5-9-2024

Understanding How CTE Educators Perceive that Professional Development Supports Educational Practices and Retention

Neyla Rivera
Walden University

Walden University

College of Education and Human Sciences

This is to certify that the doctoral study by

Neyla Rivera

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Jennifer Seymour, Committee Chairperson, Education Faculty
Dr. Suzanne O'Neill, Committee Member, Education Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2024

Abstract

Understanding How CTE Educators Perceive that Professional Development Supports Educational Practices and Retention

by

Neyla Rivera

MA, Cambridge College, 2009

BS, University of Puerto Rico, 2001

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

May 2024

Abstract

Career and technical education (CTE) educators are inconsistently supported with professional development (PD). The inconsistent support may limit advancing teaching and learning, serving the students, and retaining CTE educators in the field. How supported CTE teachers feel with PD to implement instructional practices that serve students and encourage teachers to remain in the field was explored in this study. A basic qualitative approach was used along with the theoretical foundation of the social cognitive career theory, specifically, the interest and choice model. Semistructured interviews were conducted with ten CTE educators nationwide, and MAXQDA was used for data analysis. The data were examined by applying coding process and thematic analysis. Results indicated that CTE educators often have unhelpful PD and that PD lacks support for CTE programs. CTE educators often use technology to supplement specific needs they might need that were lacking from PD opportunities. Based on the study's findings, it is recommended that stakeholders increase awareness about the support perceived by CTE educators, helping with retention issues and innovative education. In other words, CTE educators may urge more PD and provide directions on where PD is needed the most. The implications for positive social change include finding guidance to provide PD opportunities for CTE educators and advancing teaching and learning by understanding how current resources apply to be applied to CTE education.

Understanding How CTE Educators Perceive that Professional Development Supports Educational Practices and Retention

by

Neyla Rivera

MA, Cambridge College, 2009

BS, University of Puerto Rico, 2001

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

May 2024

Dedication

I am grateful to God for bestowing upon me the capacity and ability to complete this work. This dissertation is dedicated to my daughter, Ma'at Analiz Woodruff. You are my miracle, and I hope this can inspire you to dream big, work hard, and believe in yourself. I would like to thank Kenneth A. Woodruff for his support, advice, and time. Your dedication to Ma'at, provided me with the time to investigate the topic of this study and allowed me to continue this pursuit. I would also like to thank my family, including my sisters Anabelle and Lizbeth Rivera, my nephews Roberto Perez and Roger Perez, my niece Lizbeth Perez, Jose Sanjurjo, Betania Montilla, and Lisa Leandre for always being there for me throughout this journey. Lastly, I would like to dedicate this work to my professor, Dr. Jennifer R. Seymour, for your understanding, encouragement and walking with me throughout this study. Thanks to the support I have received throughout this journey, I was able to achieve this goal.

Acknowledgments

I would like to acknowledge Dr. Jennifer R. Seymour for her commitment and support in writing this dissertation. You always guided me to demonstrate excellence in this journey. I would also like to acknowledge Dr. Suzanne R. O'Neill, second committee member for your support and feedback. The leadership and mentorship of both Dr. Seymour and Dr. O'Neill proved crucial to the success of this work. Without, your time and expertise, I would be laboring on this without a definitive end in sight. Thanks to the Walden University reviewers for their advice. Lastly, I would like to thank Hannah Mueller and Hartford T. Jennings, Sr. for taking time to proofread my work.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

The *Career and Technical Education* (CTE) programs help students to advance in skills for careers and academics. Haviland and Robbins (2021) explained that CTE programs typically combine classroom instruction with hands-on training and internship opportunities. Nationwide, the CTE programs need educators who perform with rigor and expertise regarding the content they teach. According to Didier (2018), U.S. schools face a technical challenge to certify enough CTE educators to meet their needs. The shortages of CTE educators can result because U.S. schools cannot certify or license enough CTE teachers. This shortfall may affect CTE program's expected goals to advance teaching and learning.

The shortages of CTE teachers could challenge leaders in the field to create resources that support CTE teachers, and by extension program success. Claflin et al. (2019) stated that teacher's attrition that have been a pressing issue affects schools When administrators struggle to hire CTE teachers, they may struggle to retain them as well. Hasselquist and Graves (2020) discussed the impact of nationwide shortage of highly qualified CTE teachers faced by schools on education. Similarly, Bartholomew et al. (2018) told that the shortages of CTE teachers have prompted leaders to have diverse methods to certify teachers. When fewer CTE teachers enter the field, less experienced teachers who may feel unsupported may leave the field. In other words, the difficulty in staffing CTE educators may create the need to retain them. Authors such as Bowling and Ball (2018), Claflin et al. (2019), and Devier (2019) agreed that CTE programs experience difficulties to retain CTE educators. Moreover, Claflin et al. (2019) explored

factors that interfere with the CTE educator's decisions to remain in the profession. According to the Association for Career and Technical Education (ACTE; 2020), there was an increase in the number of CTE educators without certification. Advance CTE (2021) reported that schools struggle recruit or retain enough competent CTE teachers, leading to continuous retention challenges. There is a need for understanding retention issues and ways CTE teachers are assisted.

Because retention of CTE teachers is a problem, schools could use professional development to support CTE teachers. Martino (2021) discussed that teacher education programs in Florida and nationwide professional development training developed into educational action substitutes for academic preparation to address the educator shortfall problem. The CTE programs could use professional developments to support CTE educators. The problem I addressed through this study was that CTE educators are inconsistently supported with professional development (PD) to implement instructional practices that serve students and support CTE educators to remain in the field. By demonstrating the need for PD for CTE educators, Byrd et al. (2020) expanded the findings of Smalley and Sands (2018). Accordingly, Mohammad-Hussain et al. (2018) claimed that PD was necessary for CTE educators. These authors' (e.g., Byrd et al., 2020; Mohammad-Hussain et al., 2018; Smalley & Sands, 2018) findings and implications about PD needs had important application as evidence for this study.

The potential positive of this study may include that this study would add information about CTE educators' support with PD to the literature. This research may provide more awareness to stakeholders comprehending how current resources apply in

advancing teaching and learning. Besides, this investigation may help identify topics of need to plan PD for CTE educators helping with retention issues and innovating education. In other words, CTE professionals may urge more PD. The results of this study may provide direction on where PD is needed more. Also, I would disseminate the findings of this study by posting the results online in Scholarworks, which is Walden University publication research site. Furthermore, the director of the professional organization has supported this study and is interested in the results, the dissertation would be shared with them (Dr. J. Holland, personal communication, August 9, 2021).

The main sections of this chapter include a description of the problem and purpose of this study. In other words, the following paragraphs would inform essential components of this study, including the background, problem statement, study purpose, research question, the framework that would inform the study, definitions, assumptions, limitations, significance, and Chapter 1 summary.

Background

I intended to understand challenges CTE educators may experience as well as factors and support that may contribute to their teaching practices. CTE programs may experience a shortage of educators. Bowling and Ball (2018) and Devier (2019) asserted the shortage of educators. There is a shortage of CTE teachers nationwide, thus, retention can be a strategy that may aid with this issue. Indeed, Bowen et al. (2019), Clafin et al. (2019), Haddad and Stewart (2019), McIntosh et al. (2018), Park and Johnson (2019), and Saeger (2019) discussed the retention issues as alternatives to help reduce educators'

shortages. This study intended to explore difficulties CTE educators may encounter, circumstances, and aid that may strengthen their teaching practices.

A review of the literature provided substantial evidence. Leaders in professional organizations work to find alternatives to align the rigor of the programs and mitigate issues that cause CTE educator shortages impacting teaching and learning. Duncan et al. (2017) explained actions to help with the family and consumer sciences (FCS) educator shortage in response to increasing and maintaining FCS educators in the field. Furthermore, Duncan et al. agreed that investigation is urged. According to Duncan et al., initial results of the investigation from the FCS organization campaign "Say Yes to FCS" showed that (a) precise, in-depth information was urged nationwide, starting with a census of the number of educators and students; (b) there was an urgency to work across all subject and all FCS professional, involving secondary teachers, to poise the lack of educators; (c) the dearth of FCS college education programs and staff played a significant part in FCS educators' dearth; and (d) there was an urgency for earn advocacy from subject field professionals to evidence the influence FCS education had on people and society results.

The gap in the research on why and how PD can be a tool to support CTE teachers and increase retention. The inconsistent support for CTE teachers, the need for PD support to help with retention issues, and PD to strengthen instructional actions impacting teaching and learning are needs of CTE teachers are problematic. These areas are still poorly understood in the literature: how to provide consistent support for CTE teachers, how PD can strengthen instructional actions impacting teaching and learning,

and how PD can improve retention of CTE teachers. According to Yost et al. (2019), administrators noticed the urgency to help CTE educators in improving their teaching practice. Seager (2019) recommended that attention was needed to collect examine information to advance CTE teacher training programs. Additionally, Stair et al. (2017) concluded that there was an urgency for PD regarding English standards for CTE teachers. Similarly, Williams et al. (2018) indicated that CTE educators urged PD about strategies to teach special needs and limited English proficiency students. Emerick (2020) reported that CTE educators needed support with diversity and inclusion PD to improve their abilities to serve bilingual students. Thus, some of the essential problems found in the literature were the inconsistent support of PD to help retain and advance CTE educators' teaching skills.

Leaders in the field aim for actions to support teaching and learning. In 2018, Imperatore et al. published a complete excellence CTE curriculum, including standards alignment, articulation, industry partnerships, student organizations, and experiential learning. Leaders urged data to comprehend the CTE professionals' training and the reasons they did not stay in the profession (ACTE, 2020). Also, ACTE (2020) presented that an issue of concern was the total number of CTE educators without certification. Recently, CTE programs experienced many alternative certified educators (Bartholomew et al., 2018). Thus, CTE teachers may need support in different pedagogical areas. Anderson et al. (2018), Gordon et al. (2020), Hendrix et al. (2021), Lavalle and Litchfield (2019), and Zirkle (2019) stated that there was a need for PD for CTE educators. Other

authors (e.g., Dyar, 2018; Lavalle & Litchfield, 2019) claimed that the support for the CTE educators is poor or inconsistent.

This study was needed because the outcomes could provide information contributing to factors in understanding possible alternatives and considerations when planning PD for CTE educators and supporting and retaining them. Also, this study would contribute to adding more evidence to literature in the CTE field and knowledge concerning CTE educators' needs to improve teaching and learning, contributing to student success. In sum, stakeholders and future researchers will comprehend the PD, support, and resources that may allow CTE teachers and their students to succeed. The CTE program's expectations include to prepare competent students for the global world. If CTE programs' goals are well understood by CTE leaders, the curriculum may align with the global skills for their student's success. Hence, this study would add to the literature on CTE educators' need for support. While some authors (e.g., Burrows et al., 2021; Parr et al., 2019; Sabin et al., 2018) found that PD increased that CTE educators' capacity, others (e.g., Byrd et al., 2020; Emerick, 2022; Merrill & Lawver, 2019; Williams et al., 2018) showed that more PD was needed for CTE educators. Thus, some PD works well, however, more PD may be needed. The third gap is how PD can improve retention of CTE educators.

Problem Statement

The problem I addressed through this study was CTE educators are inconsistently supported with PD to implement instructional practices that serve students and support CTE educators to remain in the field. Bryd et al. (2020) demonstrated that PD was

needed to enhance CTE educator's laboratory management skills. Also, Mohammad-Hussain et al. (2018) agreed that novice CTE educators with little teaching experience need support with PD to advance their instructional practice. To summarize, Byrd et al. and Hussain et al.'s conclusions had important application in the inconsistent support with PD as well as retention issues that some CTE programs may experience.

Furthermore, Merrill and Lawver (2019) called for support for CTE educators and attention to nutrition topics. More Dyar (2018) and Zirkle et al. (2019) indicated the urgency to investigate how PD impacted CTE educators and assisted with retention issues. Studies of Olson Stewart et al.'s (2021) findings have indicated the concern to raise attention to PD and mentoring programs to support educators. Bassok (2021) and Miller and Youngs' (2021) research findings explain the urgency of supporting educators with PD. In sum, there is evidence in the literature indicating that PD for educators was necessary to help with retention and improve teaching and learning.

Purpose of the Study

In this qualitative study, I investigated how CTE educators' instructional practices are supported by PD to serve students and help CTE educators remain in the field. My goal was to understand CTE educators' perceptions of PD support for their instructional practices to teach their students. The participants for this study were national CTE teachers. I explored CTE educators' experiences with PD to advance instructional practices regarding the type of support, barriers, and challenges they may experience in their classroom. In addition, I explored CTE teachers' activities that contribute to their choices to stay in the teaching profession.

The concepts of interest in this study were the CTE teachers and their experiences with PD and retention. It is unclear what is causing CTE teachers to leave the profession. Research indicates multiple potential reasons including overwhelming tasks, being underpaid, personal reasons, and lack of PD (Claflin et al., 2019; Disberger et al. 2022; Moser & Kim, 2020; McIntoch et al., 2018). Hendricks et al. (2021) and Motto (2021) claimed that the PD for CTE educators must adapt to their actual needs. Arneson et al. (2020), Hendricks et al. (2021), and Herbst's (2020) discussed the urgency for training to enhance CTE educators' skills. The literature indicates that support for CTE educators is inconsistent. Also, the difficulties in staffing and retaining CTE educators are topics that may need more research. The uneven support and retention issues may impact teaching and learning, resulting in a problem of practice. As an indication, Bassok et al. (2021), Miller and Youngs (2021), and Olson Stewart et al. (2021) reported retention issues in their research. Although it is true that policy and reform, curriculum advancement, CTE teacher shortages, retention, and PD are fundamental research problems identified in the literature, the inconsistent support for CTE teachers is a gap in research about the practice found in the literature that few have investigated. Therefore, the phenomenon of interest is how CTE educators perceive their support with PD, whether PD aid their teaching skills and their decisions to stay in the educational field.

Research Question (Qualitative)

The research question that addressed the stated problem of this study was as follows:

RQ1: How are CTE educators supported with PD to implement instructional practices to serve students and remain in the field?

Theoretical Foundation

The theoretical foundation that I used to guide this study was the interest and choice model of the social cognitive career theory proposed by Lent and Brown (2019). The choice and interest model of the social career theory is a theoretical framework created by Lent et al. (1993). The basis of the interest and choice model includes self-efficacy and outcome expectation that helped to understand CTE educators' ideas of their support for their educational practices. The association between the Lent and Brown's interest and choice model of the social cognitive career theory and this study was that the model helped explain CTE educators' perceived support and how it contributes to their decision to remain in the educational field.

The personal inputs box of the model includes the predispositions, gender, race/ethnicity, disability, and health status. Lent and Brown (2019) explained that the Social Cognitive Career Theory (SCCT) models facilitate understanding of the way individual's social and economic status, as well as their cultural identity, impact their job-specific learning and livelihood. This part of the SCCT model could clarify how participants' gender relates to the choice to enter the field. The CTE field is concerned with nontraditional roles because the nontraditional role is one of the areas of concern in the CTE field. Moreover, the nontraditional gender role is one of the goals of the CTE program. According to the Utah State Board of Education (2024), the Federal Perkins

funds call for school districts to focus on exceptional individuals' nontraditional training as a task of the national agenda.

