom to maybe introduce some assignments and videos… maybe some YouTube videos for added instruction in the classroom… maybe a couple of games like Kahoot, interactive games… So then I had to really start using a lot more PowerPoint adding in a lot more hyperlinks into everything… a lot more interactive stuff, like EdPuzzle.

Sue added that the integration of instructional technology was a major supporter of formative assessment by providing students with ease of access and to meet them on their desired platform describing that

> I had to learn different avenues to assess them [students] virtually with different software… Technology supports my instruction again for formative assessment, because I still use it… I use it with Kahoot quizzes, the EdPuzzles, also, to support students because I post things virtually and they can go home and read it again.

The integration of instructional technology supported more than interactivity and assessment as Dylan explained, "I was making guided notes for slides… and then I was using the video component as a way to reinforce what they had learned, and they would comment on that." Guided notes were a specific strategy that was seen in three of the five classroom observations, noted in the observations on May 5th, May 11th, and May 15th, in which instructors utilized presentation software and students completed guided notes on devices. Brad furthered that

> I would use the computer for PowerPoint presentations, video, obviously embedded video that were in their instructional videos that would help them understand… the material that was being taught because of a lot of them, their visual learners... so just me explaining to them, or even me having the physical pieces that I would need, if I was demonstrating, they saw it actually going in, in that situation, it helps them.

Trevor added that the integration of targeted instructional strategies using technology integration was extremely beneficial to meet the visual learning needs of students stating

> So for some students that don't see things by description and they need to physically see them and having the ability to record yourself and, or use something from the Internet that can show a demonstration

The integration of specific, targeted instructional strategies utilizing instructional technology allowed for instructors to meet the needs of students' specific learning styles and provide greater differentiated instruction. The integration of instructional technologies provides opportunities for CTE instructors to utilize multiple methods to meet the needs of students through the integration of tools such as Google Classroom, Google Forms, Kahoot, and YouTube videos. Additionally, the integration of these digital tools provides an opportunity to flip learning for students so that they can work on material outside of the classroom to potentially provide greater amounts of time in the shop working on the development of hands-on skills.

Flipped Learning

Flipped learning serves as a digital instructional strategy that is achieved through the use of specific digital tools used to support student learning outside of the traditional classroom. Flipped learning is described as a model of instruction where instructors invert the learning process allowing for time out of the classroom to be spent on new material and providing more time for active engagement in the classroom (Song & Kapur, 2017). The integration of instructional technologies provided CTE instructors with the opportunity to allow students to take ownership of some of their learning by completing work at home, as opposed to completing the work in the classroom. Mok (2014) explains that the use of flipped learning allows for students to engage in learning new material outside of the classroom which in turn provides for more class time to be

spent on interactive and collaborative learning experiences. Additionally, Trogden (2015) contends that a greater amount of instructional time can be focused on teacher facilitation of student problem solving by employing flipped learning. The use of flipped learning allowed students to gain initial background knowledge as well as decreased the amount of time spent on direct instruction in the classroom. Wu et al. (2017) contend that through integrating flipped learning, instructors can further active learning in student-centered environments that have been created. Many participants discussed the benefits of integrating flipped learning strategies into their classrooms in order to support teaching and learning as well as the hands-on, experiential learning components of their respective programs. The utilization of flipped learning provided students with a means of both previewing learning as well as reviewing and supporting what had already been learned. Trevor described the benefits of a flipped learning describing that

> Having the ability to have students look at information prior to almost like a reverse classroom sometimes, but not always, we don't always use the reverse classroom approach, but there are times in which we're doing a content area and a student will show some specific interests and we say, 'Hey, go to our Google Classroom and there's a couple of links you can click on how to splice wires, color coding, and residential electric', so forth and so on.

Annie explained that the use of flipped learning was beneficial to students because

> I think the students really enjoyed being in the classroom and then being able to do things at their own pace at home, also with the instruction that they could watch at their own pace.

Sue furthered that

> They have access to everything we do in class virtually as well. It's easier for them to see something happening, demonstrating in class and then go back home to look at videos… If I start with the classroom and get them hooked on it first, then they wanna go back and research more.

Kyle described the greater levels of prior knowledge that can be obtained through the integration of flipped learning stating

> It's great for the student to have the ability to have some preview of the activities we plan on doing in the lab facility in the show… So if I assign a unit, there's various types of activities that it could be as simple as part identification, matching, pictures with, terminology, all those things served to make the shop experiences a little less introductory… everything seems a little bit more familiar already, so it gives them a background they would've otherwise not had.

Jorge described similar benefits in utilizing flipped learning in that

> It's base knowledge its, like the hands-on element is where they really tend to get it, but at least with some of the online technology and the computer stuff, they're able to get that, that knowledge so that when I start demonstrating and I start actually working with them, they are understanding a little bit more about what I'm what I'm talking about.

The support offered to students who needed additional exposures to the material through a flipped classroom were also noted by Dylan who described that

> Some of the kids were like, 'oh, I go back and watch the recording... Cause I was recording the meet for kids who couldn't be online… he was like, 'yeah, I was going back and I was watching your video again on the lesson before we learned

> it the next day'… So some kids were taking the initiative of that and almost like flipping their own learning… that was a positive of it.

The use of flipped learning strategies were observed in four of the five classroom observations. During classroom observations on May 1st, May 5th, May 13th, and May 15th instructors provided students with assignments to complete learning for the next day's lesson at home. The researcher noted that students were expected to either complete work online the night before class that was reviewed and supported during that lesson or students were asked to complete work online following the day's lesson to reinforce the learning that had occurred. The use of flipped learning strategies were also noted in fifteen of the twenty lesson plans that were analyzed for the document collection. The integration of flipped learning as a targeted instructional strategy can reduce the amount of time spent on direct instruction and therefore increase the amount of time spent on experiential learning opportunities during shop time. While flipped learning is an excellent strategy, another emerging instructional strategy is the use of virtual reality and digital simulations to provide greater opportunities for experiential, hands-on learning for CTE students.

Virtual Reality and Digital Simulations

Though not a new practice in providing experiential learning, the use of virtual reality and digital simulations to provide students with a safe method of honing their hands-on skills have gained in popularity as well as access in recent years. Virtual reality serves as a method of using technologies to place students in an immersive environment through which they can interact with specific elements through the use of their hands. Digital simulations provide an environment in which students can navigate through a

series of processes digitally while applying their knowledge and gaining valuable practical experiences. By integrating virtual reality and digital simulations, CTE instructors have additional methods of providing students with experiential learning opportunities that can allow for safe practice when learning these new hands on skills as well as provide experiences that CTE instructors may not be able to create in the classroom shop setting. Virtual reality and digital simulations were an additional targeted instructional strategy utilizing the integration of instructional technology that was discussed by several participants. While many of these discussions were geared toward specifics within CTE programs the benefits to supporting hands-on experiential learning were gleaned. Jorge explained the benefits of both digital simulations and virtual reality in construction courses stating that

> some sort of computer aided technology that allows you to place specific framing members in order of how you would construct a wall so that you're gaining an understanding of yeah, here's your bottom plate, here's your studs, your window opening, header, liners etc, etc… and, maybe some way to construct a whole house using some computer software… you basically, it's like Virtual Reality, it's virtual reality and you're using what feels like a TIG welder or whatever, the handle and the weight is the same its, but you're not putting yourself in any sort of danger of breathing, toxic fumes, and whatever else… it's certainly more difficult because you're… using a saw using a hammer, there is no replacement.

Kyle furthered that the benefits of utilizing virtual reality and digital simulations support specific vocations due to the changes in technology that is used in the field stating

> More and more, especially in automotive, you're using computers in the cars… so the simulations they have gone from some of the older ones, which were like click on the wrench, place the wrench on the engine to simulate the fact that you did a valve adjustment. I mean, that was kind of silly… it's representational, but now we've moved on to other things where you're actually gonna be performing, like software updates and doing controller area network testing. These simulations are gonna look essentially the same as live work because they are so computer based by nature and reality now. So we've actually kind of intersected a point where the reality of the vehicles out today, a lot of the repair work does involve working with laptops and looking at a screen. And so when it comes to us being able to train that way at home, it definitely supports the hands-on experience.

Dylan added that the benefits of virtual reality and simulations are enhancing hands-on learning by creating environments that are based on what will be experienced when students begin working in the field, explaining that

> And there's some online technology that we're looking at, with, through different companies where the students can do kind of like Virtual Reality type situations and they can, there's no way for them to cheat this type of system… there's no answers out there that they can do without doing a little bit of digging, I guess not let me just go find the answer and answer it… A software program that was made just for HVAC students and the teacher would have it on the desktop and would allow us to work as a group on this troubleshooting software… I would put it up on a SmartBoard and the students could actually do it in front of the whole class, which gave them a great feeling of like the pressure is on and it gave them that

> actual mindset of like, oh my gosh, I need to fix this… and if there's a homeowner, that's hovering over you watching you fix a header… it's the same feeling when all your classmates are watching you. And it's funny because when it's up on the board and it's right in front of you, it's harder to see and sometimes that's the problem with fixing someone's heat or air conditioning when it's right in front of you it's actually harder to fix sometimes when you're first learning how to do it and if you take a step away and think about it, it makes more sense. So it gave them that real life feeling up on the SmartBoard.

Sue summarized the benefits of both virtual reality and digital simulations explaining that

> In general for CTE programs, I mean, I don't know if this is yet, but looking in the future, like augmented reality is gonna be big. I think so let's say you're working on a car… if the student doesn't know a lot about a car, he can use augmented reality his phone in front of the car and he can have all the information instead of having a book next to him with paper.

The researcher observed during a classroom observation on May 5th the integration of digital simulations in the classroom. It was noted that the "instructor provided students with access to digital simulations of equipment." Students were asked to "complete a list of specific tasks prior to being able to engage with the physical equipment." The instructor also provided students with access to the digital simulation on their Google Classroom so that they could further their practice outside of the classroom. Additionally, in the classroom observations on May 1st and 13th noted that the CTE "instructor utilized a digital simulation on laptops to demonstrate the skill being taught." On May 13th the observer also noted that "students completed the digital

simulation prior to moving on to practical hands-on application". Additionally, the observer noted, "several students were directed to complete the digital simulation again prior to moving on to the hands-on application, while others opted to complete the simulation again on their own." In both of these observations, the instructor provided access so that "students can attempt the simulations outside of the classroom." The use of these digital simulations allowed for students to participate in a virtual learning experience of the hands-on skill prior to attempting the skill in a live setting. These practices allowed for students to make attempts in a safer environment that provided them with an opportunity to receive feedback from both the instructor and the simulation software to enhance their skills.

Through integrating virtual reality and digital simulations, CTE instructors have the opportunity to provide a greater number of hands-on learning experiences for students. The use of these instructional technologies allows for students to gain additional practice when learning new skills as well as provides a method for instructors to gain feedback on student progress. Further integration of these types of instructional technologies can allow for additional learning experiences that may not have been previously available in the classroom setting. The utilization of digital tools to support the instructional strategies that are being employed by CTE instructors can have significant benefits on the overall learning and experiences that are lived in CTE classrooms. Through the integration of digital tools, CTE instructors are better able to develop student learning experiences that allow for greater amounts of hands-on, kinesthetic learning as well as learning experiences that support individual student learning styles. However, regardless of the types of new instructional technologies, CTE

instructors need to have the requisite training in order to successfully incorporate these instructional practices in their instructional tool belt.

Expansion of Student Experiential Learning

The majority of students attend CTE programs to not only obtain training within a specific vocational field, but also to participate in the kinesthetic, hands-on, experiential learning that is provided. Kolb and Kolb (2005) explain that the use of experiential learning provides students with the opportunity to construct their own knowledge through their experiences. McCarthy (2010) furthers that experiential learning is considered to be interactive learning in which students construct knowledge through learning by doing. It is due to the hands-on learning experiences that are conducted during the time spent in the shop that allows for specific types of kinesthetic student engagement that is often what is desired by students participating in CTE programs. With hands-on application of knowledge and skills being a hallmark of CTE programs, numerous study participants indicated that the integration of instructional technologies allowed them to provide greater amounts of time in their respective vocational shops which led to a greater level of student kinesthetic engagement with hands-on content. The use of hands-on, kinesthetic learning experiences allows students to directly apply the theoretical knowledge that they have gained to diverse, experiential, learning opportunities (Clark et al., 2010). Within vocational programs, the majority of hands-on, experiential learning opportunities occur in the shop setting, which serves as the vocational lab space for students to apply the theoretical knowledge that they have obtained as well as the hands-on, practical skill that they are developing. Through the increased implementation of instructional technologies, study participants reported that they have been able to increase

the amount of kinesthetic student engagement through an increased amount of time spent working in the shop setting. These increases were obtained through the beneficial use of instructional technologies in decreasing the amount of time spent on didactic instructional elements.

Increased Kinesthetic Engagement and Shop Time

Study participants described a notable increase in the amount of time that students were able to participate in hands-on, kinesthetic learning experiences and increased time spent in the laboratory/shop setting providing greater experiential learning opportunities for students. Hawk and Shah (2007) explain that kinesthetic learners are those who prefer hands-on approaches, labs, learning by doing, and using their senses. While students need to have explicit instruction on the theoretical components of their selected vocational program, the majority of the learning is through the hands-on, kinesthetic, practical application of the technical skills that is accomplished in the time spent in the shop setting. It is through the practical application of hands-on skill that students are able to directly apply their theoretical knowledge, while participating in kinesthetic engagement through hands-on practice while in the shop. Jorge explained that the integration of instructional technology created the opportunity for, "getting more hands-on experience in the classroom as opposed to, you know, having to do so much lecture." Kyle furthered that greater flexibility was allowed for when providing didactic instruction on theory stating that you can provide students with direct instruction, "in the classroom area, but that's gonna take away from the potential shop time" by integrating instructional technologies. Kyle furthers that the integration of instructional technologies, "makes it easier to deliver both theory [didactic instruction] and hands-on to have some component

where we can have the online delivery." The use of instructional technologies has supported CTE instructors in delivering material to their students and has allowed for an expansion of the amount of time that is spent participating in hands-on, experiential learning experiences in the vocational shop.

For students attending CTE programs, the most valuable part of their day is spent applying their knowledge and skill through hands-on application in their respective shop. The integration of instructional technologies has allowed CTE instructors to shorten the duration of time that students spend at their seats and provided greater opportunity to spend more time in the shop setting. The increase of shop time and the correlated increase in student engagement due to the integration of instructional technology was described by Dylan in that "in the form of they're doing something on a computer and it automatically is done and it's graded, which means I can be up and in the shop with them more as well…That's how smart technology really helped me get more shop time as well." Instructional technologies allow for having students spend less time at their desks by completing work with instructional technologies. Brad contended that by having students complete work through instructional technologies

> you would be doing the work that we would normally be doing at the desk… and when I actually went over it in class, there was no slowing it down where they had to copy this, you know so I was able to speed it up a little bit there.

Mary summarized the benefit of integrating instructional technologies on increased shop time stating, "To make the instruction quicker on my end, so we spend more time working on skills." By spending more time on learning and practicing skills, students are often more engaged in the hands-on, practical learning process. With the ability to

increase the amount of time spent in the hands-on, shop environment, students are more likely to experience greater levels of engagement in that they are "doing" the learning. When teachers are able to leverage the instructional technology tools that are provided, they are better able to spend more time working directly with students in the experiential learning process which can improve the outcomes that are achieved in the program and further student desire to learn.

The increased kinesthetic student engagement and shop time were noted as being achieved through the integration of instructional technologies allowing students to have greater access to program materials which increased student opportunities to engage with program content. Participants noted that they were able to provide greater access to their program materials through the integration of instructional technologies that were previously either unavailable or not utilized, which provided enhancements to the ways that students were able to participate in greater kinesthetic engagement due to an increased amount of time spent applying hands-on, experiential learning in the shop. Sue explained that the use of instructional technology allowed students to have greater access to instructional supports that created content learning opportunities and that these tools

> can enhance classroom instruction by providing additional support to what's already being learned in the classroom. For example, some students might not get it straight away in the classroom, how a piece of equipment works and, and the theory behind it. And then if you post a video like an EdPuzzle and have them work through questions at home that will allow students to learn more.

The ability for students to continue to participate in hands-on application and stay current with classroom learning in the event that they were absent for a period of time was

strengthened through the integration of instructional technologies. This sentiment was furthered by Kyle stating

> It's a great way to have a student, if they're missing for any period of time… it's a great way for them to continue to keep up with what's going on in the classroom… and if they miss a day, they can also, if it's posted classwork, they could keep up with the curriculum.

Both Trevor and Mary offered agreement regarding the greater access to program material allowing for students to stay current with classroom learning and maintain levels of hands-on, kinesthetic learning in shop time due to the use of instructional technology stating, "You're not here today, but you can go to our Google Classroom and you have videos embedded in different areas of the Google Classroom in which they can click on" and

> When we started using Google Classroom, it really kept things organized for students who were absent. So it made keeping everything in one location for students who were maybe missing class and, and able to just go to the classroom to make it up a lot more accessible.

Furthermore, Kyle summarized the benefits of instructional technology with allowing access to program materials on multiple platforms by explaining that

> So technology as a general term can mean many things… I mentioned before in our online textbook that we even have an app now that the students can use… so we're not just talking about a website per se… they can also bring this education to their mobile phones, both of our training, Ford and Mercedes, has at least some compatibility through a mobile phone.

The aspects of improving program outcomes through the improved usage of time and the increased amount of time working in the shop setting which can increase student engagement can allow CTE instructors to have more effective instructional delivery. The integration of instructional technologies provided a vehicle in which CTE instructors were better able to improve their own workflows and organization which led to increased student engagement and hands-on learning experiences. Through the increased hands-on, experiential learning opportunities and student engagement, improved outcomes were seen from individual CTE programs. Additionally, CTE instructors participating in this study noted that the integration of instructional technologies also provided a means for meeting the needs of individual students and meeting them where they are as learners.

Individualized Learning

A significant majority of study participants discussed how the integration of instructional technologies into their CTE programs provided for a greater number of targeted instructional strategies that could be utilized in order to meet the individual learning styles of their students. The integration of instructional technologies provided CTE instructors with additional opportunities to further meet the needs of individual student learning styles. As all students learn in a different manner, a major benefit of instructional technology tools provides more opportunity to differentiate instruction and provide students with targeted learning opportunities that fit their desired learning style, which may be auditory, kinesthetic, tactile, or visual or a combination of several learning styles. Kyle noted that the integration of instructional strategies allows for better pacing to meet student needs explaining

> When you have a full class, everybody's moving at a different pace. So when these things can be done at their own speed, on their own time, even if I'm offering some of that in shop time, it's moving at your own pace, it's individualized education.

Mary furthered the benefits of addressing learning style through the integration of instructional technology stating

> I believe that the technology can enhance classroom instruction, especially for visual learners. I can show a video of something that I'm explaining or demonstrating in class and use that resource at a later date for students to go back and watch if they need to improve their skills.

The use of visual learning elements via instructional technology was observed in each of the five classroom observations which supported the notion that instructional technologies can further support student learning styles. This idea was furthered by Dylan who explained

> SmartBoard technology is like an enormous iPad has [it has] been such a great thing for a classroom that I don't see, like how to teach any better and for a group of kids that are visual learners that you can supplement that type of technology into it.

Brad provided more insight into the benefits of integrating instructional technology for targeted instructional strategies describing the benefits of these practices as a vital support in that

> it allows the students to visualize what's going on, you know, a lot of them, most of them are visual learners… they're not gonna learn from reading a book…

> they’re gonna learn from seeing it done and actually doing it and making mistakes.

These ideas were further summarized by Mary who explained that the use of targeted instructional technologies in a CTE classroom can be supported with specific digital tools to meet different students learning needs explaining

> and the other really cool thing I liked was Screencastify where you could record your voice or your image in the lesson plan so that students who need to hear it, in an auditory way could still like, feel like I was present, even though it was, it was just reading text to them, but like they were getting it through that as well.

In addition to just meeting student learning style needs, several participants noted that the integration of targeted instructional strategies through instructional technology allowed for more support of the hands-on elements that are hallmarks of CTE programs. Maria and Trevor each respectively addressed the use of instructional technology to address both student learning styles and hands-on instruction. Maria explained that the integration of instructional technology can enhance and support the hands-on learning process in CTE programs because

> Technology can support it [hand-on learning] by showing visuals, interactivity, but it will never replace hands-on learning… it will absolutely never replace it… there is something, there are people that learn better hands on… every student is a different learner and the hands-on learner is better for the students that are not going to grow academically, but can use as much as they can to learn… my students, every assignment, every student will do the assignment differently.

The support offered by the integration of instructional technologies with respect to hands-on, experiential learning in CTE programs was described by Trevor stating

> And then when we have different styles of learning and, and, and students that learn differently, it gives you a better resource… like I said prior, the ability to have an interactive board in which kids can come up, you have a slideshow, you have interactive activities, you can bring them up, they can see it, they can quasi do it in the, on the interactive board and then turn around and implement that in a hands-on based environment, yes, it works well. That [hands-on learning] is the hallmark of CTE programs 100%... As I referenced earlier, you have all different types of learners and finding different resources for all of those different learners is the challenge for you as a teacher… so if you're not on the internet scouring for different techniques, videos, information… you have to be on it and you have to utilize it for kids today… if you can parallel what you're doing to what they do… you can have them buy into what you are doing with a kind of familiar parallel.

The hands-on, experiential learning elements of the CTE programs being supported by elements of instructional technology was noted in each of the classroom observations in different ways. As noted in classroom observations on May 1st and May 5th, the CTE instructor "provided visual support of hands-on activity through integration of video demonstration." Additionally, classroom observations on May 11th, 13th, and 15th, noted that "students were instructed on and demonstrated how to complete a skill at which devices were provided to allow students to review steps of the skill process." Instructors utilized instructional technology to help students visualize the hands-on skill through video demonstrations as well as through the integration of images for each step

of the hands-on process. The use of these instructional technologies provided CTE instructors with methods to support students in their learning and allowed greater opportunity for students to review the steps in the learning process in order to enhance their knowledge and skills.

Providing greater opportunities for students to experience learning and to understand the knowledge and skills associated with their specific vocational skill is the end goal of all CTE programs. The benefit of integration instructional technology has been found to provide CTE instructors with greater opportunities to meet the needs of their students, to organize their lessons to better utilize their time, to provide meaningful feedback to students in a timely manner, and allow for more time in the shop that increases student engagement maintaining the ability to improve program outcomes.

Continual Programmatic Professional Development and Training

A major focus of professional development in recent years has been the concept of continuous improvement. Opfer and Pedder (2010) explain that it is imperative that professional development be continuous, as recursive professional development can impact instructional practices of teachers as well as facilitate the improvement of the school and student achievement. Professional development opportunities need to be conducted in a manner that supports the learning of the instructor as well as provides the instructors with the necessary time to successfully implement the new practices. Additionally, it is imperative that professional development opportunities, when possible, have direct links to the daily practices of those participating so that the benefits of the professional development activities are understood. Study participants discussed the need for continuous professional development that was supported by access to resources

for continued learning, development, and implementation that are related to the programs that they teach and CTE specifically. The support for professional development was found throughout VHSD documents. The VHSD professional development plan stated that staff would be afforded, "PD opportunities were made available to staff members through in-house presenters or outside providers: Google Educator Certification Boot Camp; Google Applications and a variety of additional technology training." Additionally, the VHSD technology plan discussed the plans for continuous professional development being offered on the integration of instructional technology by providing

> Ongoing professional development on integration of technology for digital learning into the curriculum. Over the next three years, ongoing, sustained professional development opportunities will continue to be provided… Through these educational opportunities, staff will be able to work towards demonstrating proficiency in the use of 21st century educational tools including wikis, databases, word processors, spreadsheets, blogs, web browsers, email, presentation applications and web 2.0 skills…. Staff members will continue to be trained to advance their skills in the use of emerging technologies such as the cloud-based Google G Suite tool. Staff will also be trained on the use of tools to support the flipped classroom, distance learning via Skype, web conferencing via Google Hangouts, online curriculum and assessments, and their integration in the curriculum.

Study participants referenced the need to have professional development linked to their specific industry or program. Annie noted that the supports needed through professional development, "it depends on the program… every program is different."

While Sue explained that professional development needed to be "tied programmatically." Trevor furthered that when considering the need for additional professional development and supports, "I think the answer to that question is gonna vary on the program… I think that depending on what you are teaching, there's a lot more available." Mary noted specifics within the industry explaining that, "We have a fall AgEd [Agriculture Education] conference and sometimes there's different workshops on engaging strategies." While Kyle noted that "I have to imagine it does depend on which career cluster we're talking about" regarding future needs for professional development to further integrate instructional technology into CTE programs. Kyle continued to explain that

> When it comes to industry specific training, I know that not every career cluster has this kind of… level of industry specific training available to it, but wherever they do, I highly recommend it because when our students leave here, we want them to have the basics, the basic hands on skills.