The contextual influences proximal to the choice behavior box of the model can inform the participant's willingness and professional needs, what they expect from the organization, their experiences, and what they can do and learn. Lent and Brown (2019) wrote that connecting the choice models with career self-management could help to explain why individuals with similar preferences options and perspectives might make different decisions. These factors motivate them to apply new concepts/skills and advance their knowledge to improve teaching and learning. The SCCT framework captured information about the participant's concerns, aspirations, and best practice preferences because of its contextual influences.

Some of the areas included in the interest and choice model were personal inputs, personal background, and learning experiences (Lent & Brown, 2019). Also, the SCCT framework was the support tool used to develop the interview questions of this study included in the interview protocol (see Appendix A). Moreover, each question included in the interview protocol pairs the interest and choice model boxes. Besides, Lent and Brown's (2019) SCCT framework helped analyze the data gathered in this study through the interview because participant's responses might provide data such as introducing themselves, which was part of the personal input information. In addition, the participants informed about their years of teaching experience that would respond to the model's background context in the model, and the type of support received; this information might report to learning experiences part of Lent and Brown's (2019) SCCT framework.

Hence, the SCCT framework relates to this study approach in that it helped capture information from participants to answer the research inquiry and data analysis.

Nature of the Study

In this basic qualitative study, I explored how the CTE educators perceived their support with professional development to incorporate instructional practices enhancing teaching and learning. Ravitch and Carl (2016) explained qualitative research techniques. Qualitative studies can explore people's circumstances, such as their perceptions and experiences. For instance, I explored how the CTE educators perceived their support with professional development to incorporate instructional practices enhancing teaching and learning. Ravitch and Carl explained qualitative research techniques, such as interviews. According to Ravitch and Carl, realistic explanations and articulation are important qualitative research's important rationales. The semistructured interviews were the qualitative approach that applied to this study. Qualitative studies can explore people's circumstances, such as their perceptions and experiences. According to Barkhuizen (2022), narrative inquiry was the primary focus of the qualitative research, which involved the individuals' narrative of their experiences. Dos Santos (2019) investigated educators' perceptions of factors affecting their instructional choices, applying qualitative approaches such as interviews and coding the data. Disberger et al. (2022) reported that they used a phenomenological case study to explore the experience of novice educators. Disberger et al. described the use of semistructured interviews and coding methods to gather and analyze the data of their studies. Haddad and Stewart (2019) reported using phenomenological approaches to investigate educators' experiences.

Definitions

Career and Technical Education (CTE): The name of employment and technical education applies to an instructional curriculum intended to train students to enter the labor force (Schmidtke, 2017, p. 193). The program of study incorporates job and academic skills to prepare students for employment and careers.

CTE educator: The CTE educators are content professionals who instruct in academic curriculum standardized with a business (Martino, 2021, p. 17).

Outcome Expectation: Lent et al. (1999) outcomes expectations is the view about what will eventually occur upon achievement. The outcome expectation was the expected results anticipated by the self-efficacy views because individuals generally wish for productive results when they believe in themselves and their capacities (Lent & Brown, 2019). Moreover, Lent and Brown (2019) explained that the (SCCT contemplates the outcome expectations as conducive to expected achievement and endurance covertly by the grade of accomplishment ideals individuals establish.

Professional Development (PD): PD has been defined as an organized advancement that essentially targets the educator's acquisition of abilities, knowledge, and qualifications for advancing their students (Güneri et al., 2017). According to Güneri et al. (2017), in post-secondary education, PD applied with the name staff development indicates a method through which staff accomplishes designed and systemized tasks utilizing assistance that the organization offers to strengthen their expert capacities (Güneri et al., 2017, p. 74).

Self-Efficacy: Bandura (1993) wrote that an individual's self-efficacy ideas encourage the way they perceive, anticipate, and encourage themselves, making multiple impacts on emotional, inspirational, intellectual, and choice methods. Lyons and Bandura (2018) explained that self-efficacy ideas were rooted in action and education, connected to self-regulated learning, an intentional plan by a person intended to advance knowledge and achieve one kind. Self-efficacy is the idea of attitudes and tenets about capacity and not part of substantial ability (Donohoo, 2018, p. 327).

Teacher Retention: Teacher retention could refer to educators who remain in the profession (Moser & McKim, 2020). According to Kim et al. (2017), the induction programs intend to mediate the impact of burden and support novice educators in the areas of teaching and organization. Kim et al. wrote that the absence of an adequate introduction to program outcomes in educator's anxiety degree and turnover.

Assumptions

The assumptions of this study are explained in this section. I designed this qualitative study to meet practical and effective criteria essential and vital to gathering the data. I assumed that the participants would understand their involvement in this study once they consented to participate. The informed consent documents indicated the purpose of the study and the participant's roles. I assumed that participants were sharing answers honestly and to the best of their ability in response to the semistructured interview questions. I assumed that data analysis would be conducted to the best of my ability, be thorough, and able to uncover the themes that come from the transcript analysis. I assumed that participant responses would facilitate the data necessary to

answer this research inquiry. It was necessary to assume that participants would be voluntary, would answer honestly, and that their data would be helpful in answering the research question because there is no way to verify that these things are true. Yet the assumptions might be out of my control, participant's contributions participating in the semi-structured interview were necessary to conduct the study.

Scope and Delimitations

I focused on CTE educators' perceptions of support for their instructional practices. This specific focus was chosen because one of the problems identified in the literature is retention and recruitment. Retention may be a problem in practice. Moreover, the literature review indicated that the support for CTE teachers is inconsistent, calling for actions to investigate this phenomenon. ACTE (2020) stated that additional data is needed to comprehend the forthcoming of professionals and their reasons for turnover decisions. Also, Anderson et al. (2018) claimed that PD's demands were obvious for CTE educators to advance their competence. Zirkle et al.'s (2019) study reported consensus about the need to support CTE educators with different expertise and capacity to strengthen their competence to thrive as CTE educators.

My goal with this study was to understand educational practices, professional development, and support perceived by CTE educators. I focused on the CTE educators' perceptions of support for their instructional practices because the literature supports this topic as an area needing more research. The literature review includes authors who called for studies on CTE and included evidence that professional development is needed (e.g., Anderson et al., 2018; Dyar, 2018; Gordon et al., 2020; Hendrix et al., 2021; Lavallee &

Litchfield, 2019; Park & Johnson, 2019; Smalley & Sands, 2018; Stair et al., 2017; Zirkle et al., 2019). The literature also included researchers who identified the issues corresponding to the CTE areas of need concerning practice such as retention, lack of professional development, and inconsistent support (e.g., Anderson et al., 2018; Bassok et al., 2021; Bowling & Ball, 2018; Chey & Ney, 2020; Davis et al., 2018; Dyar, 2018; Gordon et al., 2020; Hendrix et al., 2021; Hughes, 2019; Hughes & Partida, 2020; Lavallee & Litchfield, 2019; MacDonald et al., 2020; Merrill & Lawver, 2019; Miller & Youngs 2021; Park & Johnson, 2019; Saeger, 2019; Smalley & Sands, 2018; Zirkle et al., 2019). In summary, the logical reason for looking at support for CTE teachers is that there is great difficulty in hiring and retaining CTE teachers (Bowen et al, 2017; Bowling & Ball, 2018; Claflin et al., 2019; Devier, 2019; De John & Campoli, 2018; Hasselquist & Graves, 2020; McIntosh et al., 2018; Newton et al., 2020) and it is unclear if they need more support or not.

The population's inclusion defined this study's boundaries. Also, the exclusion criteria helped determine the study's limitations and delimitations. The participants were 10 CTE educators in the United States. Specifically, CTE educators teaching courses in a CTE program of study, which included the following disciplines: (a) barbering and cosmetology, (b) business and finance, (c) business marketing and IT (BMIT), (d) child development, (e) culinary arts, (f) early childhood education pathway, (g) FCS. The U.S. Department of Education (2017) indicated nationwide teacher shortages and the CTE discipline has been identified as a one of the academic disciplines as an area of insufficient supply of educators. They also reported nationwide CTE educators' shortages

for at least the last 20 years. The people that were excluded were supervisors and international teachers. The supervisors were excluded because the literature indicates the need for support for CTE educators suggesting more research to understand their needs and experiences with support (see Devier, 2019; Emerick 2022; Mohammad-Hussain et al., 2018; Park & Johnson, 2019; Saeger, 2019; Williams et al., 2018). The international teachers were excluded due to their location and potential differences in curriculum in another country.

The framework for this study included Lent and Brown's (2019) SCCT. The SCCT framework has five models (University of Maryland, 2020) included in its framework. I used the interest and choice models of the SCCT theoretical framework. The model was most related to this study because it considered career interests that may influence retention. The SCCT was built upon Bandura's cognitive learning theory, seeking to understand learning experiences, interests, self-efficacy, and outcome expectations. The SCCT was a theoretical framework commonly used in CTE research (Schmidtke, 2017). The SCCT theoretical framework might help understand the challenges of CTE and the perceived support of the CTE educators.

Because of the boundaries of this study were focused on CTE teachers in the United States using the SCCT theoretical framework interest and choice models, there was limited transferability of the findings. Transferability depends on the demographics of the participants that would come from all across the country. Makel et al. (2022) stated that providing sufficient details regarding participants, data gathered, and data analysis methods, would enable the audience to assess whether the findings applied to their

situations. The support they were offered varied according to their location, but there would likely be trends in support across the participants that might transfer to other CTE teachers. For others to determine if the findings might apply to their situation, I provided demographic profiles of participants including the type of school they teach in, their content area, number of years teaching, and gender.

Limitations

The possible limitations, challenges, or barriers that I addressed included finding participants to conduct interviews and reliance on virtual meetings. Haddad and Stewart (2019) used the Zoom platform to interview the participants of their study. The recruitment process for this study ended after I reached the number of 10 participants. Also, the school or district CTE supervisors might not agree to invite participants to participate in my research on my behalf. I posted the study invitation on online professional groups for educators. However, the recruitment process was slow and took eight months. While waiting for other participants who willingly wanted to participate in this study, I studied the thematic analysis and coding to ensure I understood the methods. Other limitations, challenges, or barriers I faced was that the semi structured interviews were audio recorded and the Zoom feature camera was turned off. I was unable to capture participants' gestures and facial expressions. Also, I could not capture their perceptions representing others' CTE areas, this study had been limited to the inquiry of this study, that was their perceived support with professional development.

Significance

This study is significant because it could fill a gap in practice so that educational leaders might better understand how well the resources are working to meet the initial goals of the CTE programs to advance teaching and learning. The gap in research about practice informed by peer-reviewed literature authors (e.g., Bowling & Ball, 2018; Chen & Ney, 2020; Hasselquist & Graves, 2020; Hughes & Partida, 2020; Moser & McKim, 2020; Piccott-Bryan et al., 2021; Plasman et al., 2020; Tucker & Hughes, 2020; Yost et al., 2019) include policy and reform, curriculum advancement, CTE teacher's shortages, retention, and inconsistent support with PD for CTE educators. Hence, the gaps in the literature were how to provide consistent support for CTE educators, how PD could strengthen instructional practices impacting teaching and learning, and how PD could improve retention of CTE teachers. Educational leaders might better appreciate the value of these resources concerning their initial plans and gain new insight to meet the needs of CTE educators better. Also, this study might provide insights on future topics of study relevant to the CTE field.

I explored the perceptions, challenges, and support experienced by the CTE educators, which could be necessary to advance teaching and learning. It might help identify PD gaps and more effective strategies and resources that enhance CTE programs and retention of CTE educators beyond PD and collective learning success to better comprehend CTE programs and educators' needs. This study might contribute to the literature by adding to the information and enriching the PD support area for CTE educators. The potential implications for positive social change of this study were that

this study mighty help strengthen administrative support and community relationships (see Tran et al., 2020), increase teaching and learning opportunities, and aid policy reform. It might provide awareness of CTE educators' challenges, and recruitment experiences in that stakeholders may better understand limitations in the organization and the factors that might improve CTE program recruitment**.**

Summary

Chapter 1 provided an overview of specific information describing this study. Chapter 1 was a preamble of the topic of the problem that this study investigated, which was CTE educators are inconsistently supported with PD to implement instructional practices that serve students and support CTE educators to remain in the field. Authors such as Anderson et al. (2018), Gordon et al. (2020), Hendrix et al. 2021, Lavalle and Litchfield (2019), and Zirkle (2019) agreed that CTE educators needed support with PD, while Dyar (2018) and Lavalle and Litchfield (2019) endorsed that support for CTE educators is poor or inconsistent. The purpose was to explore how CTE educators' instructional practices are supported with PD to serve students and support CTE educators to remain in the field.

The next chapter, Chapter 2, includes an introduction to the essential topics found in the literature connected to the theme of this study. Moreover, Chapter 2 provides the key search terms that guided the words used to search in the library database for studies that support the problem of this study in the database and an explanation of the theoretical framework. In conclusion, Chapter 2 includes the review of the literature.

Chapter 2: Literature Review

CTE educators are inconsistently supported with PD to implement instructional practices that serve students and support educator retention. In 2021, Bassok et al. and Miller and Young reported that there was a need for PD programs to support teachers. The literature review identified inconsistencies in PD for CTE educators, the need of PD to support for CTE instructional practices, and the urgency to help with retention issues. These gaps exist in the literature. Research is needed to investigate how PD influences CTE educators indicating PD is needed to enhance the skills of CTE educators (Dyar, 2018; Zirkle et al., 2019). Some of the issues to study in CTE are education for teaching and learning CTE content, instructional approaches, and curriculum planning (Gordon et al., 2020). More studies should be conducted to identify what ways PD impacts teaching, learning, and students' success (Anderson et al., 2018). Future research should be conducted to determine the most beneficial and effective way to conduct PD opportunities (Smalley & Sands, 2018). PD has been encouraged for CTE educators to improve teaching and learning (Asunda et al., 2015; Byrd et al, 2019; Dyar, 2018; Ferand et al. 2021; Graves & Hasselquist, 2021; Hasselquist & Kitchel, 2019; Hendrix et al, 2019; Lavallee & Litchfield, 2019; Serafini, 2018; Stair et al., 2017; Stair et al., 2016; Tripp & Onwbey, 2016). Additional training is needed to equip CTE educators with the skills to teach their students (Draaisma et al., 2018). PD for CTE educators urges them to prepare for expected skills and education, both academic and technical to increase their student's academic performance (Reese, 2010).

But, CTE educators have experienced a lack of PD in training opportunities (Stair et al., 2016). Additionally, the PD for CTE educators has been inconsistent (Smalley & Sands, 2018). When conducting the literature review. I found that researchers indicated the necessity to study PD support for CTE educators to help them advance in teaching and learning. The purpose of this qualitative study was to investigate how CTE educators' instructional practices were supported with PD to serve students and support these remaining in the field. In this chapter, I covered the literature search strategy, and the literature review associated with this study.