Study participants noted the need for continued support with professional development and the integration of instructional technology. They discussed the benefits of professional development and the need for time and local experts to be available to support the process. Sue explained that

> I think professional development is big. Like if I didn't learn how to program all these different types of software, how could I teach my students… So to me a huge thing is to make sure that teachers are aware of what's out there for them. Like, I'm pretty close with what I need for my program, but maybe some teachers are, are not as familiar as to, to the different softwares and things out

> there in terms of technology that they can use… that's the culture of students right now… They're all on their phones, they're all on laptops… So I think making all teachers aware of what's out there to be able to integrate in the classroom is important.

Maria furthered that

> I think doing professional development, especially geared towards that, like geared towards technology, I think will help, especially the teachers that might not teach technology, but need to learn it… I mean, these were things that were like, really valuable.

These ideas were highlighted by the VHSD Technology Plan which stated that VHSD would provide

> professional development on a proactive basis that is sustainable and meaningful to our curricular offerings… maintain and utilize existing professional development teams in our schools to ensure that they operate as Professional Learning Communities which are focused on student achievement goals, utilizing data to measure progress, implementing research-based instructional strategies, continuing to share techniques and results, and continuing to integrate new technology that supports instruction.

Study participants noted the importance of making instructors aware of the types of professional development that are available to them as well as the need to have local professional development support from other instructors to successfully integrate instructional technology. Sue described that, "a huge thing is to make sure that teachers are aware of what's out there for them." This idea was furthered by Dylan who stated

> We did not have Google [in my previous district] as a platform and then when I had new teacher training I asked about that and I was like, I would really like to incorporate Google Classroom a little more than nothing at the time.

Maria noted the need for instructors to provide training to other instructors and the need for options describing, "You're learning from other teachers, you know, having options and choices, with guidance, like, like I said, like a teacher who is struggling with technology." This idea was expanded upon by Dylan who described what has been gleaned about professional development throughout their career explaining

> So what I've noticed, in, it's about 20 years of teaching, is teachers need to be taught… They can't just watch a video… teachers like to learn in the same way that they like to teach… but if you teach teachers how to use it and then also get them using it… And there were a lot of things we purchased, some technology, and tried to implement it and the kids couldn't log in and it became frustrating for them… so I needed more of that continual support, to integrate the process.

Trevor further discussed the importance of continual professional development support from colleagues noting

> You have to have somebody showing you how to do stuff… there definitely still has to be that piece where people are, see I'm a visual guy and I'm a person, I'm a people person… so I like when we have professional developments that involve being there instead of watching videos… don't get me wrong, videos are good, but I find at least for myself, when I have a resource that's available to me… that knows what they're doing and can show you like with their hands in front of you… I think that's the best option.

Lastly, the benefit of time with respect to professional development was discussed by Mary who explained that

> When we have a professional development workshop on technology, that we actually get the time to use it, that we actually get the time to fully, by the time we leave understand it, because if it's just a kind of overview of it and oh, go play with it on your own, you just don't always have the time… So I think as if, if it was a full workshop on one, one type of really great technology, it would come out stronger than, you know, being introduced to different things and not really understanding the full use of it.

Conversely, study participants noted that there is a need to make sure that professional development is not just a one-shot presentation and that it is more than what has been done in the past. Annie explained that "there is a lot that we've done over and over again… I can't take another professional development on that screen." Kyle furthered that while there are often many professional development opportunities, "I found various levels of meaning in all of those, but typically, I think the stuff that's more specific to the industry, which is generally not offered by the district, is more valuable to me and my students." Additionally, Kyle explained that

> I think districts should support meaningful training and make it so that instead of, when instructors find something, instead of it being extra, it could be in palace of some of the less important trainings… if the instructor of the course has a way to get a training, that's gonna be valuable to their course from a manufacturer, from some kind of, technological thing that's gonna help their class.

Dylan further explained that the types of professional development can add to an already full plate that teachers are trying to juggle explaining that "it became like something where it was like another plate spinning while I was just trying to keep all the plates spinning… I wasn't asking for another plate to keep spinning, to try and figure out."

The benefits of professional development to improving teacher craft and student outcomes is understood. There are practices that should be implemented in order to ensure that the professional development is recursive and builds upon the skills of the instructor, as well as is supported with resources that are readily available to assist with the integration of these new practices. Additionally, professional development needs to be relevant to the instructor and the course being taught so that it has a higher likelihood of being successfully implemented in a manner that supports the instructional practices of the instructor, the learning of the students in the classroom, and the overall outcomes of the program.

Summary

The researcher was able to address the purpose of this qualitative research study through exploring the perceptions of teachers with respect to the implementation and use of instructional technologies in secondary CTE programs. Through this research four themes were identified that are linked to the potential best practices when integrating instructional technologies into secondary CTE programs. The themes identified in this study were digital tools to support classroom management, digital tools to support instructional strategies for CTE, expansion of student kinesthetic learning, and continual programmatic professional development and training. When examining the theme of digital tools to support classroom management, there was a global aspect to this theme

that circulated around both personal improvement as well as instructional improvement for instructors due to the implementation of digital instructional tools. Participants noted that they were better able to complete elements of their job as well as improve their instruction and delivery of their program materials, which in turn seemed to impact student learning. It is noted that instructors found a better use of their time when completing administrative tasks as well as an increased amount of time that could be spent on planning and instruction due to the integration of digital tools. These benefits support not only the instructors but the students as well. Additionally, the theme of digital tools to support instructional strategies for CTE revealed interesting results in the practical application of digital tools as they relate to classroom instruction. Participants described the benefits that were experienced for instructors as well as students and described the positive changes that were found when integrating new tools. Study participants discussed how the integration of instructional technology provided them with a platform to utilize specific instructional strategies to meet the needs of their students. Additionally, study participants noted instructional strategies, such as a flipped classroom and digital simulations and virtual reality, that they were able to employ due to the integration of instructional technology to support and enhance the hands-on, experiential learning as well as expand the amount of time spent in the shop of their programs. By utilizing digital tools, CTE instructors found ways to support the hallmark of CTE programs and expand the amount of time that was spent in the shop labs conducting hands-on, kinesthetic learning experiences as examined in the theme of expansion of student kinesthetic engagement. These positive changes were found to have a major benefit in supporting the hands-on application of knowledge and skill, which in turn

benefits students as they move to complete certification exams and advance into the workforce as well as post-secondary learning opportunities. Participants discussed the benefits of being able to leverage instructional technologies to increase the amount of time that students participated in hands-on shop learning experiences as well as the ability to meet the needs of individual student learning. Lastly, the identified theme of continual programmatic professional development and training provided an understanding of the current and future needs of instructors to successfully integrate instructional technologies in their programs. Participants identified the need for specific, programmatic professional development as well as the need to have professional development opportunities be offered in a continuous manner with collegial support throughout the process. Without the support of time, continuous professional development, and access to individuals that can provide additional training the benefits of the integration of instructional technologies cannot be realized. The results of this research study have significant implications on the best practices of secondary CTE instructors as well as provided an understanding of how to support and sustain initiatives to integrate instructional technologies into secondary CTE programs.

Chapter 5

Summary, Discussion, and Conclusion

The post-pandemic world of education holds great opportunity to create meaningful change in educational processes and this is no more evident than in the world of Career and Technical Education (CTE). Rapanta et al. (2021) explain that the post-pandemic educational view is one of "openness toward innovation and new learning opportunities that were not as evident before (p. 716)." Through the opportunity to reimagine educational processes several understandings need to be realized in order to provide teachers with the requisite knowledge and skills to successfully incorporate educational technologies into their CTE classrooms and programs. Briggs et al. (2021) found that the shifts in CTE following the Covid-19 pandemic have highlighted the need for educational institutions to invest in the capacities of their staff with respect to both access and preparedness to utilize instructional technologies. Educational institutions must fully understand and embrace that training both current as well as pre-service teachers is imperative for successful integration of educational technologies (Bahcivan, et al., 2019). Additionally, as Kotrlik and Redmann (2009) contend, the best way to increase the integration of educational technologies is through providing teachers with greater access to technology and training. As established in the 2006 reauthorization of the Perkins Act, funding should be utilized, in part, to provide training and professional development for CTE teachers, faculty members, and administrators in the use of technology (Kotrlik & Redmann, 2009) and was further expanded on by the 2018 reauthorization of the Perkins Act (Perkins V) in which professional development should be individualized for CTE instructional approaches, labor market alignment and training

for effective use and provision of access to tools and technology. Through understanding the benefits of integrating instructional technologies into CTE pedagogical practices as well as the need to provide recursive support that allows for the successful integration of these technological supports, CTE programs can enhance their instructional capabilities and provide greater learning experiences for students. Briggs et al. (2021) contend that through making investments in access and preparedness, CTE programs and instructors will be better able to provide "high-quality, effective, and equitable opportunities to students (p. 9)."

This qualitative research study aimed to examine the teacher perceptions as to the implementation and use of instructional technologies in secondary CTE programs. This study focused on developing a set of potential best practices that could serve as a "tool belt" for secondary CTE instructors as they work to infuse and successfully implement educational technologies to support the hands-on, kinesthetic learning experiences that are the gold standard of CTE programs. The driving desire to conduct this research was through the identification of gaps in the approach to the integration of instructional technologies in secondary CTE classrooms during and after the Covid-19 pandemic. The research was conducted at a single vocational school district in the eastern part of the United States following the drastic changes that were brought upon the educational system due to the Covid-19 pandemic. The hallmark of CTE programs is the hands-on, experiential learning that provides students with the opportunity to obtain the requisite knowledge and skills to be successful upon moving to a post-secondary institution or into the workforce within a specific vocation. The purpose of this qualitative study was to examine the potential best practices of secondary CTE instructors when integrating

educational technologies as well as understanding how the use of educational technology can support the hands-on, experiential learning of these programs. It is believed that through the development of a set of potential best practices that CTE instructors, CTE administrators, as well as CTE teacher preparation programs would better be able to support the instructional endeavors of these programs.

Through this research, four themes emerged with respect to the experiences and perceptions of secondary CTE instructors on the implementation and use of instructional technologies. The themes that were identified were (1) digital tools to support classroom management, (2) digital tools to support instructional strategies for CTE, (3) expansion of student experiential learning, and (4) continual programmatic professional development and training. Several sub-themes were identified for a few of the major themes. The usage of time in planning and instruction was identified as a sub-theme under the major theme of digital tools to support classroom management. Technologies are often praised for their time saving benefits and the same can be seen in the world of education with respect to the use of digital tools assisting the classroom management of teachers through enabling more time to be spent on planning and teaching. Regarding the theme of digital tools to support instructional strategies for CTE, flipped learning as well as virtual reality and digital simulations were uncovered as sub-themes. Through utilizing digital tools, CTE instructors were better able to utilize new and different instructional strategies that would have been much more challenging without the use of these tools. By allowing for flipped learning, instructors were better able to support student hands-on learning and allow for students to have greater access to classroom material. Additionally, the use of virtual reality and digital simulations to support instruction created more opportunity for

students to participate in hands-on application of knowledge and skill in controlled environments. Lastly, the sub-themes of increased kinesthetic engagement and shop time along with individualized learning were identified as sub-themes under the major theme of expansion of student experiential learning. Experiential learning in CTE programs is attained through time spent participating in hands-on application of skills in the shop setting. By integrating educational technologies, CTE instructors were better able to provide more hands-on, kinesthetic learning opportunities in the shop as well as provide specific individualized learning strategies to meet the specific needs of their students. These themes were identified through the interviews of ten secondary CTE instructors, as well as classroom observations, and documents, with the use of process and pattern coding.

Discussion

The four themes identified through the research of this study have a number of crossover points that have the potential to create meaningful change in pedagogical practices of CTE instructors. The first two themes of digital tools to support classroom management and digital tools to support instructional strategies in CTE were identified as major themes based on the benefits that were repeatedly discussed by study participants. These themes demonstrate the ways in which the implementation and utilization of digital tools can enhance the daily tasks of instructors as well as transform the pedagogical approach that is taken to support students. Digital tools ranged from Google Classroom and other Google Suite programs, such as Google Docs, Google Forms, and Google Slides, to YouTube, SmartBoards, Kahoot, Screencastify, and EdPuzzle. Through the integration of digital tools, CTE instructors were able to further maximize their time for

planning and instruction, which allowed for more opportunities for instructors to implement additional instructional strategies that were supported by digital tools that enhanced the offerings within their programs as well as provided greater amounts of time to be spent on hands-on, experiential learning. These ideas of utilizing digital tools to support instructors both in management and instructional strategies is supported by Fletcher et al. (2012) in their contention that integrating technology in the classroom should be for the enhancing of student learning and not just an implementation of something new. Management of student work and classroom materials were better attained through the integration of digital tools as well as the provision of information and creating multiple methods of skill demonstration. Additionally, Carver and Kosloski (2015) found that the integration of instructional technologies and digital tools can lead to improvements in student achievement by supporting students with extensions of learning outside of the classroom align with increased collaboration, problem solving opportunities, and inquiry learning. It must be understood, however, that the mere provision of digital tools will not lead to either increased usage or the enhancement of student learning without the requisite training being provided to instructors. Kotrlik and Redmann (2009) explain that the integration of digital tools and instructional technologies increases when instructors are provided with more technology and training.

Hands-on, experiential learning truly serves as the hallmark of CTE programs and creates learning opportunities that allow for real-world application of technical skills in a classroom environment that simulates what will be experienced in the workforce. By integrating instructional technologies and digital tools, participants in this study were able to generate better processes for their daily tasks as well as discover ways to support daily

instruction through the application of these tools. These applications provided a means for the identification of the theme of the expansion of student experiential learning. As Davies (2011) contends, the integration of instructional technologies can enhance teaching and learning, the effectiveness of this implementation requires an understanding of the learning goals along with an understanding of how these technologies can serve as a support for the learning goals. Through integrating instructional technologies, instructors were able to decrease the amount of time that was spent on didactic instruction and increase the amount of time that was spent conducting hands-on experiential learning opportunities in the classroom. With an increased application of the flipped classroom concept, instructors were able to present theoretical content in a passive manner outside of the traditional classroom time therefore creating more time and opportunities for students to apply hands-on skill in the classroom setting. Wu et al. (2017) contend that by implementing a flipped classroom, instructors are better able to develop student-centered learning environments that allow for a greater opportunity to participate in active, hands-on learning in the classroom. While this may not be possible in every situation, the utilization of digital tools to support theoretical instruction provides a strong option for instructors to employ that can allow for more experiential learning, which is typically the type of learning experience that drives students to attend CTE programs. Additionally, the implementation and use of digital tools and instructional technologies allowed for instructors to better meet the individual learning needs of students and adapt their instruction to cover a greater number of different learning styles. The combination of CTE programs with the integration of instructional technologies can provide greater support to students by utilizing a wider variety of learning style options (Carver &

Kosloski, 2015). It can be understood that by implementing and utilizing digital tools and instructional technologies, CTE instructors have better ways to approach daily tasks, including planning and instruction, create better processes for the delivery of instruction which can be enhanced through the integration of these tools, and provide greater opportunities to develop and employ experiential learning for students through more hands-on application and time in the shop while meeting their individual learning needs.

While the advantages that can be understood through the implementation and use of digital tools along with instructional technologies to enhance teaching and learning are evident, the need to provide instructors with the requisite training and support cannot be underestimated. Having the digital tools and instructional technologies available to instructors is only half of the battle. It is imperative that a system of supports be established in order to provide instructors with the necessary time, understanding, and skill to employ these tools and to build their own toolkit of strategies that can support and enhance the teaching and learning in their programs. Ohano and Chukwuone (2018) explain the need to support CTE instructors through the process of integrating instructional technologies through the development and refinement of knowledge and skills. Time must be provided to instructors in order to learn how to implement and use digital tools as well as to provide opportunities for trial of these tools and strategies in the live educational setting.

Additionally, a professional development plan should be developed that is recursive in nature and is derived from a standpoint of continuous improvement. In doing so, a system is created that supports the individual instructors with multiple opportunities to learn and explore new tools and strategies as well as structures

opportunities for collegial dialogue and assistance with the implementation and use of these tools. Furthermore, professional development opportunities must have a direct correlation to the programs that CTE instructors deliver so that ties can be made between the types of tools and strategies and their relationship to delivering high-quality teaching and learning within specific programs. It is imperative for CTE leaders to work directly with CTE instructors to develop a professional development plan that meets the needs of teachers and their programs. As Petko et al. (2018) contend the readiness of teachers to integrate instructional technologies is predicated on their beliefs that these inclusions will be beneficial for student learning as well as their own confidence levels in their skills to utilize these technologies. The provision of these opportunities can be best supported by having specific individuals who can serve as local experts for instructors to refer to for guidance and can provide the necessary demonstrations and explanations to support these instructional changes. It is only through the provision of continual programmatic professional development that the necessary support can be provided that increases the possibility of successful implementation and use of digital tools that support classroom management and instructional strategies that will ultimately provide the opportunity for CTE instructors to have the toolkit available to them to increase the amount of experiential learning that can be provided in their respective classrooms.

Reflection on Conceptual Framework

The conceptual framework for which this study was founded upon and guided by provided significant insight in the research findings and experiences of study participants. Rooted in constructivism, experiential learning theory, and motivation theory, this study examined the pedagogical practices and experiences of CTE instructors and how the

integration of educational technologies altered, improved, and provided opportunities for creating meaningful change in their instructional practices as well as program implementation. When considering the findings from this study, the concept of constructivism was extremely apparent with respect to the implementation and use of instructional technologies in CTE programs. Patton (2002) explains that from a constructivist perspective, experience is the creator of knowledge. This was consistently seen in the experiences that were shared by study participants in that the forced experience of implementing instructional technologies due to the Covid-19 pandemic allowed for them to see alternate ways to deliver instruction and content to their students which allowed them to further enhance their hands-on learning experiences in the classroom. These understandings provided for the continued development of knowledge through creating connections and alternate approaches to the discovery of new ideas (Bryant & Bates, 2015).

Any examination of CTE programming and instruction would be hard-pressed to be considered complete without an understanding and foundation in experiential learning theory. All study participants discussed the importance of hands-on, experiential application within their specific vocational field. Snyder (2009) contends that authentic, collaborative, and active student-centered learning environments are at the heart of constructivism. Additionally, the challenges that were presented in finding creative ways and time to facilitate hands-on learning experiences due to the constraints of the pandemic on educational settings was echoed throughout the responses of participants. The authentic learning experiences and hands-on application of skills that are obtained through CTE programs provide students with the requisite support needed to promote

employability (Clark, et al., 2010). The most significant benefit of hands-on, experiential learning experiences is found in the ability for students to create knowledge through the understanding and transforming experience (Kolb, 1984). This is furthered by Snyder's (2009) position that constructivism allows for instructors to develop methods that promote cooperative learning, problem solving activities, and discovery learning. The integration of instructional technologies provided CTE instructors with additional methods to allow students to participate in these learning experiences as well as the potential for a greater amount of time to be spent performing these hands-on learning experiences during time in the shop.

As is the case with many instructors, motivating students can be a challenging undertaking. In many cases, as Self (2001) explains, secondary teachers may not have received the requisite training needed to motivate students before they entered the workforce. This challenge was highlighted even more with the shifts to online instruction as well as the integration of hybrid learning and greater use of instructional technology tools. Instructors highlighted the need to establish goals or targets that could be attained by students through the wider use of instructional technologies to further the acquisition of industry certifications to support both the educational process and workforce aspirations of students. Shunck (2012) explains that when students are motivated by learning goals, there are increases in not only motivation but in self-efficacy, skill, and task orientation throughout the learning process. Throughout this study, participants discussed the challenges in motivating students when experiencing complete online learning as well as with hybrid learning environments but highlighted that students were more motivated by having extra time to complete hands-on learning. Therefore,

instructors need to develop their instructional capacities to respond to both student and curricular needs to develop learning activities that include instructional technologies to motivate and adapt to the diverse needs of students (Anderson, 2004). These challenges were highlighted through the conceptual framework inclusion of the fully online, hybrid, and flipped classroom concepts. All study participants noted that a completely online learning environment is not sustainable in a CTE program in that students are really unable to obtain the hands-on, experiential learning and feedback that is the hallmark of these programs. Therefore, the constructivist framework is applicable in the creation of knowledge through the experiences (Patton, 2002) that were lived by CTE instructors who participated in teaching and learning prior to, during, and after the Covid-19 pandemic.

Along the lines of creating knowledge through experience, the concept of hybrid learning presented an interesting opportunity in that students completed the theory learning online while experiencing the hands-on learning in the classroom (Metz, 2010). While this presented a benefit to increasing the amount of hands-on learning there were challenges found in students completing the necessary theoretical learning outside of the classroom. Whereas the use of a flipped classroom concept, in which students are in attendance everyday but have the ability to complete passive learning outside of the classroom while the instructor was able to serve as the facilitator of learning and problem solving for students during classroom instructional time (Trogden, 2015). Study participants noted the benefits of flipped learning in that they were able to spend a greater amount of time facilitating hands-on, experiential tasks as opposed to more time on didactic instruction due to students completing elements of passive, theoretical learning

outside of the classroom. Through the guiding principles and concepts of the conceptual framework that was utilized for this study, a greater understanding was gained through the insights of the study participants and the frames for which questions were derived.

Research Questions

This qualitative research study was driven by research questions that were designed to facilitate an understanding of the perceptions of teachers with respect to the implementation and use of instructional technologies in secondary CTE programs. The main research question driving this research was, how can educational technologies be utilized to enhance student learning in Career and Technical Education programs? This question was imperative to guide this research in that without having an understanding of the best practices that can be utilized to further student learning in CTE programs, instructors, CTE administrators, and educational preparation programs would not have the necessary guidance to understand how to implement and use these technologies. Additionally, with the opportunities for creating meaningful change that have been presented following the pandemic, it is extremely prudent to gain an understanding of how to take the educational technologies that were, for lack of a better term, forced into practice without much understanding and provide a tool kit for smooth integration that has sustained support to carry forward these efforts. To help further these understandings, subquestions were developed and examined through the data collected and will be addressed below.

Main Research Question

How can educational technologies be utilized to enhance student learning in Career and Technical Education programs? The use of educational technologies, such as

Google Classroom, Google Suite, SmartBoards, YouTube, EdPuzzle, Screencastify, and Kahoot, provides a means of enhancing student learning in CTE programs per the experiences of study participants. Participants noted that educational technologies, such as Google Classroom, the Google Suite, and YouTube, enhance student learning in CTE programs by providing students with an opportunity to experience additional hands-on learning in the shop as well as providing greater access to curricular materials through the use of digital strategies. The USDOE (2012) described the benefits of online learning and the use of instructional technologies for "assembling and disseminating instructional content more efficiently (p.2.)." This can be achieved through the utilization of digital tools to provide opportunities for flipped learning as well as creating additional opportunities for students to participate in and practice hands-on application through digital simulations and virtual reality. The use of educational technologies provides additional mediums in which CTE instructors can provide students with access to curricular materials as well as the ways in which students interact with these materials.

It can be understood that by allowing students to have a greater number of opportunities to interact with curricular material they are furthering their tacit knowledge that provides for better learning outcomes on required certification exams. Additionally, the integration of educational technologies can provide CTE instructors with additional abilities to meet the learning styles and needs of students that allows increased exposure to curricular experiences. These findings align with the findings of Alexander et al. (2012) in that the integration of instructional technologies can present greater convenience and flexibility along with more opportunities for students to view and review program materials, which can decrease stress and promote individualized

pacing. While study participants noted that instructional technologies would never be able to replace the in-person, hands-on learning that is a hallmark of CTE programs, they did discuss that learning opportunities are expanded by the integration of instructional technologies by utilizing targeted learning strategies such as flipped learning and digital simulations. The use of digital simulations and virtual reality in CTE programs allows for students to participate in learning experiences that simulate dangerous situations that they may not be able to participate in through the restrictions that exist on secondary students as well as an opportunity to safely practice using tools prior to being handed the actual piece of machinery. These findings aligned with Davies (2011) contention that when integrating instructional technologies, the goal should be for the "wise and competent use of technology to facilitate learning (p. 50)." The facilitation of student learning experiences can be supported and enhanced by allowing students to have numerous opportunities to interact with curricular materials and the increase the amount of time that students have when applying the theoretical and hands-on application of the requisite skills and knowledge that they have obtained during their vocational training. These experiences along with the knowledge and skills that are obtained allow CTE instructors to provide deeper learning experiences and improve outcomes for students as they move on to the workforce or post-secondary institutions to further their schooling.