Literature Search Strategy

The educational databases I used in this study were ERIC, SAGE Journals, Taylor and Francis Online, Wiley Online Library, Science Direct, Family and Consumer Sciences Journal, Education Science, National Science Foundation, IEEE Xplore, Pro Quest, Emerald, CTE Journal, and Gale Academic. The search terms used in this study were the following: *CTE teacher, CTE instructor, CTE faculty, Technical Education teacher, technical education instructor, technical education faculty, career education teacher, career education instructor, career education faculty, professional learning,* and *professional development.* In addition, the secondary terms used were *continuing education, teacher training, in-service training, faculty development, faculty continuing education, faculty training,* or *faculty in-service.* Lastly, *teacher perceptions, teacher perspective, teacher attitudes, teacher views, teacher belief, educator perceptions, educator perspective, educator attitudes, educator views, teacher education, educator*

education, educator self-efficacy, teacher support, and *learning outcomes* were the terms applied and combined to search for peer-reviewed articles and empirical studies.

Theoretical Foundation

The theory that supported this study wase Lent and Brown's (2019) SCCT. The SCCT is composed of five models (New Vocational Science Findings from University of Maryland, 2020), two of which would be used for this study: the interest and choice models. The SCCT is a model based on Bandura's social cognitive learning theory (SCT), and it was used to contemplate interest development, choice-making, and performance. SCCT is a common theory used in CTE studies in the United States (Schmidtke, 2017). The SCCT and SCT both were learning theories commonly applied in CTE research (See Dos Santos, 2019; Henry et al., 2014; Hirano et al., 2022, Rubenstein et al., 2018; Yeagley et al, 2010). The CTE could apply to this study, but the SCCT was selected because it oversees career development or interest, and this study addressed CTE teacher's perceptions of their support with PD. The SCCT was the theoretical framework this study applied, specifically the interest and choice models of the SCCT.

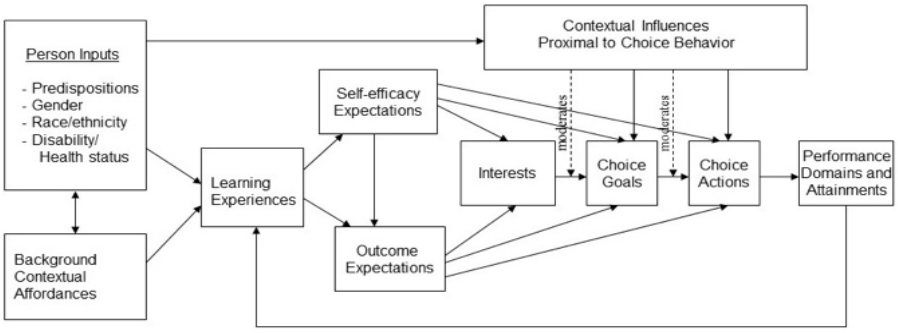
. The basic components of SCCT include individual inputs, background contextual affordances, learning experiences, self-efficacy expectations, outcomes expectations, contextual influences proximal of choice behaviors, and performance domains attainments (see Figure 1). Lent et al. (2019) told that the individuals' perceived importance, competence and expectations were key factors in the decisions they made. The interest, choice goals, and choice actions in the SCCT theoretical framework might act as moderators for contextual influences proximal of choice conduct resulting in the

performance domains and attainments. The components of the interest model of SCCT included self-efficacy, and outcome expectations. Lent and Brown (2019) explained that in the interest model the individual capacity to achieve conducted learning and vocational interest. The interest model might indicate that the atmospheres facilitate circumstances that could produce individuals' attention to engage in particular tasks. The intellectual and individual surroundings might provide circumstances impacting individual's interest.

The components of the choice model of the SCCT included the interest, the choice goals, and choice actions contributing to performance domains and attainments. Lent and Brown (2019) explained that goals help individuals to work and persist succeeding in challenging tasks. The model choice could connect the individuals vocational desire motivating them to advance their competence. The challenges and support might relate to personal objectives that could impact individual attainment, and persistence. Lent et al.'s (1993) quantitative study outcomes with 166 participants indicated that impact of prior achievement on the participants' involvement was powerful anticipator of their participants' math grades, regulated by their self-efficacy. According to Lent et al., prior accomplishment and self-efficacy outcomes expectations anticipated their study participants' involvement to enlist courses.

Figure 1

Integration of SCCT's as shown in Lent and Brown (2019)



Note. From "Social Cognitive career theory at 25: Empirical status of the interest choice and performance models" by R.W. Lent & S.W. Brown, 1993, *Journal of Vocational Behavior, 115(3),* p. 3., Copyright 1993, with permission from Elsevier and Lent.

Application of SCTT in Previous Research

The SCCT theory has been applied in multiple research studies. Research has shown that SCCT can explain individual perceptions and analyze factors related to their job decisions and guided instructional approaches (Ali et al., 2017; Henry et al., 2014; Yeagley et al., 2010). Ali et al. (2017) performed two exploratory quasi-experimental investigations to analyze the general efficacy of an SCCT school based-science career education on SCCT job conclusion and found that for one study participant's math and science self-efficacy increased from standards, Contrary to their first study, participants' math and science self-efficacy was related to cultural race in their second study. Lent et al.'s (1993) results also indicated the effect of prior achievement to engage in math classes of their study participants' interest. Other research has indicated that only

nurturing help beliefs from relatives and friends were significant with professional results (Isik, 2013). Views of assistance may impact educators' capacity for educational practices (Hirano et al., 2022; Rubenstein et al. 2018). Supportive practices and relationships may help individuals to strengthen their capacity (Hirano et al., 2022; Pena et al., 2022). The assistance sense by the individuals might correlate to their desire professional results.

Interest and Choice Models

The interest model includes the idea that self-efficacy anticipated the outcome expectation (Lent & Brown, 2019). For example, teachers' self-efficacy might predict outcome expectation for their teaching ability. With more teaching experience educators had better self-efficacy compared to novice educators (Rubenstein et al., 2018). The outcome expectation of their teaching might reflect better competence, strengthening outcome expectation. The self-beliefs of the individual concerning their skills might have affect outcome expectation. So, self-efficacy might be important for outcome expectation. Self-efficacy could aid in interpreting and advancing multiple scholarly and occupation progress, especially concerns, decision-making, performance knowledge, area of expertise achievement, and comfort self-administration of numerous occupational attitudes (Lent, 2016). The educator's self-efficacy might predict learning outcomes and student's success for the CTE program. Thus, the interest and choice model self-efficacy might relate to outcome expectation because it may anticipate job choice and dispositions.

The interest and choice models could be used to anticipate an individual's desire, achievement, or accomplishment and more substantial elements that interfere with the individual beliefs (Lent & Brown, 2019). This interest and choice models helped as I explored features such gender, years of teaching experience, perceived support that could encourage or discourage participants' interest, and outcome expectations as I collected and analyzed data to understand CTE educators' perceptions of their support for their educational practices. The interest and choice models are used to contemplate intellectual and actions elements such as learning actions, self-efficacy, and learning outcomes. I did not intend to measure self-efficacy for its qualitative nature; however, self-efficacy is an essential component that may be explored indirectly through the actions and perceived support with PD, their professional background pertinent to their experiences, and belief capacity. Self-efficacy could impact the learning outcomes expected from CTE educators to advance teaching and learning. Furthermore, self-efficacy could reflect learning outcomes and impacted the retention of CTE educators.

The SCCT could provide the design to connect and understand the data gathered for this study. The interest and choice models assisted in the development of the interview questions (see Appendix A). The choice and interest model helped me to explore the personal inputs, such as participants' gender, years of teaching experience, and educational background. The choice and interest models also assisted in exploring learning experiences that might inform self-efficacy and outcome expectations. In addition, the choice and interest model helped to understand participants' interests, goals, and actions.

Literature Review Related to Key Concepts and Variables

CTE

CTE programs are educational career preparatory courses taught in high schools and postsecondary institutions. Regional Laboratory Appalachia, the SRI International, and the National Center for Education and Regional Assistance (2020) discussed that researchers had centered their attention on the correlation of student's involvement in secondary and postsecondary CTE programs, and their educational achievements and job prospects. CTE educators are content-specific experts who instruct curriculum aligned with an industry (Martino 2021, p. 17). CTE educators teach academic and job skills correlated industry standards. Each state may have its own criteria and pathways for its CTE programs. In the sections that follow, I review the literature related to (a) CTE, (b) policy and reform, (c) the shortage of CTE teachers, (d) retention, (e) retention of CTE educators, (f) professional development, (g) professional development in CTE, (h) STEM CTE PD, (i) CTE international programs PD, (j) self-efficacy, (k) different support for educators, and (l) justification of literature selection rational.

The CTE program developed from traditional vocational education 2006, which have received federal funding for more than a century (Haviland & Robbins, 2021). According to the U.S. Department of Education (2019), 77% of the high school students who graduated in 2013 had earned CTE credits. There are 16 national career clusters in the CTE curriculum. Some of the CTE clusters are agricultural education, business management and administration, education and training, and health science.

But CTE programs taught in high schools may struggle to retain their CTE teachers, while develop alternatives to strengthen curriculum alignment and training for them. The Department of Education (2019) required that the school districts' CTE programs align curriculum, meet the demands of the job-skills trade, and offer industry certifications. According to the Department of Education (2019), high school CTE programs' expectations were to direct its students to college programs of study or other postsecondary programs that may involve additional specific technical instruction. Moreover, the Department of Education explained that obstacles in the capacity gaps in the United States, generally between workers that urged either a high school diploma, college certificate, or associate degree. The requirement expected for the CTE program may suggest more rigor and alignment to CTE programs resulting in PD for CTE educators.

CTE programs evolved from traditional vocational education into academic clusters and job expertise. Haviland and Robbins (2021) stated that CTE programs are grant-funded and developed. Martino's (2021) study findings call into question the widely accepted idea of workshops to prepare CTE educators. According to Martino, CTE teacher retention is an issue in the nation. CTE educators' needs may change as the CTE programs advance.

Policy and Reform

The Perkins Act provides nationwide guidance or instruction of how CTE programs can use their funds. Regional Laboratory Appalachia, the SRI International, and the National Center for Education and Regional Assistance (2020) explained that a

requirement for states to utilize Perkins funds was to complete an evaluation demonstrating alignment of the CTE programs with job trends, allocating resources to innovative methods that match abilities with job demands. Teachers should know why they need to follow certain rules such as caps on student's enrollment. The Perkins Act standardized the policy and reform of CTE programs in the United States, requiring that CTE programs offer students opportunities to earn industry certifications recognized nationwide (U.S. Department of Education, n.d.). Furthermore, the act mandated that CTE teachers should receive continuing training to enable them better to prepare their student's CTE for jobs and careers.

The objective of Perkins Act was to increase the rigor of the CTE programs by aligning the academic support for the current job demands (Plasman et al., 2020). Specifically, the act targeted the high skills job demands of the 21st century that incorporate STEM education. The budget may allocate funds to inspire innovation and support the alignment of the programs with high-capacity demand in the workforce (Perry, 2019). Thirty-six states used funds to direct PD for educators, directors, and CTE experts (Advance CTE, 2021).

Perkins policy mandates may not have benefitted everyone, as research has shown lack of support for CTE. In the Tucker and Hughes' (2020) study, schools failed to support CTE programs and did not fund them in the same way as other programs. This was a qualitative study with 16 participants. Similarly, research has shown that participants perceived the policies that promote the programs were ignored, there was a lack of understanding of CTE, and there was a poor collaboration between CTE educators

and core-subject educators. In summary, Perkins's policy may not be being implemented in the schools.

According to the Regional Laboratory Appalachia, the SRI International, and the National Center for Education and Regional Assistance (2020), CTE administrators were not aligning their programs in the high school programs in West Virginia, due to a poor understanding of the modern standards. The latest approved act Perkins promotes collaboration; however, a more specific explanation of specific alliance actions, may aid states and regions to recognize changes more evident (Plasman et al., 2020). While it is true that Perkins required training for the CTE, it does not necessarily follow that expectation in some school districts. Perry (2019) observed that the Perkins funds should apply to motivate and help CTE educators. Tucker and Hughes' (2020) study findings reported lack of actions from some CTE leaders indicating they may overlook the policies.

Shortage of CTE Teachers

There is a shortage of CTE teachers(Bowen et al., 2017; Bowers and Myers, 2019; Bowling and Ball, 2018; Claflin et al., 2019; Devier, 2019; Dainty et al., 2011; Disberger et al., 2022; Duncan et al., 2017; Graves & Hasselquist, 2021; Hasselquit & Graves, 2020; Haddad & Stewart, 2019; McCandless & Sauer, 2010; McIntosh et al., 2018; Moser & McKim, 2020; Newton et al., 2020; Pullay & Tibbitts, 2022a; Smalley & Sands, 2018; Tran et al., 2020; Werhan & Whitbeck, 2017). There was a challenge to certify CTE educators (Didier, 2018). CTE struggle to find educators, due to a lack of foundational classic CTE training in colleges and secondary schools (Bowling & Ball,

2018). Bowling and Ball (2018) performed an experimental analysis reflective study of coherent beliefs of teacher's certification opportunities. They analyzed the literature about alternative certification in CTE and agricultural education and found that many of the educators who earned their teaching certifications in alternative programs had the vocational abilities but lacked the essential skills to manage their classrooms. Devier (2019) conducted a quantitative study to investigate CTE educators' shortage applying national archival data from each state of the United States, applying a binary logistic regression was applied to examine the data. Alternative certified educators required PD responding to their needs (Bowling & Ball, 2018; Devier, 2019). Devier found that CTE alternative certification/licensure qualifications did not predict if there would be a CTE educator shortage. Devier also found that the academic degree of the teacher did not predict CTE educator shortage. The shortage of CTE educators may challenge the leaders to consider PD to enhance, alternatively, certified educators' pedagogical capacity. Still, the CTE alternative certification programs may not anticipate CTE educator's shortage.

The shortages of CTE educators may result from the difficulties for certifying CTE teachers and closure of educational programs to prepare CTE educators. The influences that lead to educator shortages could be multiple. McIntosh et al. (2018) authors explained factors that influence educators to leave the profession, which may cause teacher shortages. McIntosh et al. (2018) focused on investigating agriculture educators who left the career. McIntosh et al. (2018) was a quantitative study. The participants who completed the survey for McIntosh et al.'s study was 118. The results of the survey in McIntosh et al.'s study indicated that 89 out 114 thought-out leaving the

teaching profession. Disberger et al. (2022) performed a phenomenological case study to investigate novice educators' experiences during their first three years of teaching. Hasselquist and Graves (2020) perform a qualitative study to analyze elements related with CTE educator's retention in a rural area of a Midwestern state. The total number of participants in Hasselquist and Graves's (2020) study was 4. The participants of their study were four CTE educators, three agricultural educators and one FCS educators (Hasselquist & Graves, 2020). Hasselquist and Graves (2020) found four themes associated to teacher's retention. The CTE teacher shortages may affect teaching and learning, urging action to identify factors impacting educators' needs.