Research Subquestion One

In what ways can educational technology support experiential learning in CTE programs? Study participants described several ways in which instructional technologies can support the hands-on, experiential learning in CTE programs. Guthrie and Jones (2012) explain that the use of instructional technologies to support experiential learning

in CTE programs is a demonstration of the need for CTE instructors to be aware of constructing opportunities for students to build meaning though intentionally integrated opportunities throughout the program. Participants described how instructional technologies can shorten the amount of time spent on the theoretical didactic teaching portions of programs, thus increasing the amount of hands-on, shop time that is utilized during class periods. Additionally, participants explained how the use of digital simulations and virtual reality can support experiential learning by providing opportunities for hands-on application of skills in a safe, controlled environment prior to the application in the real-world shop setting. The use of digital simulations also provides opportunities for students to complete learning experiences that they may not be able to participate in due to restrictions that are in place with respect to the types of situations that secondary students can and cannot participate in classroom or work-based learning settings. These experiences acknowledged by instructors aligns with Green's (2015) discussion that CTE instructors need to operate from a perspective of facilitation, providing students with opportunities to construct their learning through experience and knowledge. This can further support experiential learning elements by providing students with additional opportunities to practice their skills, building confidence as well as expanding hands-on skills.

Research Subquestion Two

How can CTE programs benefit from incorporating educational technologies? Study participants noted that CTE programs can benefit from the incorporation of educational technologies through the support and enhancement of hands-on, experiential learning as well as greater alignment with industry standards. By integrating

instructional technologies in secondary CTE classrooms, instructors were better able to provide students with shorter periods of direct instruction, which led to an increased amount of time spent working in the shop space on the hands-on application of technical knowledge and skill. These findings align closely with Fletcher et al. (2012) in their contention that the implementation and use of instructional technologies should be for the enhancement of student learning opportunities. Furthermore, CTE programs can offer greater access to classroom learning materials for students through the use and implementation of instructional technologies. As explained by Jones (2015), the increases in access to instructional technologies have furthered the educational opportunities for many students. In addition to greater access, CTE programs can better support student learning through the implementation and use of instructional technologies by better being able to support individual student learning needs and providing individualized pacing on program materials. Study participants also noted that the incorporation of educational technologies led to greater organization of program materials and an enhanced usage of time when compared to previously lower levels of instructional technology integration.

Research Subquestion Three

What types of supports do teachers need in order to better facilitate the integration of educational technology within CTE programs to provide an understanding of what CTE instructors need to successfully implement and use instructional technologies? Study participants noted that additional support and professional development would be beneficial in the implementation and use of instructional technologies. It is imperative to provide instructors with not only initial training on how to implement and use specific

educational technologies, but to also provide a recursive structure that allows for instructors to have a dedicated individual within the organization that can be their support net as they utilize these tools and have questions that arise from their experiences. As noted by Kotrlik and Redmann (2009) the integration of instructional technology by CTE instructors is greatly dependent on previous trainings on specific instructional technologies that have been provided. It was noted that continuous professional development offerings would be the most beneficial, especially when they are supported by having locally available colleagues that can support the integration process. Additionally, study participants discussed the need to have professional development surrounding the integration of instructional technology that is linked to the specific industry that the CTE program represents. As CTE programs are required to maintain their currency with industry standards, it is imperative for instructors to have opportunities to participate in training that is specific to their trade and the betterment of the student outcomes for those within their program. Furthermore, study participants discussed the need for having time to work with singular elements of instructional technology that allows for a clear understanding of the offerings of a specific educational technology as well as methods to integrate the technology in a manner that will support the goals of the CTE program. Instructors need to have the opportunity to interact with new instructional technologies in manageable chunks so that they are not overwhelmed with these new processes and have a chance to figure out the best approach to including these new instructional tools into their classroom environment. These findings align with the contention of Bahcivan et al. (2019) that training, for both current and pre-service educators, is paramount to the integration of instructional technologies.

Research Subquestion Four

How has the integration of technology changed CTE programs? Study participants explained that the integration of instructional technologies has led to improvements in CTE programs through greater alignment with industry standards, with respect to technology. Additionally, study participants discussed the use of instructional technologies has provided an ability to expand on what is done during face-to-face class time in that more time can be spent working in the shop on hands-on, experiential learning elements due to the use of targeted instructional strategies such as flipped learning and digital simulations. Boucher et al. (2017) support these findings in that when students are provided with more opportunities to participate in meaningful, active learning, there is greater potential for increased achievement (as cited in Wu et al., 2017). Numerous study participants explained that they have experienced improvement in how they present program materials and the greater student access to materials that they have been able to provide to students through the integration of instructional technology. As Mok (2014) posited, the use of instructional technology that allows students to participate in passive learning elements outside of the classroom provides for a greater amount of class time to be allocated to collaborative and interactive learning experiences. Study participants noted that due to the increased use of instructional technologies they have found that many of their work flow processes have been improved so that they are spending more time planning learning experiences and focusing on teaching and learning as opposed to spending more time on administrative tasks. Additionally, the integration of instructional technologies has allowed for instructors to explore teaching tools that they may not have been willing to or have seen the benefit of prior to their hand being

forced due to the Covid-19 pandemic. The increased use of instructional technologies allows for instructors to present materials in a manner that is meeting students where they are as well as keeping up with the ever-changing standards of industry to ensure that programs are providing the best, most relevant learning opportunities.

Leadership Reflections and Implications

The data collected and results of this qualitative research study has several implications for school leaders who oversee secondary CTE programs. CTE school leaders should be aware of the benefits that can be achieved through the integration of instructional technologies in CTE programs. Additionally, CTE leaders can utilize the results of this research study to support the targeted instructional strategies employed by CTE instructors in order to create greater learning opportunities for students as well as increase the organization and usage of time for CTE instructors. It is imperative for CTE leaders to understand that incorporating instructional technologies in CTE programs will take time and will need a balance between traditional practices and digital learning tools. Petok et al. (2018) established that both school and teacher readiness are imperatives to be addressed prior to the integration of educational technologies. Furthermore, CTE leaders should consult with and include instructors in the decision making process in order to ensure that they are supporting the needs of instructors as well as working to increase the 21st Century skills being taught in the classroom.

When considering aspects of change, the experiences of the Covid-19 pandemic could be considered episodic change. Weick and Quinn (1999) explain that episodic change occurs during divergence periods in which an organization moves away from the normal conditions that would create equilibrium. These changes can be characterized as

episodic in that the move to a fully online educational model was dramatic, extremely wide in scope, and was not a complete move because it was not fully implemented (Weick & Quinn, 1999). Conversely, of great importance is the data that was collected regarding the need for continuously sustained professional development on the implementation and use of instructional technologies in CTE programs. The need for continuous change is an imperative to creating a sustained learning environment for professionals within an organization. Weick and Quinn (1999) contend that "the distinctive quality of continuous change is the idea that small continuous adjustments, created simultaneously across units, can cumulate and create substantial change (p. 375)." CTE school leaders need to be aware that CTE instructors can greatly benefit from having turn-key professional learning from colleagues who are able to provide continued support throughout the integration process. Furthermore, school leaders need to ensure that instructors are provided with the time needed to fully understand and employ the instructional technologies that are being provided. Previous training experiences as well as the commitment of time in integrating new technology are paramount to the successful integration of instructional technologies (Kotrlik & Redmann, 2009). The offerings of professional learning should be, when possible, linked to the specific vocation that is being taught to ensure that the instructional technologies are both relevant to the curricular materials as well as to ensure that there is greater alignment with industry standards. By utilizing the results gleaned from this qualitative study, CTE school leaders will have the requisite experiential support to provide for a strong rationale when making decisions to design professional development opportunities and for supporting instructors in the implementation phase of incorporating instructional technology. In the

spirit of continuous change and improvement, CTE leaders need to work with instructors and staff to create professional development programs that are recursive in nature, supported with local experts, broken into small manageable chunks, and directly related to specific fields that can be integrated immediately. As Petko et al. (2018) summarize, it is the readiness of the instructor as well as their level of confidence in utilizing these technologies that will ultimately support the successful integration.

CTE school leaders that desire to create the meaningful change that is necessary to support instructors in their journey to integrate instructional technologies to enhance their program offerings and student achievement must have an understanding that situational leadership offers an excellent approach to accomplish these goals. The need for school leaders to integrate the concept of situational leadership was highlighted by the cumulative experiences of the Covid-19 pandemic. Northouse (2019) describes situational leadership as an approach that understands different situations will call for different leadership styles and that situational leadership contains both supportive and directive elements based on the leaders evaluation of given organizational members competence and willingness to perform a specific goal. With an understanding of situational leadership, CTE leaders must also be willing to lead from both a transformational and transactional leadership perspective. Northouse (2019) explains that transformational leadership changes people by focusing on "emotions, values, ethics, standards, and long-term goals (p. 163)." CTE leaders need to be willing to fully understand those that they lead and to be extremely cognizant of where each of their staff members are coming from with respect to understanding, skill, training, and comfort level with respect to the integration of instructional technologies. With that

understanding, however, CTE leaders must also be aware that this change process will not happen overnight and will involve a continuous improvement cycle in order to build the knowledge and skills of instructors to implement these tools. Burke (2018) contends that a continuous improvement action, or evolutionary change, will require segmented attention of the organizational population or a phased involvement of members of the organization over time. Bernhardt (2013) furthers that continuous school improvement is an ongoing process that includes planning, implementing, evaluating, and improving. The utilization of a continuous improvement model allows for a generation of commitment through an understanding of the big picture, framing the components of change in a way to ease understanding, and making information accessible for staff to "own, use, and apply (Bernhardt, p. 13, 2013)." Through a willingness to employ situational leadership to ensure that staff members are supported, directed, and understood throughout a continuous improvement process, the greater the likelihood of successfully implementing meaningful change within the organization.

Additionally, the experiences of the Covid-19 pandemic in the world of education exacerbated issues related to equity and access. With respect to CTE, in particular, the Covid-19 shift to fully online instruction highlighted a social justice issue with the need to discover ways to provide hands-on learning experiences to students who have a kinesthetic, tactile learning preference. Dantley and Tillman (2006) contend that social justice leadership requires the investigation and development of solutions for scenarios that create and perpetuate inequities. The experiences of the complete altering of education during the Covid-19 pandemic led to school officials and teachers to find ways to deliver high-quality teaching and learning in an environment that many had little to no

experience. This was extremely acute in CTE programs, which are highlighted by hands-on, experiential learning. The social justice leadership needed to address these situations required, and still does require, unique and collaborative thought processes to develop, implement, and support alternate methods of providing students with the requisite hands-on learning that is needed in order to be successful within a given vocation. The collaborative nature of these leadership experiences is codified by Dantley and Tillman's (2006) explanation that social justice must operate in a democratic environment that celebrates the collective knowledge of "multiple voices, identities, and perspectives of all those in the community (p. 22)." This research demonstrates the need to investigate and problem solve these social justice issues (Dantley & Tillman, 2006) that are specific to CTE but also throughout many different educational settings.

Furthermore, this research lends itself to the need for understanding transformational leadership practices with respect to providing greater access to educational opportunities. When school leaders are looking to make changes with respect to the daily practices that are utilized in classrooms, it is imperative that they support these changes with focused leadership. Burke (2018) explains that transformational leaders are able to create meaningful change by staying the course, building and sustaining a steadfast focus on mission and strategies, addressing resistances directly and immediately, and regaining traction when mistakes are realized. Northouse (2019) furthers that transformational leaders are attentive to the needs and motives of those that they lead and work to help others reach their full potential. School leaders, especially in CTE, need to have a focus on a clear vision and provide a framework to supports all organizational members through the necessary changes. When working to

increase the use of instructional technologies, CTE leaders need to understand the beliefs and experiences of their staff members and include them in a collaborative decision making process that develops processes that help support all organizational members. Under these circumstances, leaders act as coaches and work to build a climate that is supportive and provides careful attention to the needs of organizational members (Northouse, 2019). By utilizing transformational leadership, CTE school leaders can provide students with greater access to CTE programs and curricular content by supporting the implementation and use of instructional technologies by instructors. Additionally, through creating processes to transform how things are accomplished within a CTE program, opportunities to further the amount of hands-on, experiential learning that is experienced by students on a daily basis may also be achieved. In doing so, the leader may exhibit an additive effect, thus leading others to accomplish more than is expected (Northouse, 2019) and in turn creating greater opportunity for student, instructor, and program success.