According to Hasselquist and Graves (2020), the four themes that rise from the data were (a) setting boundaries between individual and professional time, (b) establishing limits, (c) creating PD help support, and (d) advancing in the classroom. Similarly, Disberger's et al. (2022) informed that four main themes emerged from the data gathered for their study (a) program management, (b) community, (c) personal, and (d) school (p. 119). Some of the difficulties experienced by their study participants were evaluation and success, curriculum and plan student's interest, workload, and allotment (Disberger et al., 2022 as shown in Table 1, Table 2, and Table 3 in Disberger et al., 2022, p. 127). Haddad and Stewart (2019) focused on investigating how School-Based Agricultural Education (SBAE) educators move to other program in SBAE CTE program keeping them in the profession, helping the program's effective retention. Disberger et al. (2022) found that educators participants searched for consistent support on the nature of being an agriculture educator and did not get a response. Disberger et al. (2022) wrote

that the sample size of their research was eight novice agricultural educators and ended with six novice agrarian educators. In Disberger's et al. (2020) study one participant left the teaching profession during the second year of teaching. McIntosh et al. (2018) evaluated differences between traditional certified educators and alternatively certified educators. McIntosh et al. (2018) found that conventional and alternatively certified educators left the career because of anxiety-related to their jobs to leave the job. Besides, they left work because of their low salary. Disberger et al. (2022); Hasselquist and Graves (2020); Haddad and Stewart (2019) were qualitative studies applying phenomenological methods. The CTE educators may feel overwhelmed due to some job duties, leaving the profession causing issues with retention. The qualitative methods applied in Disberger 's et al. (2022) study were observations, semi-structured interviews, and three focus groups. Disberger et al. (2022) informed that the data was coded, and four themes emerged. Haddad and Stewart (2019) investigated Haddad and Stewart's (2019) study was a qualitative with eight SBAE educators. Haddad and Stewart (2019) found that educators' motivation factors for SBAE migration were various. Haddad and Stewart (2019) wrote that they interviewed the participants via the Zoom platform. According to Haddad and Stewart (2019), one of the educators' reasons for migration was their curiosity about how the new SBAE program contributed to moving as a favorable option. Haddad and Stewart (2019) found that some of the reasons to migrate were administrative support, salary, community, time, and family. Hasselquist and Graves (2020); Disberger's et al. (2021); and Haddad and Stewart (2019) explained multiple factors experienced by their study participants affecting retention issues.

There is a shortage of FCS educators. The FCS organization explained its efforts and actions to help with recruitment of FCS educators (Duncan et al., 2017). Werhan and Whitbeck (2017) investigated if there were shortages of FCS teachers in the state of Kansas and how leaders gathered data to submit their reports about teacher shortages, and they surveyed 236 superintendents from Kansas state and 11 618 nationwide superintends (Werhan & Whitbeck, 2017). Werhan and Whitbeck (2017) found that their participants of the study, 34% reported that it was a challenge to staff FCS educators; however, they did not inform that there was a shortage of FCS educators. Only 55% of the nationwide superintendents who answered the survey said that it was challenging to staff FCS educators; however, 56% reported that they did not inform FCS educators of shortage data to their corresponding Federal state (Werhan & Whitebeck, 2017). Werhan and Whitbeck (2017) found that factors for the inadequacy of FCS teacher report data were (a) many diverse offices, the did the report partially, (b) the information received by the superintendents was not explicitly indicating the reasons for the vacancy left unfilled, (c) the process to examine the total of educator's vacancies to the total of applying forms submitted considered for shortage information. not all states were informing with accuracy about the FCS educator shortage (Werhan & Whitbeck, 2017). Moreover, Werhan and Whitbeck (2017) discussed how they applied data to determine FCS educators' lack and the impact of not reporting accurately on policy, recruitment, education, and FCS educators' opportunities. Werhan and Whitbeck (2017) suggested that every state identify the CTE shortage educators individually by the field for exacted and instrument tools. The shortages of FCS may not be accurately reported by state

administrators. The CTE teacher shortages in our nation may reflect in the challenges to certify CTE educators, reduction in college foundational CTE training, and inconsistent support influencing their retention.

Retention

Of all the issues surrounding retention, the most basic question is are teachers being retained? In their study, Bassok et al. (2021) conducted a research that looked at Louisiana teachers, specifically ECE teachers, and investigated their retention issues. Their overall findings were that they demonstrated that early childhood educators (ECE) who left the profession had low-grade child relationship capacity. Bassok et al. (2021) wrote that their study participants were 5,900 ECE in 1,500 childcare, school-based, and head start programs. Bassok et al. (2021) explained that their study measures included administrated data information from the Louisiana Department of Education (LDOE). The data were analyzed using the quality rating and improvement system (QRIS). According to Bassok et al. (2021), the results of their study showed that (a) more than a third of educators teaching in the year 2017 -2018 did not teach the year after 2018, (b) ECE teacher turnover in the state of Louisiana was more extensive in comparison with other states, (c) the ECE educators who left scored low in the classroom evaluation measure, and (d) the urgency for particular actions to decrease the significant differences among ECE expert support and aid for ECE educators. The strategies to retain educators may need better approaches. Besides, Olson Stewart et al. (2021) conducted action research to explore approaches to support educators and help with retention in the state of Arizona. The total number of participants in Olson Stewart et al. ‘s (2021) study six were

K-8 school novice educators without teaching experience. I will discuss Olson Stewart et al. ‘s study in the section of support of this literature review. Various models to support retention have been created nationwide and internationally (Olson Stewart et al., 2021). Some of the basic approaches to retain educators included PD, mentoring programs, and induction programs (Olson Stewart et al., 2021, p. 52). Olson Stewart et al. (2021) reported that 83 percent of their study participants were retained, however, one participant left teaching. Olson Stewart et al. (2021) and Bassok et al. (2021) study findings indicated the urgency for supporting educators with resources and PD to help with retention issues. Bassok et al. (2021) discussed that the educator's turnover provoked alarm that elevated considerations in PD were intensively jeopardized by educators' turnover every year. Bassok et al. (2021) concluded that their study implied that policy efforts in the ECE may not be adequate without attention to educator attrition. Likewise, Bassok et al. (2021) explained that if ECE educators left the profession, PD and mentoring would not accomplish the expected results. Teacher turnover could induce considerable trepidation.

The next issue in retention is whether or not you can predict if teachers will be likely to be retained. If one can anticipate what factors indicate teachers will or will not be retained, then you may avoid unnecessary conflicts and lack of retention. One study investigated these anticipators of retention. Miller and Youngs (2021) focused on investigating powerful anticipators of keeping first-year educators (FYEs). Miller and Youngs (2021) found that FYEs ideas of the colleagues with their support were the powerful anticipators of teacher retention. More, Miller and Youngs’ (2021) study

findings demonstrated that there was correspondence between FYEs and their colleagues for which they had tenacious connection. Despite, Dos Santos's (2019) study found that helpful administration and prepared classroom provided impact elements in the areas of retention and recruitment. Moreover, Dos Santos (2019) found no association between salary and retention. The findings in Dos Santos (2019) study indicated that the motive for participants of the study to agree to teach in Fiji was the support from who perceived by the participants.

Mentoring programs are one way to improve retention if they are implemented effectively. This was not the case in the next study. Miller and Youngs' (2021) study was a quantitative study with 159 participants. Toombs and Ramsey (2020) investigated the descriptions of expert committee's perceptions about the effect of a poor organization mentoring program for Oklahoma first-year novice SBAE educators. Toombs and Ramsey's (2020) study found that an issue impacting retention of the novice educators was the strong relationship built with their coworkers. Also, Toombs and Ramsey (2020) found that participants of their study agreed that mentoring programs should demonstrate school environment, education capacity, establish tutoring relationships, and teacher retention (p. 50). They used Qualtrics in their quantitative study with 42 participants (Toombs and Ramsey, 2020). Although the specialists committee acknowledged Oklahoma's introduction-year SBAE educators generally used unofficial tutoring, they recognized the deficiency of introductory actions (Toombs and Ramsey, 2020). The issues with recruitment and retention may concerned educational leaders.

In contrast to Miller and Young (2021) the next study did find mentoring programs to be effective. De Jong and Campoli (2018) investigated whether educational program mentors for elementary school educators reduced the turnover between early career educators. De Jong and Campoli (2018) found that having mentors for the academic program mentors for elementary school educators related to a significant decrease in early-career teacher turnover and could be beneficial for urban schools. However, a limitation of their study was that they did not analyze motives for turnover in a particular setting, they examined information from the school and staffing survey from 2007 to 2008 (De Jong & Campoli, 2018). De Jong and Campoli (2018) and Bassok et al. (2021) concluded that support for educators was crucial to help with the retention issue. The professional aid may help reduce the educator attrition by supporting the educator's decisions to remain in the educational field. By demonstrating practical options to retain CTE educators, Bassok et al.'s (2021) suggested that PD may help with teacher retention problems. The results of Miller and Young (2021) contradict Toombs and Ramsey's (2020) conclusion that mentoring programs were practical. Still, retention and support for CTE educators were problems identified by the authors.

Synthesis of Retention Research

When we discuss retention, we need to consider the basic question of whether or not teachers are being retained. Multiple authors addressed various topics in the research literature on retention. Bassok et al. (2021) overviewed of the problems of keeping ECE teachers in Louisiana. In this extensive strong study, Bassok et al. (2021) were able to come to several conclusions. Bassok et al.’s study strong conclusions may support

training teachers may help with retention problems. Olson Stewart et al. (2021) wrote that teacher retention was an essential issue experienced nationwide; states, such as, Arizona experienced challenges in staffing and retaining teachers. The most important seem to be that teachers are not being kept at rates similar to other states; besides, the low-performing teachers are the ones who are leaving.

There is a question that some researchers are asking of whether or not they can anticipate if teachers will be retained. Some of the elements that may impact retention include more support for educators and school climate. Miller and Youngs (2021) demonstrated that if the FYEs' had positive perceptions of their colleagues, they will be more likely to stay to be retained. Chaney et al. (2020) and Dianty et al. (2011) discussed that the importance of offering support to the educators during their first years of teaching. These positive relationships were shown to support FYEs and improve retention. Chaney et al. (2020) conducted a quantitative study to examine new teachers (within one to three years of teaching experience) to analyze participants' experiences with support for their instructional practices during their first teaching years. Chaney et al. (2020) found that educators' views of demand for introduction assistance were commonly outside of what induction programs offered. The total number of participants in Chaney et al. (2020) study was 170 middle school educators who taught math or English subjects from a sample of 1809, 889 who were novice educators, 321 answered the questionnaire, and 170 were eligible for the study. The measure was a survey to inform about the support provided during their initial years of teaching. The American Association of Public Opinion Research applied to analyze the data (AAPOR, as cited in

Chaney et al., 2020). Chaney et al. (2020) reported using logistic regression samples to anticipate the participant's perceptions of support. Chaney et al. (2020) findings indicated that new teachers who informed that they had experience in private or other public schools in the district reported being ready to manage their classroom and apply instructional approaches but not feeling prepared to plan lessons. This finding could imply that the teacher's support may be specific to each individual and not general. According to Chaney et al. (2020), their study findings revealed that most of the support perceived and received by the study participants was from mentor teachers. They did not have information about their participant's college training (Chaney et al., (2020). The frequency of the support determined participants' perceptions of the support received. Chaney et al. (2020) concluded that more research identifying educators' specific needs support was urgent. Similarly, Dos Santos's (2019) study showed that support in different ways influences retention, specifically administrators support, and well-equipped classroom supported retention. The anticipators for retaining educators include relationships with their colleagues, administrator support received, and classroom well-equipped.

Other elements that may be a retention anticipator such as connection with the school, classroom climate, relationship with administrators, and easy adaptation to a similar culture (Dos Santos, 2019). In the same way, Dos Santos (2019) focused on investigating international school educators' teaching experiences regarding their career knowledge and retention ideas. The participants in Dos Santos' (2019) study were Australian educators informing that they decided to teach in Fiji because of the sense of

community integration. According to Dos Santos (2019), if the participants did not feel connected and supported in the school they may leave. Dos Santos (2019) found that educators' perceptions of the administrators had a constructive and supportive approach, and the administrators provided excellent classroom feedback. In summary, retention anticipators may include constructive administrative support, well-equipped classrooms, cultural identification, and community identification. Briefly, the common findings of Bassok et al. (2021); Chaney et al. (2020); Dos Santos (2019); Miller and Young (2021); Olson Stewart et al.'s (2021) studies were that administrative support and school climate may aid with retention problems.

In order to improve retention, many schools attempt to implement mentoring programs. The following two articles show divergent results for mentoring programs. Miller and Young (2021) found that a first-year mentoring program was deficient and did not improve retention. This study only had 49 participants in a quantitative study, so it is unclear if its findings were reliable and valid. They did appear to have a consistent thread that the program had deficiencies. In contrast, De Jong and Campoli (2018) report studies that demonstrate the effectiveness of mentoring programs for retaining early career educators.

Retention of CTE Educators

The literature indicates several anticipators of retention for CTE educators in particular. Dainty et al. (2011) conducted a quantitative study to investigate elements impacting the retention of FCS in the state of Kansas. The total number of participants surveyed were 448 high school FCS educators excluding 66 FCS who were part of the

pilot study. Dainty et al. (2011) found that some of the elements influencing FCS retention were educators' dedication, relationships, educational training, relationships, and administrative support. According to Dainty et al. (2011), the FCS who participated in their study indicated that the initial support for novice teachers was important to retain them. Dainty et al. (2011) suggested that their study results implied that alternatives to engagement and support novice teachers should be considered to help with retention. Similarly, Moser and McKim (2020) investigated views of four factors of connectedness and professional commitment out of the representative of SBAE educators, including standards as the relation among professional responsibility. Moser and McKim (2020) found that school connectedness was a high anticipator of professional commitment, but the participants of their study indicated that there was poor school connectedness. Also, Moser and McKim (2020) found the statistical significance of SBAE educators' association with colleagues and professional commitment, can contribute to retaining teachers. The total of participants in their quantitative study were 207 educators from a sample size of 705 educators (Moser & Mc Kim, 2020). They concluded that there was an urgency for supporting the SBAE educators to nourish connections with their schools. PD could encourage relationships and aim for professional commitment helping with retention issues. Park and Johnson's study (2019) demonstrated that additional anticipators for retention exist. Park and Johnson (2019) identified additional anticipators for retention such as PD actions. Park and Johnson (2019) investigated association among job contentment, commitment, and motivations to leave the CTE health science educators in Texas. They reported that they analyzed 249 feedbacks from the participants of their

study. Moser and McKim and Park and Johnson's studies were both quantitative studies. PD could aim to retain CTE educators. Also, PD may encourage educators' professional commitment while fostering their sense of connectedness to their schools.