Recommendations for Practice

While the integration of instructional technologies is not a new thought process or goal in the field of education, it is one that needs to be reexamined in light of the effects and realities that were experienced during the Covid-19 pandemic. CTE school and district leaders need to rethink the approach that has been employed in rolling out new instructional technologies and digital tools in the classroom. It is recommended that CTE leadership teams include CTE instructors to provide feedback on not only the needs of instructors and programs, with respect to the integration of instructional technologies, but also in the approach to designing and implementing training programs. By including

practitioners in the design and development of these programs, CTE leadership will be better able to implement training programs and initiatives that have the requisite support of instructors to allow for better outcomes when being rolled out. Additionally, CTE leadership needs to have a specific focus on fostering environments that encourage instructors to take risks and try new techniques in their classrooms. By building an educational environment that supports instructors trying new things and working to discover new instructional processes, CTE leaders can facilitate changes within the classroom that support greater student learning and achievement as well as provide methods for CTE instructors to have more time to focus on planning and instruction.

In addition to including practitioners in the discussion regarding the design and implementation of training programs, it is imperative that CTE leaders ensure that resources are provided to instructors with respect to time and assistance in integrating new tools and technologies. This can be accomplished by creating schedules that allow for instructors to spend time both learning and taking small steps to integrate new tools and technologies. Additionally, CTE leaders need to ensure that staff members have local "experts" available to them to assist and support the learning and implementation of these tools. By having individual points of contact for instructors and flexibility with respect to time, CTE leadership is providing necessary supports to allow for continuous growth and improvement of instructor capacities.

CTE instructors need to be willing to explore new, or new to them, instructional technologies. This willingness can lead to a discovery of instructional technologies that can enhance specific pedagogical elements within classrooms as well as provide processes that can better help support the use of time, which can provide instructors with

a greater amount of time to focus on planning and instruction. As found in this study, once CTE instructors were able to gain an understanding of how to utilize some of the instructional technologies that were available, they were better able to understand the benefits that these technologies can have on their professional practice as well as their organization and time management. It must be understood, however, that making changes in the use of instructional technologies needs to be taken slow and to not make too many changes all at once. Change implementation should be done in manageable, small increments as too many changes can lead to overwhelm and can cause implementation to slow and/or stop altogether. Furthermore, CTE instructors should look to leverage free online resources and training for implementing and using instructional technologies in their classroom. As an example, there is a wealth of free training available online for the many Google products that can be accessed at any time and are broken down into manageable modules that are self-paced and provide basic to advanced training. By creating and implementing small changes, CTE instructors can fundamentally change their daily classroom practices that can serve to increase their productivity as professionals as well as advance the achievement of their students and their programs.

Recommendations for Future Research

The integration of instructional technology in secondary CTE programs is an area that requires more future research to ensure that CTE instructors are supported in their endeavors to not only further the use of educational technology in the classroom but to ensure that industry standards are being met in instruction. Both instructional technology and industry based technology are arenas that are continually changing and moving

forward in a world that is becoming increasingly digital. It is imperative for CTE instructors to have the requisite knowledge and skills to support these endeavors. Therefore, continued research is needed on the experiences of CTE instructors who are integrating instructional technologies as well as the best practices that are being employed while doing so.

Additionally, future research would be extremely beneficial within the experiences and best practices of specific vocations and the CTE programs that are supporting these programs. By having a greater body of research within a specific field, instructors will have a better understanding of the best practices for integrating instructional technology into their specific program. This particular area of research will further help not only the pedagogical practices of the instructors but also the outcomes that are achieved and capable of being achieved by students completing these programs. Within a similar frame, future research would aid in the understanding of the integration of instructional technologies based on teacher beliefs. Through gaining a better understanding of the beliefs, whether personal or pedagogical, of those that are completing the implementation process of instructional technologies a stronger grasp of best practices to support those in the trenches would be beneficial to the decision making process regarding these types of changes.

Furthermore, based on the data collected from this study, additional research would be beneficial in the specific arena of supporting special education students and students with diverse learning styles through the integration of instructional technology in CTE programs. While the majority of study participants discussed the benefits of better meeting the needs of their individual learners through the use of instructional technology,

more research into this specific topic could substantially benefit both instructors and students. Furthermore, value could be added to this area of research through an examination of the perceptions and experiences of students completing CTE programs to better understand the necessary supports that should be in place. Completing studies in these areas would help to further push the needle of vocational education and the offerings and support that are available to staff and students.

Rigor and Ethical Considerations

The design of this qualitative research study meets the rigorous requirements of a valid study. Credibility has been ensured through the triangulation of multiple data sources (Toma, 2006) including interviews, document collection, and observations. The credibility of this study has been furthered by presenting data and interpretations to participants utilizing member checking to ensure that the data is representative of their experiences (Lincoln & Guba, 1982). Furthermore, the results of this study can be reported as trustworthy due to the design elements promoting credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1982). Transferability, or generalizability, was achieved in this study through the use of thick descriptions of the findings as well as purposeful sampling (Lincoln & Guba, 1982). The data collected and findings derived from the data meet the dependability criteria in that the study was designed with a naturalistic approach in which the data collection took place in the natural setting of the participants and the design removed the conscious and unpredictable changes that may occur (Lincoln & Guba, 1982). Toma (2006) explains that the findings of a study have confirmability when they are a reflection of the participants and the inquiry. Based on the neutrality of these findings they would be objectively

confirmable. The design and conscious decisions made in this qualitative research study have been supported to ensure that rigorous and trustworthy research has been conducted.

With the appropriate permissions and approvals obtained along with the development of protocols to support the research, the major ethical consideration that had to be understood by the researcher was their current role, serving as a principal of several schools throughout VHSD. The researcher needed to be aware that their position may have impacted the responses of study participants. However, study participants seemed to be very open and honest when discussing their experiences and were excited to share the successes and challenges that they had faced when integrating instructional technologies in their CTE programs. Rossman and Rallis (2017) explain that in order to ensure that the data collected and reviewed was done against the personal positionality and worldview of the researcher to ensure that the data presented was completed in an unbiased manner. Through developing and understanding their positionality, the researcher was able to compile, analyze, and present the data findings in a manner that was unbiased and objective.

Limitations of Study

This research study has several limitations. The first limitation is that this study was conducted at a single vocational school district. Despite the fact that the CTE programs offered throughout the district are housed in different school buildings and have diverse student populations based on the resident school districts, the students are all from the same county and the schools are situated within a fifteen mile radius. It is understood that the majority of study participants may have similar experiences due to the nature of training and offerings of equipment and technology. Additionally, the type

of student that attends these CTE programs are often more similar with respect to access to technologies and socioeconomic factors.

The second limitation of this study is the length of time and experience that the CTE instructors have with implementing instructional technologies and online learning. All instructors had to shift their instructional methods in March 2020 due to the New Jersey state order that all schools had to close to in-person instruction due to the Covid-19 pandemic. Much of what was implemented by instructors at that time was done on the fly with little previous knowledge or experience in delivering their programs using an online platform. While the instructors have been given greater professional development in using instructional technologies and online learning platforms as well as have more experience with schools implementing a mix of online and in-person learning, there is still not a significant breadth or depth of instructor experiences in this area. Additionally, the number of participants, while representative of 20% of the instructor population of the district, does not necessarily support the experiences and understandings of a larger scale representation of CTE instructors.

A third limitation is the type of CTE programs that are offered within the schools of this study. While there is a diverse set of CTE program offerings, some of the programs are more academically driven and therefore may have more theoretical aspects that can be offered using an online learning platform. While all programs have theoretical knowledge that students must obtain, not all programs are able to offer online simulations of the hands-on instruction that students must also obtain knowledge and skills in order to be successful in the transition to the workforce. The types of programs that are offered at VHSD may not be similar to those offered throughout New Jersey let

alone the United States. Therefore, the experiences of the instructors of these programs may not be as similar to those working in different CTE fields and from different regions of the state and the country.

Conclusion

This chapter discussed the implications of this study and the recommendations for integrating instructional technology in secondary CTE programs based on the perceptions of CTE instructors. The conclusions and recommendations for future research are addressed based on improving the implementation and use of instructional technologies in secondary CTE programs as well as ensuring that these programs are able to remain current with industry standards. The manner and methods by which knowledge is delivered and received must continue to evolve both in the traditional and online classroom environments (Kentnor, 2015). It is imperative that CTE instructors be provided with the necessary means to successfully integration instructional technologies into their programs in order to stay current with industry standards to maintain flexibility and adaptive structures that provide the foundation for both meeting students where they are with respect to how they learn and enhancing the learning opportunities that are afforded to students in and out of the classroom. Multiple recommendations have been made in order to support secondary CTE teachers when integrating instructional technologies as well as to promote the development of best practices based on the perceptions and experiences of CTE instructors.

This study examined the need for secondary CTE instructors to integrate instructional technologies into their program delivery. Several recommendations were made for both CTE instructors and CTE school leaders as to the types of best practices

that have been successful in CTE classrooms as well as the types of training and professional development opportunities that should be developed in order to promote successful implementation of instructional technologies. As Dougherty and Lombardi (2016) contend that the groundwork is established for continuing to advance and sustain CTE programs due to the demands for increasing educational opportunities that are linked to the development of skills and competencies related to specific trades provided the basis of vocational education. These recommendations may also have implications in the design of CTE teacher preparation programs as well as the types of support that may be necessary during and after these programs have been completed. The recommendations made in this study aim to not only support CTE instructors and school leaders but to help develop classroom practices that enhance the hands-on, experiential learning environments that are traditionally utilized in CTE programs. Furthermore, this study has provided recommendations that can help to further student learning and achievement through the integration of instructional technology. The findings of this study align with Kotrlik and Redmann's (2009) discussion of the 2006 reauthorization of the Perkins Act, in which they explain that funding is provided under this legislation for training and professional development for CTE teachers, faculty members, and administrators in the use of technology. CTE school leaders need to be aware of the perceptions and experiences of instructors implementing instructional technologies to ensure that they are able to provide the necessary supports, training, and professional development that will allow for strong collaboration, collegial support, and successful integration.

References

Adams, E. (2010). The joys and challenges of semi-structured interviewing. Community *Practitioner: The Journal of the Community Practitioners' & Health Visitors' Association*, 83(7), 18.

AdvanceCTE (2021). *Career Clusters.* Retrieved from https://careertech.org/career-clusters.

Agostinho, S. (2005). Naturalistic inquiry in E-learning research. *International Journal of Qualitative Methods, 4*(1), 13–26.

Alexander, M. W., Truell, A. D., & Zhao, J. J. (2012). Expected advantages and disadvantages of online learning: Perceptions from college students who have not taken online courses. *Issues in Information Systems, 13*(2), 193-200.

Ames, C. (1992). Achievement goals and the classroom motivational climate. In D. H. Schunk & J. L. Meece (Eds.), *Student Perceptions in the Classroom* (pp. 327-348). Hillsdale, NJ: Erlbaum.

Anderman, E. M., Austin, C. C., & Johnson, D. M. (2002). The development of goal orientation. In A. Wigfield & J. S. Eccles (Eds.), *Development of Achievement Motivation* (pp. 297-220). San Diego, CA: Academic Press.

Anderson, T. (2004). Towards a theory of online learning. In T. Anderson & F. Elloumi (Eds.), *Theory and practice of online learning* (pp. 33-60). Athabasca, AB, Canada: Athabasca University.

Aliaga, O. A., Kotamraju, P., & Stone III, J. R. (2014). Understanding participation in secondary career and technical education in the 21st century: Implications for policy and practice. *The High School Journal*, *97*(3), 128-158.

Aragon, S., Alfeld, C., & Hansen, D. (2013). Benefits of Career and Technical Student Organizations' on female and racial minority students' psychosocial and achievement outcomes. *Career and Technical Education Research, 38*(2), 105-124.

Ausburn, L. J., & Ausburn, F. B. (2008). Effects of desktop virtual reality on learner performance and confidence in environment mastery: Opening a line of inquiry. *Journal of STEM Teacher Education 45*(1), 54-87.

Bahcivan, E., Gruer, M. D., Yavuzalp, N. & Akayoglu. (2019). Investigating the relations among pre-service teachers' teaching/learning beliefs and educational technology integration competencies: A structural equation modeling study. *Journal of Science Education and Technology, 28*(5), 579-588.

Bartley, S. J., & Golek, J. H. (2004). Evaluating the cost effectiveness of online and face-to-face instruction. *Educational Technology & Society, 7*(4), 167-175.

Bernhardt, V. L. (2013). *Data analysis for continuous school improvement*. New York, New York: Routledge.

Beuving, J., & de Vries, G. (2020). Teaching qualitative research in adverse times. *Learning and Teaching*, *13*(1), 42–66.

Bird, K. A., Castleman, B. L., & Lohner, G. (2020). Negative impacts from the shift to online learning during the covid-19 crisis: Evidence from a statewide community college system. Retrieved from https://www.edworkingpapers.com/sites/default/files/ai20-299.pdf.

Boone, H. N. (1990). Effect of level of problem solving approach to teaching on student achievement and retention. Journal of Agricultural Education, 31(1), 18-26.

Borzak, L. (1981). *Field study: A source book for experiential learning* . Beverly Hills, CA : SAGE.

Bowen, G. A. (2008). Naturalistic inquiry and the saturation concept: A research note. *Qualitative Research, 8*(1), 137-152.

Bozick, R. & Dalton, B. (2013). Balancing career and technical education with academic coursework: The consequences for mathematics achievement in high school. *Educational Evaluation and Policy Analysis*, *35*(2), 123-138.

Briggs, A., López, D., & Anderson, T. (2021). Online career and technical education programs during the pandemic and after. Retrieved from https://www.urban.org/sites/default/files/publication/104193/online-career-and-technical-education-programs-during-the-pandemic-and-after_1.pdf.

Brod, M., Tesler, L., & Christensen, T. (2009). Qualitative research and content validity: developing best practices based on science and experience. *Quality of Life Research*, *18*(9), 1263–1278.

Bryant, J., & Bates, A. J. (2015). Creating a constructivist online instructional environment. *TechTrends*, *59*(2), 17-22.

Burke, W. W. (2018). *Organizational change: Theory & practice*. Thousand Oaks, CA: SAGE.

Cannon, J. G., Kitchel, A., & Duncan, D. W. (2012). Perceived teaching and learning professional development needs of Idaho secondary career and technical education teachers. The Researcher, 24(1), 43-54.

Cappelli, P. H. (2015). Skill gaps, skill shortages, and skill mismatches: Evidence and arguments for the united states. *Industrial & Labor Relations Review, 68*(2), 251–290.

Carver, D. L., & Kosloski, M. F. (2015). Analysis of student perceptions of the psychosocial learning environment in online and face-to-face career and technical education courses. *The Quarterly Review of Distance Education, 16*(4), 7-21.

Castellano, M., Stringfield, S., & Stone, J. R. (2003). Secondary career and technical education and comprehensive school reform: Implications for research and practice. *Review of Educational Research, 73*(2), 231-272.

Clark, R. W., Threeton, M. D., & Ewing, J. C. (2010). The potential of experiential learning models and practices in career and technical education and career and technical teacher education. *Journal of Career and Technical Education, 25*(2), 46-62.

Colorado, J. T., & Eberle, J. (2012). Student demographics and success in online learning environments. *Emporium State Research Studies, 46*(1), 4-10.

Corbin, J. & Stauss, A. (2015). *Basics of qualitative research: Techniques and procedures for developing grounded theory.* Thousand Oaks, CA: SAGE.

Crossland, A., Gray, T., & Reynolds, J. (2018). ESSA and Digital Learning: Closing the Digital Accessibility Gap. The 10. *American Institutes for Research*. Retrieved from https://files.eric.ed.gov/fulltext/ED602482.pdf.

Croxton, R. A. (2014). The role of interactivity in student satisfaction and persistence in online learning. *Journal of Online Learning and Teaching, 10*(2), 314-325.

Davies, R. S. (2011). A framework for evaluating educational technology integration. *TechTrends, 55*(5), 45-52.

Dantley, M. E., & Tillman, L. C. (2006). Social justice and moral transformative leadership. *Leadership for social justice: Making revolutions in education*, 16-30.

Diaz-Lazarno, C. M., Cordova, S., & Franklyn, R. (2009). Experiential activities for teaching about diversity. In R. A. R. Gurung & L. R. Prieto (Eds.), *Getting culture: Incorporating diversity across the curriculum* (pp. 191-199). Sterling, VA: Stylus Publishing.

Doolittle, P. E., & Camp, W. G. (1999). Constructivism: The career and technical education perspective. *Journal of vocational and technical education, 16*(1), 23-46.

Dougherty, S. M. (2016). Career and Technical Education in High School: Does It Improve Student Outcomes?. *Thomas B. Fordham Institute.* Retrieved from https://files.eric.ed.gov/fulltext/ED570132.pdf.

Dougherty, S. M. & Lombardi, A. R. (2016). From vocational education to career readiness: The ongoing work of linking education and the labor market. *Review of Research in Education, 40,* 326-355.

Fatonia, N. A., Nurkhayatic, E., Nurdiawatid, E., Fidziahe, G. P., Adhag, S., Irawanh, A. P., Julyantoj, O. & Azizik, E. (2020). University students online learning system during Covid-19 pandemic: Advantages, constraints and solutions. *Systematic Reviews in Pharmacy, 11*(7), 570-576.

Fletcher, E. C., Djajalaksana, Y., & Eison, J. (2012). Instructional strategy use of faculty in career and technical education. *Journal of Career and Technical Education, 27*(2). Retrieved from https://files.eric.ed.gov/fulltext/EJ995896.pdf.

Flynn, M. (2020). Shifting to online learning - in the classroom. *ASCD Express, 15*(23). Retrieved from http://www.ascd.org/ascd-express/vol15/num23/shifting-to-online-learning-in-the-classroom.aspx.

Friedel, J. N. (2011). Where has vocational education gone? The impact of federal legislation on the expectations, design, and function of vocational education as reflected in the reauthorization of the Carl D. Perkins career and technical education act of 2006. *American Educational History Journal, 38*(1), 37-53.

Garza Mitchell, R. L. (2017). Online career and technical education in the community college. *Community College Journal of Research and Practice*, *41*(6), 336-340.

Garza Mitchell, R. L., Etshim, R., & Dietz, B. T. (2016). Online CTE in the community college. *Career and Technical Education Research, 41*(3), 193-212.

Gordon. H. R. D., & Xing, X. (2020). Servant-leadership during the covid-19 crisis: Implications for CTE. *The CTE Journal, 8*(2). Retrieved from https://www.thectejournal.com/uploads/1/0/6/8/10686931/gordon_fall_2020.pdf.

Guba, E. G. & Lincoln, Y. S. (1982). Epistemological and methodological bases of naturalistic inquiry. *Educational Communication and Technology, 30*(4), 233-252.

Guthrie, K. L., & Jones, T. B. (2012). Teaching and Learning: Using Experiential Learning and Reflection for Leadership Education. *New Directions for Student Services, 2012*(140), 53–56.

Harasim, L. (2000). Shift happens: Online education as a new paradigm in learning. *Internet and Higher Education, 3*, 41-61.

Hawk, T. F., & Shah, A. J. (2007). Using learning style instruments to enhance student learning. *Decision Sciences Journal of Innovative Education*, *5*(1), 1-19.

Hite, R. (2021). Augmented and virtual reality in education: An examination of the impact on learning. Retrieved from https://cdn.zspace.com/collateral/case-studies/Augmented_and_Virtual_Reality_in_Education-An_Examination_of_the_Impact_on_Learning.pdf.

Huang, H. M. (2002). Toward constructivism for adult learners in online learning environments. *British journal of educational technology*, *33*(1), 27-37.

Horvitz, B. S. (2019). Extending the reach to technical education with distance learning. *Community College Journal of Research and Practice, 43*(7), 534-538.

Jackson, R. L., Drummond, D. K., & Camara, S. (2007). What is qualitative research? *Qualitative Research Reports in Communication*, *8*(1), 21-28.

Jocson, K. M. & Martinez, I. D. (2020). Extending learning opportunities: Youth research in CTE and the limits of a theory of change. *Equity & Excellence in Education, 53*(1-2), 165-176.

Jones, S. H. (2015). Benefits and Challenges of Online Education for Clinical Social Work: Three Examples. *Clinical Social Work Journal*, *43*(2), 225–235.

Kentnor, H. (2015). Distance education and the evolution of online learning in the United States. *Curriculum and Teaching Dialogue*, *17*(1&2), 21-34.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development.* Englewood Cliffs, NJ: Prentice-Hall.

Kolb, A. Y. & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education*, *4*(2), 193-212.

Kotrlik, J., & Redmann, D. (2009). Analysis of teachers` adoption of technology for use in instruction in seven career and technical education programs. Career and Technical Education Research, 34(1), 47-77.

Kroth, M. (2007). Maslow-move aside! A heuristical motivation model for leaders in career and technical education. *Journal of STEM Teacher Education*, *44*(2), 5-36.

Knight, J. (2013). *High-impact instruction: A framework for great teaching.* Thousand Oaks, CA: Corwin.

Kuhfeld, S., Soland, J., Tarasawa, B., Johnson, A., Ruzek, E., & Liu, J. (2020). Projecting the potential impact of covid-19 school closures on academic achievement. *Educational Researcher, 49*(8), 549–565.

Kunz, J. (2020). Celebrating career and technical education. *Techniques, 95*(1), 58–59.

Lachlan, L., Kimmel, L., Mizrav, E., & Holdheide, L. (2020). Examining the impact of covid-19 on the teaching workforce. Retrieved from https://gtlcenter.org/sites/default/files/Examining_Impact_COVID19_Workforce.pdf.

Lai, P. K., Portolese, A., & Jacobson, M. J. (2017). Does sequence matter? Productive failure and designing online authentic learning for process engineering. *British Journal of Educational Technology*, *48*(6), 1217-1227.

Lake, R., & Dusseault, B. (2020). Remote classes are in session for more school districts, but attendance plans are still absent. *Center for Reinventing Public Education*. Retrieved from https://www.crpe.org/thelens/remote-classes-are-session-more-school-districts-attendance-plans-are-still-absent.

Lambeth, J. M., Joerger, R. M. & Elliot, J. (2009). Implications for focusing research in career and technical education and workforce development. *Career and Technical Education Research, 34*(3), 137-153.

Lekes, N., Bragg, D. D., Loeb, J. W., Oleksiw, C. A., Marszalek, J., Brooks-LaRaviere, M., Zhu, R., Kremidas, C. C., Akukwe, G., Lee, H., Hood, L. K. (2007). Career and technical education pathway programs, academic performance, and the transition to college and career. *National Research Center for Career and Technical Education.* Retrieved from https://files.eric.ed.gov/fulltext/ED497342.pdf.

Levesque, K., Laird, J., Hensley, E., Choy, S. P., Cataldi, E. F., & Hudson, L. (2008). Career and technical education in the United States: 1990 to 2005. Washington, DC: National Center for Education Statistics.

Lynch, R. L. (2000). High school career and technical education for the first decade of the 21st century. *Journal of Vocational Education Research, 25*(2), 155-198.

Manly, R. A. (2011). The decentralization of Perkins: History, impact and recommendations for future cte legislation. *Career and Technical Education Research, 36*(2), 119-152.

Manley, A. R., & Zinser, R. (2012). A Delphi study to update CTE teacher competencies. *Education & Training, 54*(6), 488–503.

Marshall, J. C. (2016). The highly effective teacher: 7 classroom-tested practices that foster student success. Alexandria, VA: ASCD.

Mason, R. (2000). From distance education to online learning. *The Internet and Higher Education, 3*(1), 63-74.

Maxwell, J. A. (2013). *Qualitative research design: An interactive approach.* Thousand Oaks, CA: SAGE.

McInnes, S., Peters, K., Bonney, A., & Halcomb, E. (2017). An exemplar of naturalistic inquiry in general practice research. *Nurse Researcher, 24*(3), 36–41.

Metz, K. (2010). Benefits of online courses in career and technical education. *Techniques: Connecting Education & Careers 85*(6), 20-23.

McCarthy, M. (2010). Experiential learning theory: From theory to practice. *Journal of Business & Economics Research, 8*(5), 131-139.

Mok, H. N. (2014). Teaching tip: The flipped classroom. *Journal of Information Systems Education, 25*(1), 7-11.

Montrieux, H., Vanderlinde, R., Schellens, T., & De Marez, L. (2015). Teaching and Learning with Mobile Technology: A Qualitative Explorative Study about the Introduction of Tablet Devices in Secondary Education. *PloS One*, *10*(12), e0144008–e0144008. https://doi.org/10.1371/journal.pone.0144008.

Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). e-Learning, online learning, and distance learning environments: Are they the same?. *The Internet and Higher Education*, *14*(2), 129-135.

Moyer, R., Snodgrass, J., Klein, S., & Tebben, C. (2017). Simulated Work-Based Learning: Instructional Approaches and Noteworthy Practices. *Office of Career, Technical, and Adult Education, US Department of Education*. Retrieved from https://files.eric.ed.gov/fulltext/ED583035.pdf.

New Jersey Department of Education. (2019). *Career & Technical Educators.* Retrieved from https://www.nj.gov/education/license/cte/infofaq.htm.

New Jersey Department of Education. (2020). *NJ School Performance Report.* Retrieved from https://rc.doe.state.nj.us/report.aspx?type=state&lang=english&schoolyear=2018-2019#P60c07623c63349b19d16037102b68e0b_6_293iS0.

Northouse, P. G. (2019). *Leadership*. Thousand Oaks, CA: SAGE.

Ohanu, I. B., & Chukwuone, C. A. (2018). Constraints to the use of online platform for teaching and learning technical education in developing countries. *Educational Information Technology, 23*(6), 3029-3045.

Opfer, V. D. & Pedder, D. (2010). Benefits, status and effectiveness of continuous professional development for teachers in england. *The Curriculum Journal: Schools and Continuing Professional Development in England - the State of the Nation Study, 21*(4), pp. 413–431.

Patton, M. Q. (2002). *Qualitative research and evaluation methods*. Thousand Oaks, CA: SAGE.

Petko, D., Prasse, D., & Cantieni, A. (2018). The interplay of school readiness and teacher readiness for educational technology integration: A structural equation model. *Computers in the Schools, 35*(1), 1-18.

Plank, S., Deluca, S., & Estacion, A. (2005). *Dropping out of high school and the place of career and technical education: A survival analysis of surviving high school*. St. Paul, MN: National Research Center for Career and Technical Education.

Pregowska, A., Masztalerz, K., Garlińska, M., & Osial, M. (2021). A Worldwide Journey through Distance Education—From the Post Office to Virtual, Augmented and Mixed Realities, and Education during the COVID-19 Pandemic. *Education Sciences, 11*(3). Retrieved from https://www-proquest-com.ezproxy.rowan.edu/docview/2501847975/fulltextPDF/B070DA8B251441B1PQ/1?accountid=13605.

Rapanta, C., Botturi, L., Goodyear, P., Guardia, L., & Koole, M. (2021). Balancing technology, pedagogy and the new normal: Post-pandemic challenges for higher education. *Postdigital Science and Education, 3(3), 715-742.*

Rapley, T. (2007). Interviews. In C. Seale, G. Gobo, J. F. Gubrium, & D. Silverman (Eds). *Qualitative research practice* (pp. 15-33). London: SAGE.

Rossman, G. B. & Rallis, S. F. (2017). *An introduction to qualitative research: Learning in the field.* Thousand Oaks, CA; SAGE.

Rubin, H. J. & Rubin, I. S. (2012). *Qualitative interviewing: The art of hearing data.* Thousand Oaks, CA: SAGE.

Saldaña, J. (2016). *The coding manual for qualitative researchers.* London: SAGE.

Saphier, J. Haley-Speca, M. A., & Gower, R. (2008). *The skillful teacher: Building your teaching skills.* Boston, MA: Research for Better Teaching, Inc.

Schulte, P. A., Stephenson, C. M., Okun, A. H., Palassis, J., & Biddle, E. (2005). Integrating Occupational Safety and Health Information Into Vocational and Technical Education and Other Workforce Preparation Programs. *American Journal of Public Health (1971)*, *95*(3), 404–411.

Schunk, D. H. (2012). *Learning theories: An educational perspective.* Boston, MA: Pearson.

Scott, J. & Sarkees-Wircenski, M. (2008). *Overview of Career and Technical Education*. Homewood, Il: American Technical Publishers.

Song, Y. & Kapur, M. (2017). How to flip the classroom - "Productive failure or traditional flipped classroom" pedagogical design? *Educational Technology & Society, 20*(1), 292-305.

Snyder, M. M. (2009). Instructional-design theory to guide the creation of online learning communities for adults. *TechTrends, 53*(1), 48-56.

Spring, J. (2014). *The American school: A global context from the puritans to the Obama administration.* New York, NY: McGraw-Hill.

Stone, J. R. (2017). Introduction to pathways to a productive adulthood: The role of cte in the American high school. *Peabody Journal of Education, 92*(2), 155-165.

Strengthening Career and Technical Education for the 21st Century Act of 2018, 115 U.S.C.§ 1 et seq. (2018). https://www.congress.gov/115/bills/hr2353/BILLS-115hr2353enr.pdf.

Toma, D. (2006). Approaching Rigour In Applied Qualitative Research. In C. F. Conand & R. C. Serlin (Eds.), *The SAGE Handbook for Research in Education* (pp. 405-423). Thousand Oaks, CA: SAGE.

Thomson, D. (2011). Conversations with Teachers on the Benefits and Challenges of Online Learning for Gifted Students. *Gifted Child Today Magazine*, *34*(3), 31–39.

Toppin, I. (2018). Who is going to build the wall? A building trades crisis in the U.S.A. *International Journal for Research in Vocational Education and Training, 5*(1), 64-76.

Trogden, B. G. (2015). Confchem conference on flipped classroom: Reclaiming face time - How an organic chemistry flipped classroom provided access to increased guided engagement. *Journal of Chemical Education, 92*, 1570-1571,

Tucker, C. R. (2013). The basics of blended instruction. *Educational Leadership, 70*(6), 57-60.

United States Bureau of Education (1913). Report of the Committee on Economy of Time in Education. In Willis, G., Schubert, W. H., Bullough Jr, R. V., Kridel, C., & Holton, J. T. (Eds.)(1994). *The American curriculum: A documentary history*. Westport, Ct: Greenwood Publishing Group.

United States Department of Education (2012). Understanding the implications of online learning for educational productivity. Retrieved from https://files.eric.ed.gov/fulltext/ED532492.pdf.

United States Department of Education (2013). National center for educational statistics. *Secondary/high school: Percentage of public high school graduates who earned any credits, and various minimum numbers of credits, by career and technical education (CTE) curricular and subject area: 2013.* Retrieved from https://nces.ed.gov/surveys/ctes/tables/h186.asp.

United States Department of Education (2019). Bridging the skills gap: Career and technical education in high school. Retrieved from https://www2.ed.gov/datastory/cte/index.html.

Van Manen, M. (2014). *Phenomenology of practice: Meaning-giving methods in phenomenological research and writing*. New York, NY: Routledge.

Watson, J. (2008). Blended Learning: The Convergence of Online and Face-to-Face Education. Promising Practices in Online Learning. *North American Council for Online Learning.* Retrieved from https://files.eric.ed.gov/fulltext/ED509636.pdf.

Weick, K. E., & Quinn, R. E. (1999). Organizational change and development. *Annual review of psychology*, *50*(1), 361-386.

Wells, T., & Miller, G. (2020). Teachers' opinions about virtual reality technology in school-based agricultural education. *Journal of Agricultural Education, 61*(1), 92-109.

Wilkin, T., & Nwoke, G. I. (2011). Career and technical education teacher shortage: A successful model for recruitment and retention. *Journal of STEM Teacher Education*, *48*(1), 22-35.

Wong, H. K. & Wong, R. T. (2014). *The classroom management book.* Mountain View, CA: Harry K. Wong Publications, Inc.

Wu, W.-C. V, Chen Hsieh, J. S., & Yang, J. C. (2017). Creating an online learning community in a flipped classroom to enhance EFL learners' oral proficiency. *Educational Technology & Society, 20*(2), 142-157.

Xiao, J., Sun-Lin, H. Z., Lin, T. H., Li, M., Pan, Z., & Cheng, H. S. (2020). What makes learners a good fit for hybrid learning? Learning competencies as predictors of experience and satisfaction in hybrid learning space. *British Journal of Educational Technology*, *51*(4), 1203-1219.

Appendix A

Interview Protocol

Topic: Teacher perceptions of the implementation and use of online learning in secondary CTE programs.

Research Question: How can online learning be utilized to enhance student learning in Career and Technical Education programs?

Sub-Questions:

- In what ways can online learning support experiential learning in CTE programs?
- How can CTE programs benefit from incorporating online learning?
- What types of supports do teachers need in order to better facilitate the integration of online learning within CTE programs?
- How has the integration of technology changed CTE programs?

Interview Questions (follow-up and probing questions will be used in response):

1. What experience, prior to the Covid-19 pandemic, did you have integrating instructional technology into your classes?
2. In what ways do you believe technology can enhance classroom instruction?
3. How did teaching during the pandemic change your approach to instructional technology?
4. In your experience, how does technology support your instructional goals?
5. What types of professional development did you have, prior to the pandemic, with respect to integration instructional technology?
6. What do you think are the best ways to integrate instructional technology in CTE programs?
7. How do you see technology being integrated into CTE programs moving forward?
8. What types of support and professional development are still needed to successfully integrate technology?
9. Are there ways that the integration of instructional technology can support the hands-on, experiential learning that is a hallmark of CTE programs?
10. With respect to your instructional practices and the integration of technology, what has changed in the last two years?

Question	Follow-up Question	Notes
What experience, prior to the Covid-19 pandemic, did you have integrating instructional technology into your classes?		
In what ways do you believe technology can enhance classroom instruction?		
How did teaching during the pandemic change your approach to instructional technology?		
In your experience, how does technology support your instructional goals?		
What types of professional development did you have, prior to the pandemic, with respect to integration instructional technology?		
What do you think are the best ways to integrate instructional technology in CTE programs?		
How do you see technology being integrated into CTE programs moving forward?		
What types of support and professional development are still needed to successfully integrate technology?		
Are there ways that the integration of instructional technology can support the hands-on, experiential learning that is a hallmark of CTE programs?		
With respect to your instructional practices and the integration of technology, what has changed in the last two years?		

Appendix B

Document Collection

Topic: Teacher perceptions of the implementation and use of online learning in secondary CTE programs.

Research Question: How can online learning be utilized to enhance student learning in Career and Technical Education programs?

Sub-Questions:

- In what ways can online learning support experiential learning in CTE programs?
- How can CTE programs benefit from incorporating online learning?
- What types of supports do teachers need in order to better facilitate the integration of online learning within CTE programs?
- How has the integration of technology changed CTE programs?

Document Collection Protocol

1. Who created the document?
2. When was the document created?
3. For whom, was the document created?
4. How does the document demonstrate the support of technology integration?
5. In what ways does the document provide examples of steps taken to integrate technology in CTE programs?
6. How does the document reflect the importance of technology integration?
7. How does the document support the improvement of instructional practices through the use of technology integration?
8. How does the document demonstrate different strategies employed by teachers to implement and use instructional technology?
9. How does the document demonstrate the use of instructional technology to improve instructional practice?
10. In what ways does the document provide examples of the professional development process supporting the improvement of instructional practices through the integration of technology?

Question	Data
Who created the document?	
When was the document created?	
For whom, was the document created?	
How does the document demonstrate the support of technology integration?	
In what ways does the document provide examples of steps taken to integrate technology in CTE programs?	
How does the document reflect the importance of technology integration?	
How does the document support the improvement of instructional practices through the use of technology integration?	
How does the document demonstrate different strategies employed by teachers to implement and use instructional technology?	
How does the document demonstrate the use of instructional technology to improve instructional practice?	
In what ways does the document provide examples of the professional development process supporting the improvement of instructional practices through the integration of technology?	

Appendix C

Observation Protocol

Topic: Teacher perceptions of the implementation and use of online learning in secondary CTE programs.

Research Question: How can online learning be utilized to enhance student learning in Career and Technical Education programs?

Sub-Questions:

- In what ways can online learning support experiential learning in CTE programs?
- How can CTE programs benefit from incorporating online learning?
- What types of supports do teachers need in order to better facilitate the integration of online learning within CTE programs?
- How has the integration of technology changed CTE programs?

Observation protocol checklist

_____ Technology integrated into instruction
_____ Technology used to support experiential learning
_____ Technology integrated to provide greater hands-on instruction
_____ Uses of multiple technology platforms
_____ Technology integrated both in and out of the classroom

Strategy	Integrated (Yes or No)	Notes
Technology integrated into instruction		
Technology used to support experiential learning		
Technology integrated to provide greater hands-on instruction		
Uses of multiple technology platforms		
Technology integrated both in and out of the classroom		