Chen and Ney (2020) discussed five approaches to improve CTE teacher recruitment and retention through PD. It is unclear that this is a peer-reviewed article. However, they reported on their research directly on the topic of this study. According to Chen and Ney (2020), their analysis of nine interviews with administrators, two industry experts, and six focus groups with CTE teachers (Chen and Ney, p. 15) determined general topics of needs. As a result of their study, the five strategies to increase CTE recruitment through PD were the following: (a) increased awareness among faculty staff about CTE, (b) invest in building CTE PD differentiation alongside industry-specifics sectors, (c) develop more effective professional support systems, (d) increase CTE value, and (e) engage institutions of higher education. These approaches are common urgent themes identified by Chen and Ney (2020) resulting from their study findings. The authors listed these approaches as ways that could anticipate and benefit CTE teachers' retention.

One of the needs topics was creating CTE PD corresponding to the CTE educator's needs and growth chances. (Chen & Ney, 2020). Chen and Ney (2020) found that administrators experienced difficulties in facilitating quality PD due to the inaccessibility of business partners. Furthermore, Chen and Ney reported that their study's findings indicated that CTE educators urged more profound education on the subject and instructional strategies for diverse and unique student populations. Chen and

Ney (2020) concluded that the obstacles identified in their research for CTE teacher shortages were mixed. On the other hand, Kohli (2019) explained that one of the findings of the study was that the educators who participated in the research established critical PD as a mechanism of endurance and acknowledgment, enhancing their ethnic education in an encouraging and communicative society. Kohli (2019) conducted a study to investigate female educators' experiences who perform unofficial and official roles in civil rights. Kohli's (2019) study was a qualitative investigation with 11 participants. Snowball sampling was applied to recruit the study participants (Kohli, 2019). Also, Kohli (2019) reported that the interviews were the method to gather data for the study. Kohli (2019) concluded that critical PD could help with retention. PD could reinforce understanding of challenging educational and societal trends. Both authors (Chey & Ney, 2020; Kohli, 2019) discussed that PD could advance educators' capacity and help with retention.

Pulay and Tibbitts (2022b) conducted a quantitative study to investigate FCS educators' content in their classroom area and discover if there was an association between their efficacy and their classroom setting area as a mechanism to keep and hire FCS educators. The framework underlying the study was a theoretical framework. Similarly, Saeger (2019) focused on investigating educators' contentment with CTE teacher preparation programs (TPP) after less than five years they complete the program, compared to their belief before completing TPP programs. In Pulay and Tibbitts' (2022b) study, the number of participants was 126 interior design educators who taught interior design from Oklahoma. They reported using a survey to gather the data for their study.

The measures were the Likert scale and Spearman's association to discover classroom contentment (Pulay & Tibbitts, 2022b). Pulay and Tibbitts (2022b) informed that they analyzed their study's data with IBM statistical tests, specifically Statistical Package for Social Sciences (SPSS version 24). Results showed that 70% of their study participants were content with their classroom setting and believed that their classroom setting area increased teaching. Pulay and Tibbitts (2022b) concluded that their study participants informed overwork tasks. However, there was no proof of a significant connection between typical work duties and their classroom setting (Pulay & Tibbitts, 2022b). Likewise, Saeger (2019) examined the connections between educators' satisfaction with the CTE teaching profession found in the literature. Saeger's (2019) study was quantitative with 117 participants. Saeger (2019) wrote that the longitudinal study used surveys to gathered data from the participants of the study. Saeger (2019) found no statistically significant difference in program contentment between program graduates and postgraduates. Saeger's (2019) study's findings concluded no significant association between the happiness of program completers of those employed as teachers and those who have left the teaching profession, both groups were evenly contented.

Some researchers (Claflin et al., 2019; Bowen et al., 2017; Saeger, 2019) studied the factors that interfere with the CTE teacher's decisions to stay in the education field. The literature indicated that more research is needed to investigate CTE educators' support, interests, and resources perceived needs. A study focused on investigating the rationale of CTE educators that leave the educational field. Claflin et al. (2019) found that significant predictors of turnover were the higher levels of work experienced by the

CTE teachers conflicting with work-family (Claflin et al., 2019, p. 132). Claflin et al. (2019) researched the reasons for change motives and work-family disagreement of CTE educators in the state of Oregon. Claflin et al. (2019) found that educator's informed motives for leaving were: (a) to move to an administrative position, (b) for personal reasons such as health, (c) to change teaching subject areas, and (d)for a more desirable job opportunity. Claflin et al. (2019) was a quantitative study with 194 participants. Similarly, Saeger (2019) examined the connections between educators' satisfaction with the CTE teaching profession found in the literature. It follows, then, some anticipators of retention, such as engagement and support, professional commitment, and connectivity with schools, may improve teacher retention; these factors may still need attention, investigation, and careful analysis. Thus, PD considering CTE educators' professional growth areas and social-emotional learning may be necessary; partnering with post-secondary institutions may help leaders enhance PD's diverse CTE educators.

Synthesis of Retention of CTE Educators Research

The synthesis of the retention anticipators section is that several things have been identified as anticipators including school connectedness, relationship with colleagues (Moser & McKim, 2020), PD and job contentment (Park & Johnson, 2019). Indeed, PD has been shown as a retention anticipator by several authors; Kohli (2019); Chen and Ney (2020) both showed that PD could help with retention. Indeed, Kohli (2019) found that critical PD was necessary and could support retention. According to Chen and Ney (2020) study, their study findings revealed that five PD approaches could benefit retaining CTE educators. These approaches to retain CTE educators included awareness

of CTE between faculty, create different PD parallel with the particular standards of the industry for each CTE curriculum, create genuine PD assistive organizations, and appreciate the importance of CTE, and collaborate with postsecondary education organizations. However, the administrators who participated in their study faced challenges to provide PD for their CTE instructors (Chen & Ney, 2018). In summary, PD can help retention according to many studies, but the PD may not be available.

Other authors discussed different anticipators for retention, specifically possible associations between classroom setting, self-efficacy, and educators' satisfactions. Pulay and Tibbitts' (2022b) study indicated that classroom settings influence educators' teaching attitudes. Pulay and Tibbitts (2022b) found an association between classroom setting and retention. Moreover, their study participants expressed beliefs that their classroom setting influence their teaching dispositions (Pulay & Tibbitts, 2022b). In divergent findings regarding other anticipators Pulay and Tibbitts (2022b) informed that there was no crucial evidence to indicate anticipator value of work duties and classroom setting. Also divergent was the finding by Saeger (2019) who found no difference between the educators' program satisfaction and those who stay or left the teaching profession. Overall, there is some evidence that the educators' degree of contentment with their classroom settings and their competence may impact their teaching and willingness to be retained, but there is also evidence that contradicts this and found satisfaction did not predict attrition.

Multiple additional factors may conflict with the CTE decision to remain to teach. These factors could include overworking tasks, family, health issues, promotion,

and opportunities to change subjects (Claflin et al., 2019). Claflin et al. (2019) found that the most significant anticipators for educators leaving the profession were the overworking tasks and family. Furthermore, Claflin et al. (2019) mentioned that their study participants expressed that overworking task, family, health issues, promotion, opportunities to teach other subjects as factors conflicting with their options to stay in the profession.

In summary, there are several retention anticipators including school connectedness, relationship with colleagues (Moser & McKim, 2020), PD, job contentment (Park & Johnson, 2019), associations between classroom setting, self-efficacy, and educators' satisfactions. In contrast there is also research on aspects that work against retention including overworking tasks, family, health issues, promotion, and opportunities to change subjects (Claflin et al., 2019). Different circumstances may affect teachers' retention.

Professional Development

PD could be a mechanism for advancing educators' teaching skills to promote education. Brand (2020); Davis et al. (2018); Eroglu and Özbek (2021); Hughes (2017, 2019); Hughes and Partida (2020); Kramarski and Heaysman (2021); Sabin et al. (2018) agreed that PD advanced teaching and learning. According to Eroglu and Özbek (2021), PD tasks at institutes were essential in increasing instruction conditions. Eroglu and Özbek (2021) performed a quantitative study with 322 educators from different departments, including vocational education. In their study, Eroglu and Özbek (2021) found that the measure of teachers' perceptions was trustworthy and accurate for the tool

they developed to evaluate features of schools that help PD effectiveness. Eroglu and Özbek's (2021) study results showed that the Cronbach alpha coefficients measured were *.91* for manager aid, *.74* for organizational assistance, and *.92* for the sum of the measure. Eroglu and Özbek (2021) concluded that the big points determined that features aim at educators of institutions impacted educator's ideas of engaging in PD. The needs of the educators should be considered to plan effective PD for educators. Kramarski and Heaysman (2021) investigated the impact of self-regulated learning (SRL) and self-regulated teaching (SRT) threefold approach. Their study participants were educators who participated in SRL and SRT PD (Kramarski & Heaysman, 2021). The total number of participants was 57 educators and their students. Kramarski and Heaysman (2021) found that the educators who participated in their study improved their SRL-SRT resulting in their student's success. However, the SRL and SRT conceptual model was general, not specific to a field or academic content (Kramarski & Heaysman). The authors mentioned above agreed that PD might influence educators' capacity to improve teaching and learning.

Other authors (Hicks et al., 2022; TeKippe, 2020; Castillo et al., 2018; Doyle et al., 2018; Hales, 2017) researched the ways PD impacted educator's instructional practices. Castillo et al. (2018) performed a mixed-method study to investigate research in the USA targeting the multitiered system of supports (MTSS) to comprehend and identify diverse ways that educators participate in PD plan on MTSS and its productiveness. The sample size of Castillo et al.'s study included 1997 to 2018 research, that involved K-12 educators who participated in PD to incorporate the MTSS. Doyle et

al. (2020) investigated the extent to which features of PD related to increment educator subject knowledge (ESK) and knowledge of student misconception (KOSM) of novice teachers who attended summer PD. Doyle et al. (2020) found that the median ESK obtained was statistically significant ($p < 0.001$), and the KOSM was not statically significant. However, Doyle et al. (2020) reported that the term used for creating curriculum tasks was adversely connected with the advance in ESK ($p < 0.05$) and KOSM ($p < 0.05$). Doyle et al.'s (2020) study was quantitative. The total number of participants was 1858 educators. Doyle et al. (2020) informed that they used pre- and post-surveys and applied a *t-test* to analyze participants' responses. Overall, Doyle et al. (2020) found that the absence of significant advancement in KOSM worried them since their study participants acknowledged that the PD program intended to increment the educational understanding.

PD urged to be developed based on the educators' demands to take advantage of the positive results. Davis et al. (2018) investigated 4 Google computer science (CS) PD outcomes from 2014, 14 CSPD in 2015, and 36 CSPD in 2016 for educators who participated in Google CSPD from the United States of America (USA) and Canada (CA). Davis et al. (2018) found that the CSPD assured educators' capacity for CS education. Also, Davis et al. (2018) found urgency for investigating various options to reach educators' demands of an ample area of subjects and the difficulties to adjust. Davis et al. (2018) informed that they examined a total of 19,989 pre and post questionnaires between the years 2014 and 2016. Moreover, Davis et al. (2018) found that the outcomes of the 2015 and 2016 questionnaires aid the effects of the 2014 examination results.

Davis et al. (2018) concluded that the model of the CSPD was logical and produced positive results in helping educators and students reduce educational challenges. Davis et al. (2018) reported that they did not see a change of significance demonstrated for self-efficacy. Similarly, Makopoulou et al. (2021) explained that in their study not all the participants demonstrated increased self-efficacy in the additional sections. Davis et al. (2018) and Makopoulou et al. (2021) investigations showed PD's advantages to support educator's instructional abilities.

Makopoulou et al. (2021) conducted a quantitative design study to investigate the effect of a continuing PD program on the self-efficacy of their study participants. The framework underlying the study was a conceptual framework. Participants were physical education educators and educators' assistants. Makopoulou et al. (2021) wrote that data for their research was collected in three phases. Makopoulou et al. (2021) wrote that for the first round of collecting their study data, there were 1533 participants who started the continuing PD, 1432 at the end of the six hours course, and 149 between three to six months after PD participation from elementary and secondary schools in England. Makopoulou et al. (2021) discussed that continuing PD created to advance educators' staff self-confidence and ability to integrate all students into physical education. The measures in Makopoulou et al.'s (2021) were courses planned by professionals in inclusion and self-efficacy, demographic, and school inventories were created. The data were analyzed with Proc Mixed in the statistical analysis system (as cited in Makopoulou et al., 2021, p. 788). Makopoulou et al.'s (2021) study results showed that age and gender did not influence participation in continuing PD. According to Makopoulou et al. (2021),

the study outcomes revealed that participants' self-efficacy augmented meaningfully. Also, Makopoulou et al. (2021) found that educators with teaching experience range from 5 to 15 advance attending the continuing PD. Makopoulou et al. (2021) concluded that the PD planning consideration should include practical education experiences. Conversely, Davis et al. (2018) explained that the participants of their study had the chance to think about their issues and skills through the PD to show themselves that they had advanced. According to Davis et al. (2018), 64 percent of the educators reported incorporating at least 50 percent of the content learned in the PD into their lessons. PD designed to help educators improved needs may help to improve teaching and learning. Davis et al. (2018) discussed that the questionnaires were analogous. Davis et al. (2018) discussed that the in-person PD fomented a better sense of union than the networked PD. Despite this, Davis et al. (2018) found that their examination outcomes indicated that the educator's issues were keen to advance compared to their measures of self-efficacy, outcome expectations, and perceptions. PD may be more effective in assisting educators if they assert their specific needs because it may raise motivation to integrate concepts learned into their classes.

The resources available to the educators may not be enough to satisfy their content with the professional and instructional practices. Pulay and Tibbitts (2022a) investigated whether interior design subject was instructed, and specific topics of the subject taught in the high schools in Utah, Idaho, and Washington states. Pulay and Tibbitts (2022a) found that the teachers took one class of interior design, taught the content, then they would use aid if accessible. McDonald et al. (2020) and Merrill and

Lawver's (2019) studies demonstrated the need for considering the attention to the nutrition topic of study. McDonald et al. (2020) conducted an experimental analysis of education periodicals about food education, determining gaps, and suggested guidelines for the next investigations. The sample of McDonald et al. (2020) was 36 peer-reviewed articles from the years 2010 to 2019. In their study, McDonald et al. (2020) found that the publication of articles on food preparation had descended. The findings of McDonald et al.'s (2020) study implied that there was an urgency for studies in the area to be more carefully led by current theories and scientific accuracy. Moreover, McDonald et al. (2020) explained that, in general, the proof from their examination showed that few food preparation education periodicals implied an absence of accuracy.

Educators could benefit from collaborating with FCS extension programs to support their practices. The FCS extension programs could facilitate educators with more mechanisms and materials that might be challenging to get because of a lack of funding in the school districts (Holland & Coleman, 2017). The outcomes of a team collaborative effort between the University of Maryland Food Supplement Nutrition Educational and the FCS department of one public school district in Maryland (Holland & Coleman, 2017). According to Holland and Coleman (2017), the school district and the postsecondary education developed a collaborative association to ensure that FCS educators were prepared to teach nutrition to their students. Holland and Coleman (2017) reported that in a period of 3 years, 20 FCS educators, including child development instructors, which is a CTE program of study, participated in eight workshops each

month. The participants received materials and resources for instruction and PD credits granted by the state department of education.

Hughes and Partida (2020); Hughes (2017, 2019) researched on PD about metacognitive awareness (MA). According to Hughes and Partida (2020), quantitative information results showed the study participant's poor understanding of instructional subject education and knowledge of cognition (KOC). Hughes and Partida (2020) informed that their study had 11 participants, STEM education trainees from California. Hughes and Partida's (2020) mixed-method study showed the urgency of additional time to address participants' understanding of instructional subject education and KOC.

In the year 2017, Hughes investigated MA of technology and engineering 6th to 12th grade educators throughout their teaching actions. Hughes (2017) used a qualitative approach to comprehend participants ' degree of knowledge of engineering plan subjects and the skills to instruct these subjects. Hughes (2019) conducted a study to examine the urgency for including methods of MA inquiry to advance metacognitive knowledge in the educational areas of technology and engineering. Hughes (2017) found that the participants of the three groups had their individual MA knowledge while teaching, some participants demonstrated average to great degree of MA, specifically the participants who completed the PD. Hughes (2019) found that the groups who completed the PD demonstrated better MA capacity.

The sample size of Hughes' (2019) study was 21. The sample size of Hughes' (2017) study was 18. According to Hughes (2017, 2019), the total participants of their study were mixed to create 3 groups considering their participation and completion of

PD. The names of the PD utilized for Hughes' (2017, 2019) study were Transforming Teaching through Implementing Inquiry (T212) and the National Board for Professional Teaching Standards PD. Hughes (2019) informed that the instrument used in their study was Metacognitive Awareness Inventory (MAI) to gather quantitative information and the Kruskal-Wallis test to compare independent samples. Hughes (2019) reported that the Kruskal-Wallis examination indicated that MA ($p < 0.05$), regulation of cognition ($p < 0.04$), and KOC ($p < 0.43$), were statistically significant. Divergently, Hughes (2017) informed that semi-structured open-ended interviews applied to the study, and they coded the data of their study. The MAI based on regulation of cognition (p. 29) applied to create the interview questions (Hughes, 2017). They recorded and transcribed the interviews (Hughes, 2017, p.31). In 2017, Hughes explained that two expert coders analyzed the data gathered of the study. Hughes (2017) concluded that PD incorporating MA effect teaching and learning. Consequently, Hughes' (2017, 2019) studies may indicate that PD integrated with MA helped benefit teachers' capacity. Overall, these studies' outcomes may mean that PD advantages teachers' skills and instructional practice.

According to Widayati et al. (2021), educators may perceive the PD differently. Widayati et al. (2021) conducted a qualitative study to investigate vocational educators' views of continuing PD in Indonesia. Widayati et al. (2021) qualitative study had six vocational educators. They applied semi-structured interviews to gather the data of their study (Widayati et al., 2021). In their study, Widayati et al. (2021) found that the educators who participated in their study needed PD to improve their expertise. Gore and Rickards (2021) investigated why veteran educators might oppose engaging in PD by

studying their reaction to a new research-based team mechanism named Quality Teaching Rounds (QTR). Gore and Rickards's (2021) qualitative study found that the participants engaged in the QTR offered their chances to improve instructional aspects, regardless of initial doubts they admired being asserted. Gore and Rickards (2021) and Widayati et al.'s (2021) studies demonstrated that PD may better benefit teacher's advanced skills if PD responds to their demands. Brand (2020); Dogan and Altun (2018); Green and Moore (2016); Herranen et al. (2021); Hughes (2019); Smalley and Sand (2018) also explained that PD should aim educator's needs. These conclusions, which Hughes (2019); Widayati et al. (2021) discussed in that PD was practical when responding to teachers' needs, add weight to the controversy for more PD to support educators' instruction and their students while retaining them.

TeKippe et al. (2020) performed a qualitative study to investigate the course of PD for continuing education and practical instruction. TeKippe et al. (2020) found that PD was necessary to apply consistent, pragmatic approaches. Also, TeKippe et al. (2020) found a misunderstanding about active learning. Besides, TeKippe et al.'s (2020) study revealed an absence of PD concerning effective instruction. Furthermore, TeKippe et al. (2020) concluded that they created the 3CM method for staff and instructors to further the reasons and ways of instructing active learning (as shown in Figure 6, TeKippe et al., 2020, p. 49). According to TeKippe et al. (2020), the total number of participants was 28, including student-teacher, K-12 educators mentoring student educators, postsecondary educators, and administrators (TeKippe et al., 2020, 43). They used a Likert- scale survey, an open-ended survey, and interviews (TeKippe et al., 2020). Moreover, TeKippe

et al. (2020) reported that they organized the data gathered for their study into themes and coded them. This study was small.

Hicks et al. (2020) conducted a quantitative study to investigate the impact of a limited PD curriculum mediation on teacher assistants (TA) in comparison to a traditional curriculum taught by TAs without support connected to the PD created by them. Another study (Hales, 2017) examined the application of writing and the language used by high school educators in a professional language community (PLC), where the author was an active participant of the PLC. Eroglu and Özbek's (2021) explained that PLC was a significant approach to PD that happened in schools. Hales (2017) also observed how the educators who participated in the PLC supported each other. However, Hales' (2017) study could not consider potential factors that bring crucial attention to PLC, and the educators who participate in Hales (2017) study taught in the same school. Hales (2017) conducted a qualitative case study to investigate the way educators used language in the PLC and participatory action research (PAR). Makopoulou et al. (2021) conducted a quantitative design study to investigate the effect of a continuing PD program on the self-efficacy of their study participants. The frameworks underlying the study of Hales (2017); Hicks et al. (2020); Makopoulou et al.'s (2021) studies were conceptual frameworks. The authors (Hicks et al., 2020 & Makopoulou et al., 2021) agreed that that the PD organization should be based on providing educational experiences to the educators.

Hicks et al. (2020) found that (a) the TA group who taught the intervention curriculum had more student engagement, (b) knowledge of the subject was not a

significant factor contributing to instructional actions, and (c) TA who taught the intervention curriculum had a better RTOP when they taught the intervention curriculum. Hicks et al. (2020) explained that they investigated the improvement and intellectual gains of each group of TA. According to Hicks et al. (2020), the total number of participants was 42, 41 graduate students who were hired as TAs to teach an introductory biology lab and one expert educator. The measures in Hicks et al.'s (2020) study were the Reformed Teaching Observation Protocol (RTOP) and the Task Analysis Guide Science (TAGS). Hicks et al. (2020) wrote that the data were analyzed with ANOVA. Hicks et al. (2020) reported that they documented the TA's instruction as they implemented both the traditional and the curriculum supported with interventions. Hicks et al. (2020) informed that their study results showed that the TAs who received support implemented student-centered practices. Hicks et al. (2020) concluded that PD design does not necessarily need long to be effective. Moreover, Hicks et al. (2020) concluded that a PD design that contemplated modeling instructional practices, the intellectual challenge of the curriculum, critical thinking, time to reflect, and a few hours of training could produce advances in impacting instructional practices.

Hales (2017) informed that the study participants were eight educators and one administrator from one public school in the southern area of the USA. Hales (2017) wrote the data gathered applied in the study were (a) group discussion, (b) field notes, (c) videotape, and (d) focus groups. Hales' (2017) study measures were transcripts, member checking, and coding. The codes were new knowledge, sharing, reflection, argument, uncertainty, questioning, and avoidance (Hales, 2017). NVivo was the software to

analyze the data. Hales' (2017) study results showed that educators opted to sharpen specific topics to discuss, obtain the initial meetings to help establish the PLC group's expression and get the assurance to share their instructional practices. Also, Hales' (2017) study findings revealed that educators' conversations about recent insights decreased, and educators debated and inquired more regarding actions. The group became more able to collaborate and build more awareness of the discipline. Hales (2017) concluded that the study participants engaged more as their sections increased. Moreover, Hales (2017) concluded that the study participants gained understanding to arrange the data gathered in their classes, applied additional documentation to aim the, integrate expression suggestive study, and collaborated more to share best practices (Hales, 2017, p. 50). The authors (Hales, 2017; Hicks et al., 2020; & Makopoulou et al., 2021) concluded that the PD planning consideration should include practical education experiences. PD support for educators may include educators' particular needs.

Synthesis of Professional Development Research

The literature review included studies identifying PD as a mechanism to improve teaching and learning. Some authors (Brand, 2020; Davis et al., 2018; Eroglu & Özbek, 2021; Hughes, 2017, 2019; Hughes & Partida, 2020); Kramarski & Heaysman, 2021; Sabin et al.'s, 2018) conducted studies that implied that PD improve teaching and learning. Eroglu and Özbek (2021) was a quantitative study average in size whose findings included considering educators' needs to plan for PD, which in their study influenced participants' engagement in the PD. Kramarski and Heaysman's (2021) study demonstrated that PD improved teaching and learning. According to Kramarski and

Heaysman (2021), their study participants improved their SRL and SRT after participating in PD, yet the SRL and SRT model were not particular to a subject. Overall, PD has been found to improve teaching and learning.

Studies on PD's impact on instructional practices found in the literature were Castillo et al. (2018); Davis et al. (2018); Doyle et al. (2020); and Makopoulou et al. (2021). Castillo et al. (2018) mixed study investigating MTSS concerning PD's plan on MTSS to comprehend various ways educators participate in the PD. Doyle et al. (2020) was a solid quantitative study whose findings reported that the median ESK gained by the participants of their research was significant the KOSM was not substantial. Still, Doyle et al. (2020) informed that the findings of not significant KOSM worried them because the PD program intended to increase educators' knowledge. Likewise, Davis et al.'s (2018) study findings demonstrated that CS PD increased educators' CS skills reducing educational challenges for the educators and their students. Also, Davis et al. (2018) conducted a substantial study with a large sample. Furthermore, Davis et al. (2018) found an urgent need to examine educators' options for PD demands. In contrast, Makopoulou et al.'s (2021) study, which due to attrition was small, found benefits of PD supporting teaching and learning but in a divergent finding revealed no significant change in the educators' self-efficacy.

The literature review indicated an urgency for considering the attention to nutrition topics. McDonald et al. (2020) and Merrill and Lawver's (2019) investigations revealed the need to consider paying attention in PD to nutrition topics. McDonald et al. (2020) study implications included the need for studies in nutrition to be more accurate.

Some resources for teachers may not be available for some educators. Pulay and Tibbitts's (2022a) study indicated that educators would use aid if accessible. Hence, Holland and Coleman's (2017) paper suggested collaborating with extension programs to support teaching and obtain materials. In summary, research on nutrition PD indicates that PD is needed indicating that resources may be accurate. In addition, some educators may obtain assistance by partnering with FCS extension programs.

Educators' poor understanding of instructional content may affect teaching and learning. Hughes and Partida's (2020) mixed study demonstrated a need for extra time to help participants comprehend educational content and KOC. Hughes (2017) qualitative study revealed that participants had an average level of MA, most for those who participated in the PD. Hughes's (2017) study conclusions indicated that PD's integration with MA influences teaching and learning. Even being a small study, Hughes's (2019) quantitative analysis showed that the participants' MA improved even more after completing the PD.

A study finding reported that educators could perceive PD differently (Widayati et al., 2021). According to Widayati et al. (2020), their study participants were urged to improve their teaching skills. The implications of Widayati et al.'s study included that PD would benefit educators' capacity when considering and responding to their needs, just as Gore and Rickards' (2021) findings indicated that PD might help educators improve their skills. Tekippe et al. (2020) study findings included an absence of PD for practical and pragmatical continuing education. Also, Tekippe et al. (2020) reported a misunderstanding about active learning. Therefore, overall PD is subjective.

While authors such as Hick et al. (2020) reported a limited PD connection supporting the PD curriculum, Hales' (2017) study findings demonstrated that PLC served as support among the teachers in the group. Hicks et al.'s (2020) study revealed that TAs who received PD applied more student-centered instruction in their classrooms. Hicks et al. indicated that the cognitive gains of their study participants were evident in their practices. According to Hicks et al., PD did not need to be extensive to be effective. Hales' (2017) study indicated the need for additional actions regarding educators' discussions. Together, Makopoulou et al. (2021); Hicks et al. (2020); Hales (2017) explained, in the end, to consider practical experiences when planning PD. By demonstrating that poor content knowledge, poor curriculum alignment with training, and low pedagogical skills, Hughes and Partida (2020) and Merrill and Lawver's (2019) studies extend the findings of Hick et al. (2020) and Makopoulou et al.'s (2021). PD seems necessary to strengthen educators' instructional capacity to serve students by advancing teaching and learning.

Professional Development in CTE

There are several studies that support the use of PD in CTE. According to Stair et al. (2017), there was an urgency for more PD opportunities for CTE educators to use English Language Arts standards in the assigned work to the students. Stair et al. (2017) focused on conducting a descriptive nature study to comprehend CTE educators' ideas of the common core state standards (CCSS). Stair et al. (2017) found that some CTE educators had a lack of preparedness to teach in their qualitative study in essence with 71 participants. Another study on PD, Lavallee and Litchfield (2019) focused on

investigating the PD planned for FCS and health educators. Lavallee and Litchfield identified eight areas of PD needed for FCS educators. Lavallee and Litchfield (2019) was a quantitative study. Lavallee and Litchfield (2019) reported that out of 24 educators who completed the training, only 10 FCS educators implemented the lessons. Likewise, Anderson et al. (2018) investigated professional PD's effect on increasing educators' capacity to deliver instruction to their students. The total number of participants in Anderson et al.'s s (2018) quantitative study were 20 CTE educators. The urgency for more PD and increment applicable curriculum in the field of CTE was evident for strengthening support accessibility to the curriculum. PD could aim CTE educators improve their teaching skills (Anderson et al., 2018). In sum, PD for CTE teachers may require more investigation to determine a coherent plan supporting their teachers' instructional needs.

Some researchers concluded that more studies in the CTE field suggested (Bowen et al., 2017; Claflin et al., 2019) to understand elements that included educational training, preservice educators' experiences, or approaches of credential in the CTE field. Bowen et al. (2017) conducted a quantitative study to investigate educators' impact on school policy and classroom authority concerning work happiness for educators, including CTE educators. The total number of participants were 88,050, and 19 190 were CTE educators from the survey pool with less than three years of experience (Bowen et al., 2017, p. 185). Results showed that the novice CTE educators informed a significantly greater level of school empowerment than the other educators. According to Bowen et al.

(2017), these findings showed that the CTE educators might remain in the field longer than the math and science educators.

Another research study that discussed the PD needs of CTE teachers to remain in the profession was Harding et al.'s (2019) study. Harding et al. (2019) investigated whether there was a change in the PD emphasis on early childhood education (ECE) educators' wellness, behaviors, and practices. Harding et al. (2019) used a quantitative approach to analyze the national data of 484 educators. Harding et al. (2019) found that modifying the additional PD aimed to satisfy educators' particular demands and advance children's atmosphere. Harding et al. (2019); Brunsek et al. (2020) applied quantitative approaches to gather and analyze their study data. Also, Brunsek et al. informed that they also used qualitative approaches in their study. Brunsek et al. discussed ways PD increase educators' capacity and benefits students, specifically the PD of language expression. Brunsek et al. found a significant connection between the literacy PD program and the child's results, matching the focus of the PD and the PD that involved tutoring. Brunsek et al.'s study restraints were that some PD did not have application accuracy data or program elements and only included studies written in English for their research. The ECE program is one of the CTE programs offered in some public schools' systems.

Three more studies performed at the secondary school levels generally applied curriculum implementation through PD training for the CTE educators. Piccott-Bryan et al. (2021) investigated CTE educators' experiences incorporating literacy into their CTE content, and the help received from their administrators. Piccott-Bryan et al. (2021) found that the administrators were open and recognized their demand to facilitate assistance to

assure literacy incorporation. Simultaneously, Hendrix et al. (2021) found that the food science PD was able to increase the 34 participants' self-perceived ideas on the food topics assessed in the study. Hendrix et al. (2021) wrote that their research participants indicated poor teaching of food concepts before training. Hendrix et al. reported an increase with statistical significance ($P < 0.05$) in the food science principles assessed after the training. Hendrix et al. (2021) used a survey to determine effectiveness of the PD after the training. According to Hendrix et al. (2021), the participant's self-perceived education increased after participating in the PD. They wrote that 74% of the participants were enthusiastic about implementing the curriculum (Hendrix et al., 2021, p. 205). Byrd et al. (2020) studied CTE educators' degree of importance, skills, and PD laboratory management needs in Iowa. The participants of their study were 148 agricultural educators. Byrd et al. (2020) applied the theory of self- efficacy of Bandura to guide their quantitative study. One of the research questions of Byrd et al. (2020) study was to determine the PD urgency of Iowa SBAE educators for the identified standards regarding the laboratory management. Byrd et al. (2019) concluded that additional PD was critical to helping educators who participated in the study build the capacity to keep equipment and practice safely during their course's laboratory. The curriculum implementation may be supported with PD plan to responds to the CTE educator's demands.

Some CTE educators may experience difficulties to implement curriculum. The results in Piccott-Bryan et al.'s (2021) study showed that incorporation of literacy was crucial, literacy incorporation was difficult for some educators, and the need to facilitate creative educational methods for teachers. Piccott-Bryan et al. (2021) was a qualitative

study with a sample of 11 administrators and 80 CTE educators. However, Piccott-Bryan et al. (2021) reported that four educators and three administrators provided data for their study. Piccott-Bryan et al. (2021) explained that they used semi-structured interviews to gather the data for the analysis, then a coding method was applied. Also, Piccott-Bryan et al. (2021) found administrators' willingness to support their CTE educators. The PD for CTE educators may consider strategies to help CTE educators implement curriculum.

The PD for CTE educators should reflect the areas of skill development, considering individual areas for improvement. Merrill and Lawver (2019) recommended the importance of understanding the areas of demand of CTE educators to aid their knowledge. Merrill and Lawver (2019) were a quantitative study with 198 participants. Smith and Smalley (2018) argued that PD was inconsistently supported. Small and Smalley (2018) wrote that PD should support educators and keep them in the field. Similarly, Dogan and Altun (2018) found that educators reported PD weaknesses on personal and professional issues. Dogand and Altun (2018) was a qualitative study with 27 participants. Widayati et al. (2021) found that the educators needed aid to grow professionally. Widayati et al. (2021) was a qualitative study with six participants. Widayati et al. (2021) wrote that semi-structured interviews were applied to gather data for the study. According to Herranen et al. (2021), it was essential to know the educators' needs from the perspective of PD. The PD may address the needs of the CTE educators to boost their skills and capacity.

Landford and Maruco (2017) examined the related concepts such as academic integration and skills development required for technical education in the CTE

Academies' program effectiveness. Landford and Maruco (2017) reported that their study was qualitative with a case study design applying a theoretical framework. The total participants in Landford and Maruco's (2017) study were 93, including 54 coordinators and educators and 41 students. According to Landford and Maruco (2017), the CTE courses in the secondary school's curriculum, anticipated that educators show realistic, authentic real-life experiences in the assignments and in the industry. Brunsek et al. (2020) investigated the relationship between PD and children's outcomes. They analyzed 64 studies about PD by applying quantitative and qualitative approaches (Brunsek et al, 2020). Brunsek et al. (2020) found that the PD that involved language expressional and social-emotional operation were the PD that connected with children's outcomes. Brunsek et al. (2020) explained that PD increases educators' skills and benefits students, specifically the PD of language expression. The education of the students is affected by external and internal elements in the learning environment. The CTE educators should integrate academic in their lessons. Also, the CTE educators may provide students with experiential work learning experiences. Together these Chen and Ney (2020); Burnsek et al. (2020); Landford and Maruco (2017) findings mean that PD opportunities could refine educators' capacity and strengthen their ability to teach CTE subjects and skills that needed to be model to the students.

Smith and Smalley (2018) conducted a descriptive study to explore mid-career agricultural educators' anxiety, burnout, and PD needs. The total number of participants in this study was 20 mid-career agricultural education educators representing a national sample. They were selected because they applied for and were accepted into the National

Association of Agricultural Educators (NAAE) PD in 2013. Smith and Smalley (2018) wrote that they created and emailed the tool via Qualtrics. According to Smith and Smalley (2018), the general standards the participants rated higher urged for professional development were the standard one - experiential learning (*M = 3.11; SD = 2.17*) and Standard 2 - program design and planning (*M = 3.17, SD =1.72*). Smith and Smalley's (2018) study results showed that the Standard 6 - Certified Agriculture Teachers and professional growth (*M = 6.60, SD = 1.47*) was the standard participants rated the least preference for PD. Smith and Smalley (2018) recommend more studies to explore educators' needs for PD. There is an urgency for PD considering instructional approaches and authentic field experiences such experiential learning.

CTE administrators may demand more expertise to understand CTE programs and better support educators. Two quantitative studies (Bartholomew et al., 2018; Yost et al., 2019) explored administrators' ideas about their own readiness to help CTE educators. There is a need to support CTE educators since several start their teaching careers without formal educational training (Yost et al., 2019). CTE administrators claimed that the abilities and duties of the CTE were challenging (Yost et al., 2019). Bartholomew et al. (2018) investigated the school administrators' ideas and aid for certified CTE educators in alternative teacher programs. Bartholomew et al. (2018) was a small study performed with 39 urban and rural school administrators in a western state of the United States. Most of their study participants believed that alternative CTE educators demanded more assistance (Bartholomew et al., 2018). CTE educators may need additional help to enhance their instruction. Bartholomew et al. (2018) found that their study participants

hired alternatively certified CTE teachers and perceived that the alternative approved educators were less prepared and less effective than regularly trained educators considering the absence of instructional training. The CTE administrators require to understand that alternatively certified CTE educators lacking teaching skills may contribute to their lack of formal education. Bartholomew et al. (2018); Yost et al.'s studies evidence showed the need perceived by administrators to assist CTE educators in refining their practice. These findings indicate alternatively, certified CTE educators may need more support to enhance their instructional practice. Considering, the diversity of CTE programs, CTE administrators may need aid to comprehend the curriculum in order to assist their CTE educators.

According to Tyler and Dymock (2019), the CTE educators claim to need support because the aid they receive is poor or inconsistent. Tyler and Dymock (2019) conducted a qualitative study with 26 vocational educators. Tyler and Dymock (2019) wrote that they conducted semi-structured interviews and used NVivo to analyze the transcripts of the participants' discussions. Tyler and Dymock (2019) found that experience educators told that PD were useful and boosted their skills and provided space for reflecting on their teaching practices. Contrary, Tyler and Dymock (2019) found that novice teachers perceived their capacity boosted with the collective work. Güneri et al. (2017) found that participants in their study reported an urgency for training in some themes such project-based learning, planning, technology integration, developing assessments, and student's engagement. Güneri et al.'s (2017) study was quantitative with 73 participants; however, only 19 study participants answered the survey. Güneri et al. (2017); Tyler and Dymock

(2019); Yost et al. (2019) explained issues impacting CTE educators and administrators, reflecting the urgency for PD's needs that support the CTE instructional practices. The instructional practices could become relevant to the academic and employability skills needed to succeed in a CTE program. This research intends to understand the educators' experiences with PD. It is necessary to address this issue and how it affects teaching and learning.

Synthesis of CTE Professional Development Research

The literature review identified the urgency for more studies involving CTE educators. Lanford and Maruco's (2017) study indicated that the CTE curriculum anticipated that CTE educators would facilitate realistic academic and job experiences. PD could refine CTE educators' capacity by helping them advance their teaching skills.

The literature review findings indicated areas to consider when planning PD for CTE educators. Stair et al.'s (2017) study findings indicated that the CTE educators who participated in their study lacked preparedness to teach their CTE courses. Also, Lavallee and Litchfield's (2019) findings identified eight areas of need for FCS educators. Lavallee and Litchfield's (2019) study was a small quantitative study. However, Lavallee and Litchfield (2019) reported that most of their study participants did not implement the lessons learned in the PD they completed in the study. These two studies indicate that CTE teachers do not benefit from PD. These researchers found CTE teachers in need, but not implementing the PD (Lavallee & Litchfield, 2019; Stair et al., 2019; Anderson et al., 2018). The PD areas of concern for CTE educators include how knowledge from PD

applied in the classroom advances educators' instruction, benefits students, and help with retention.

The PD advances for ECE educators may benefit students learning outcomes. Harding et al. (2019) researched how PD about child development may connect to ECE to help educators. Similarly, Brunsek et al. (2020) studied the connections among teachers in PD with preschool children's intellectual, social, and emotional results. Harding et al. (2019) concluded that PD were necessary. Most importantly, Harding et al.'s (2019) study reported that PD modifications helped educators satisfy the particular needs of their students. In the same way, Brunsek et al. (2020) found a connection between literacy PD for educators and their student's success.

A topic of research also found in the literature was curriculum implementation. Literacy incorporation into the CTE curriculum could be another challenge experienced by CTE educators. Piccott-Bryan et al.'s (2021) study findings indicated that incorporating academics was essential for the CTE curriculum but challenging to include for some CTE educators. According to Piccott-Bryan et al. (2021), the CTE administrators who participated in their study reported that they were susceptible to supporting CTE educators to incorporate academics into the CTE curriculum, recognizing the need to keep them. In comparison, Yost et al. (2019) found that the CTE administrators in their study urged to understand the CTE programs and their tendencies to help CTE educators build CTE program success. Still, Hendrix et al. (2021) found that PD increased CTE educators' capacity as participants in their study who, according to the authors, had poor teaching skills before the training, specifically food science PD.

Briefly, curriculum incorporation may be a difficulty experienced by CTE educators. CTE leaders may be eager to provide support for CTE educators to incorporate. Thus, administrator's understanding of the CTE curriculum and its trends may be essential to facilitate support CTE educators' demands to implement the CTE.

Even PD could be judgmental of teaching and learning. Byrd et al. (2020) found that CTE educators' participants in their study lacked laboratory management skills. Byrd et al. (2020) conclude that more PD was critical to support CTE educators in strengthening their abilities to maintain and conduct laboratory experiences for their students. PD could facilitate support for educational practices that challenge CTE educators. This finding is contrary to earlier articles that found that PD was not helpful to CTE.

Despite the debate on whether or not PD is beneficial, in the literature there was urgent need to know CTE educators' needs and grow professionally identified in the literature. Dogan and Altun (2018) and Widayati et al.'s (2021) study findings indicated that CTE educators needed support to grow professionally, and PD support was urgent. Güneri et al.'s (2017); Smith and Smalley's (2018); Tyler and Dymock's (2019) findings indicated the urgency for PD, the need for more studies, and inconsistent support for CTE educators. Güneri et al.'s (2017) study findings informed the training need for CTE educators. Also, there was a need for instructional practice PD. Tyler and Dymock (2019) found that PD experiences were helpful for CTE educators who participated in their study because they boosted their skills and reflected on their practice. Tyler and Dymock's (2019) study indicated that novice educators believed collaborative tasks enhanced their

skills. Thus, there is some support for PD for CTE. It might be helpful to note that Herranen et al.'s (2021) study findings reported that knowing the educator's needs was essential when planning PD.

There is some debate about whether experiential programs such as alternative certification or traditional textbook-based programs are more effective. Bartholomew et al.'s (2018) study informed that their study participants were administrators who perceived that alternatively certified educators were less prepared and less effective than traditional certified CTE educators. However, Bartholomew et al. (2018) explained that their study was lack of qualitative information. In support of experiential learning, According to Smith and Smalley's (2018) study results, participants reported that experiential learning was a higher area of need. Moreover, Smith and Smalley concluded that their study's implications suggested exploring CTE educators' needs considering instructional practices and experiential learning. Similarly in favor of experiential learning, Landford and Maruco (2017) conclude that integration and experiential learning for CTE educators strengthen their abilities to teach CTE courses, leading to program success. Therefore, there seems to be some support for experiential learning. Studies by Harding et al. (2019); Piccott -Bryan (2021); Stair et al. (2017); Smith and Smalley (2018) have indicated that CTE teachers may lack support to enhance their teaching skills. However, it is still undetermined whether the support for CTE educators was consistent.

STEM CTE PD

Teaching and learning could refer to the approaches used in the classroom. The CTE educators could be expected to provide students with real-life activities and experiential learning experiences. The U.S. Department of Education (n.d.) reported that the CTE's objective was to create more academic, career, and technical capacity for secondary and post-secondary students who chose to participate in career and education programs. Some CTE programs integrate academics and Science Technology Engineer and Mathematics (STEM) to align the curriculum and meet workforce standards. Parr et al. (2019) discussed the importance of PD to enhance the CTE curriculum. There are several PD programs for STEM that will be explored in this section.

The advances in technology and high-skills job demand may cause the need to implement strategies that are adjusted with the industry demands in response to the 21st-century skill required by industries. Ellis et al. (2020); Gordon et al. (2019); Merrill and Lawver (2019); Prabyai and Silalaiy (2020) discussed the importance of STEM into the CTE curriculum as a needed skill to prepare students for the demand of the industry. Shernoff et al. (2017) concluded that increased curiosity in and appropriate integrated methods to STEM learning. The CTE programs may have emphasized math and science concepts due to technological advances. This may increase the urgency for creating resources and modifications to the CTE programs without considering the educator's needs and focusing on what the students should learn.

Ferand et al. (2021) found that STEM it Up PD program was helpful for the participants of their study participants as increased participants understanding of the CTE

subject they taught. The total number of participants were 14 agriscience educators selected from 20 states recommended by state directors. Parr et al. (2019) researched core content (math) adjustment into CTE lesson plans to assess the possible chance of the student's understanding of math. In their study, Parr et al. (2019) intended to decide the influence of a math build-up curriculum sample into the CTE classes on students' math understanding. Parr et al. (2019) applied a conceptual model in their study and quasi-experimental design. The total of participants of Parr et al.'s (2019) study were 14 CTE teachers and 10 math teachers from Kentucky who participated in a ten-day PD to create a CTE classroom curriculum. Then, the CTE teachers selected the CTE courses where they would implement the math-enhanced curriculum they planned. The CTE educators participated in a ten-day PD before developing the lessons. According to Parr et al. (2019), educators could only implement 9 out of 21 lessons created in training. Nevertheless, Parr et al. (2019) found that math-enhanced curriculum might benefit student's math comprehension skills. PD enhancing math and STEM curriculum may benefit CTE educators' practice if their support corresponds to the particular demand and aligns curriculum.

Teaching and learning in the CTE field could be affected by the issues that CTE may experience, such as teacher shortages and retention issues. The literature on the needs of PD for CTE may indicate the urgency for PD considering the CTE educators specific needs for training and understanding of how they are being supported. Hughes and Partida's (2020) mixed-method study demonstrated the importance of additional time to address participants' understanding of the subject and KOC. Sabin et al.

(2018) conducted a project to aid CTE teachers in incorporating technology in their CTE courses in New Hampshire. Sabin et al. (2018) informed that Creating Computer Challenges (CCC) was funded by the National Science Foundation (NSF). Sabin et al. (2018) reported that some of their study findings include that PD' chances improved CTE educators' technical capacity and incorporated analysis exercising the concepts learned from the PD.

Brand's (2020) study is not as strong as Sabin et al. (2018) but it still helps to understand what makes an effective PD. Brand (2020) conducted a study to examine the learning educator's memoir participating in a collective PD project that they called inquiry by engineering design (IBED). The total participants were 16 middle school science, math, and CTE educators ranging from 6 to 30 years of teaching experiences. Educators' constant thinking on their training foundation guided their comprehension of the valuable tasks that incorporated questioning and engineering plan for their students (Brand, 2020, p. 7). In addition, Brand (2020) found that the PD contributed to their study participants in how teaching methods impacted their duties and the urgency to face difficulties that emerge with education and innovative instructional approaches. Brand (2020) informed that she applied an inductive examination and coded the information gathered in her study. According to Brand (2020), the three topics that arises from the data were (a) educators appreciated IBED education for their students, (b) educators had concerns associated to the efficient incorporation of the IBED tasks, and (c) educators started to adjust IBED educational approaches to within their prior core. Brand (2020) concluded that the study results show that the participants advanced their understanding

of how to incorporate science and engineering activities in their classrooms. Brand's (2020) qualitative study demonstrated that PD could promote educators' capacity to integrate science and engineering concepts. Moreover, the PD plan facilitated chances for the educator to prepare, exercise, and reflect on their instructional practices. Although Brand's (2020) study was small, the results support the importance facilitated educators with the training that considers their needs, applying their expertise incorporating the new skills, and the time to reflect and adjust their instructional methods.

Brand (2020); Hughes and Partida (2020); Sabin et al.'s (2018) studies prove that PD could help when an assertive and strategic plan considers addressing the needs and forceful engagement of the educators. The PD alternatives for educators may promise to be practical if they are strategically planned considering the needs of the educators. Brand (2020); Hughes and Partida (2020); and Sabin et al.'s (2018) research findings implied that PD that is designed and well planned can effectively innovate teaching and learning**.**

The CTE educators provide students with laboratory experiences and real-life experiences in the classroom and in the industry. The experiential learning is a type of experience expected to be offered to the CTE students by the CTE. The majority of the CTE educators are required to take training as CPR and other training such as accident prevention that would prepare them reduce the chances for injury and accident in their classroom and respond diligently to emergency situations. Most of the educators may require Cardiopulmonary Resuscitation (CPR), first aid, and accident prevention training. The 148 study participants were selected randomly for Byrd et al.'s (2020) study. Byrd et al. (2020) found that 70% of participants did not receive first responders training. Also,

they reported that only 73% of the study participants required their students to pass the safety test. Health and safety could be one of the priorities to be taught in CTE courses to limit the chances of hazardous situations and injuries. Byrd et al. (2020) concluded that agricultural education educators urged PD in the domain of dangerous materials and laboratory maintenance. Byrd et al. (2019) concluded that additional PD was critical to helping educators who participated in the study build the capacity to keep equipment and practice safely during their course's laboratory. Besides, Merrill and Lawver (2019) found the need for training for CTE educators in teaching safety methods. Safety is essential for successful laboratory experiences, and some CTE educators may need PD in this area.

Merrill and Lawver (2019) conducted a methodological quantitative design study to investigate PD demanded by food and nutrition educators with a STEM-intensified food and nutrition level one curriculum. The participants were 198 FCS educators from the Utah State Board of Education, including 19 FCS educators selected to participate in the beginning pilot group to test the curriculum developed by Utah University faculty in FCS, nutrition, and food science. Merrill and Lawver (2019) reported Cronbach's alpha coefficients rated from *.50 to .96* (p. 43). Merrill and Lawver (2019) wrote that they sent emails to recruit study participants. The study measures were surveyed through Qualtrics.

Results showed that the FCS educators participants rated hygiene for food and handling (*M = 4.89; SD = 0.583)*, sanitation (*M = 4.84; SD = 0.37)*, and kitchen safety rules and guidelines (*M = 4.84; SD = 0.42)* the significant standards (Merrill & Lawver, 2019, p. 45). Merrill and Lawver (2019) found that the FCS educators who participated in

this study believed they were knowledgeable about teaching the food and nutrition curriculum. However, a difference in the FCS educators' perception and capacity, showing that multiple objectives in the first standard kitchen and safety and sanitation techniques were the fields urged for PD (Merrill & Lawver, 2019). The authors concluded that it was necessary to support FCS educators to incorporate the STEM-intensified food and nutrition curriculum and examine authentic practical experiences in the PD. Furthermore, Merrill and Lawver (2019) recommended that urgent attention be given to FCS educators with PD. Although this study was small, the findings showed PD's needs for FCS educators teaching food and nutrition one courses, indicating the relevance of training to enhance teaching and learning and advance FCS educator's capacity to teach and incorporate. The CPR and other trainings would prepare CTE educators with the skills to reduce chances for injury in their classroom and in the field. Both studies by Byrd et al. (2020) and Merrill and Lawver (2019) found the need for PD in for CTE educators in different CTE fields of study. Technological advancement may demand more aligned and specific instruction in the diverse CTE programs. CTE educators may urge support for their instructional practices to meet expectations of producing globally competent CTE students.

Synthesis of CTE STEM Professional Development Research

The literature review included studies indicating the need for PD concerning STEM integration to enhance CTE curriculum courses. Some authors, such as Ellis et al. (2020); Gordon et al. (2019); Merrill and Lawver (2019); Prabyai and Silalaiy (2020) explained the consequence and urgency of integrating STEM concepts into the CTE

programs. CTE STEM curriculum may include math, science, and educational technology, which may increase the need for training for some CTE educators. While some authors suggested that PD was needed for CTE educators, other authors such as Brand (2020); Ferrand et al. (2021); Hughes and Partida (2020); Parr et al. (2019); and Sabin et al. (2018) researched PD impact on educator's CTE curriculum. Parr et al.'s (2019) study findings indicated that math skills necessary to incorporate into the CTE curriculum advantage teaching and learning, benefiting the CTE students. They received instruction from their study participants, CTE and math educators who develop integrated CTE lessons during the PD that they participated. Sabin et al. (2018) study demonstrated that STEM PD improved educators' capacity. Brand's (2020) study found that PD advanced participants understood better the concepts they taught, helping them face challenges they experienced in their classrooms. Similar to other studies in this review One of the implications of Brand's (2020) study was to consider educators' need to plan PD for teachers. Finally, Byrd et al. (2020) and Merrill and Lawver's (2019) findings indicated that the urgency to intensify the STEM curriculum (Merrill & Lawver, 2019) and PD concerning safety and sanitation were necessary. In summary, unlike some of the previous findings shared in this review the research on STEM PD indicated that it was effective in improving teaching and learning.

CTE International Programs PD

There is an urgency for preparing CTE educators in the global world. In international countries, CTE is known as vocational education. The literature included international studies that discussed the need for training for CTE educators experiencing

challenges in their field. Three international studies Ananekwe (2020); Pineda-et al. (2019); Tran and Pasture (2021) found a lack of support and resources for the CTE programs and educators. Ananekwe (2020) discussed the lack of resources and preparedness, suggesting policy and reform for the CTE program in Nigeria. The studies mentioned in this paragraph support the fact that some vocational programs experience lack of resources and support.

The literature contained international studies that discussed the need for resources and support for CTE experiencing challenges in their field. The dearth of professionals in the field of education is a global problem researched by Akgunduz and Mesutoglu (2021); Herranen et al. (2021); Hrmo et al. (2016); Pineda et al. (2019). A study indicating that PD may not meet expectations include Herranen (2021). Herranen et al. (2021) conducted a quantitative study on the massive online open courses (MOOC) pertinence from the educator's opinion, from the context of the relevant theory in Finland. Herranen et al. 's (2021) study was quantitative-survey research. Herranen et al. (2021) informed that before the courses, the total number of participants was 364 educators from multiple subjects, including CTE, and 177 post-training, including 10 CTE educators. The post questionnaire results showed Chronbah's alpha significance > 0.7 for the pre and post questionnaire participants' responses. Herranen et al. (2021) found that participants reported MOOC PD did not achieve their standard assumptions about learning new concepts about collaboration ($SD = 1.01$) and the importance of math ($SD = 1.00$). Herranen et al.'s (2021) study may imply that PD content did not capture educators'

needs since the results showed that the participants reported that the MOOC PD did not meet their expectations.

Differences in implementation and the urgency to comprehend the CTE programs may reflect how the CTE programs are supported by stakeholders. In their study, Pineda et al. (2019) found significant differences in the implementation of the programs, factors influencing the growth of the programs, time for tutoring, and educators' perceptions about lack of information and knowledge. Contrary to Pineda et al. (2019), Serafini (2018) found that stakeholders gave particular attention to increasing the budget to boost CTE programs and facilitate PD to their educators. The CTE programs' aim relies on stakeholders' comprehension of CTE, which may reflect the type of support received in diverse ways of support or not receiving support.

The literature included research on CTE concerning failures and difficulties for training and education. Hrmo et al. (2016) studied the contemporary issues and failures in the vocational high schools' education system in Slovakia to prepare a skilled workforce for the regional and global market. According to Hrmo et al., the primary difficulty for technical education and training was to reach the advancing capacity urges of people and the global work following the standard of continuing training. Hrmo et al. found that there was an urgency for preparedness when training students for professional careers. Akgunduz and Mesutoglu (2021) performed a study to investigate a continuing PD program's impact on high school vocational educators' education, beliefs, and capacity to industry 4.0 and STEM education in Turkey. The research design was qualitative, applying a case study approach. Akgunduz and Mesutoglu (2021) reported that the

number of participants in their study was 39 educators from four schools. The study participants utilized Adobe Connect in synchronous PD (Akgunduz & Mesutoglu, 2021). They applied categories and codes to characterize the participant perceptions and examined them. In addition, Akgunduz and Mesutoglu (2021) wrote that they used two surveys to gather the data for their study. Akgunduz and Mesutoglu (2021) found that the PD increased participants' capacity in industry 4.0. However, the study participants reported urgency to advance their capacity concerning STEM lesson plan elaboration, robotic programming, and mobile programming (Akgunduz & Mesutoglu, 2021, p. 178). Akgunduz and Mesutoglu (2021) and Hrmo et al. (2016) found the importance of PD preparing educators and the need to align PD with current global and curriculum demands. CTE educators internationally may need help to meet global demand needing support to strengthen their capacity.

Some CTE educators experienced challenges with professional development and limitations in the classrooms. Quesada et al. (2020) have shown that teachers who were expected to use experiential learning and received PD were not satisfied with it. The PD may fail to meet participants' needs and expectations. Quesada et al. (2020) found that based on the participants' experiences, the experiential learning experiences presented in the modules did not reflect Kolb's model cycle as defined in the modules. Quesada et al. (2020) focused on studying vocational teacher's challenges, resources, and capacity to implement experiential learning in vocational high schools in Guatemala. According to Quesada et al. (2020), a PD was planned to train educators to apply experiential learning in the technical and vocational education and training (TVET) program. Quesada et al.

(2020) discussed that the participants expressed that their courses lacked reflectiveness and experiments. Moreover, the participants of this study did not inform experiential learning experiences performed in their classrooms. Thus, the PD was not beneficial to helping them use PD in their classrooms.

Other studies have found convergent evidence that PD is not sufficient in international settings. Herranen (2021) found that PD was insufficient in achieving educator's standard assumptions about learning new concepts and collaboration. Also, Prabyai and Silalaiy (2020) found that CTE educators experienced difficulties with PD for incorporating academic content, educational tasks, and constructive knowledge. Yirci (2019) investigated recent statistics of in-service training for educators in Turkey. Yirci's study (2019) concluded that in-service training for the participants was inadequate. Yirci (2019) concluded that there was no applicable content and poor goal requirements to select the educators who participated in the PD. Overall, there is evidence of PD in international countries from at least four studies: Akgunduz and Mesutoglu (2021); Dogan and Altun (2018); Tyler and Dymock (2019); Widayati et al. (2021).

Synthesis of CTE International Professional Development Research

The literature included international studies that discussed the need for resources and support for CTE educators experiencing challenges in their field. Each country may perceive the need for CTE programs differently. International authors reviewed here in this section conducted their studies in the following countries: Nigeria, Spain, Italy, Finland, Turkey, and Slovakia. Ananekwe (2020); Pineda-et al.'s (2019); Tran and Pasture (2021) studies coincided in their findings for need support and resources.

Tran and Pasture's (2021) study findings indicated that at personal and organizational proportions, educators auto-rate their PD needs differently. According to Tran and Pasture, additional inside oppositions and anxiety countered receptive knowledge associated with students' demands and outcomes. Also, Ananekwe's (2020) paper indicated an absence of highly competent native instruction and aid to help educators advance technology and experiential learning. Equally important, Ananekwe mentioned in the paper the need for essential textbooks with international backgrounds. Hence, the lack of innovative resources may cause instructional approaches to keep traditional techniques preventing the integration of global advances into their curriculum. Moreover, Pineda et al. (2019) found that one-third of the educators who participated in their study reported not receiving format training, poor understanding of the program, challenges in integrating concepts, and collaborating with industry (Pineda et al., 2019). These three authors' findings may indicate that CTE international educators also urged PD to advance teaching and learning.

The support received by the vocational educators at international level may differ among the programs. Pineda et al.'s (2019) study findings showed that differences in program implementation, coaching time, educators beliefs training and poor were affecting the development of the programs significantly. Instead, Serafini's (2018) study findings showed that the stakeholders allocate more money to extend CTE programs and train their educators. Although Serafini (2018) indicated that PD was supportive, the stakeholders allocated money to improve CTE and provide PD for the CTE educators. However, this was not the same experience of the educators' participants in Hrmo et al.'s

(2016) study. Thus, this difference may indicate that in some areas the CTE programs may require better approaches to persuade stakeholders and have them gain better understanding of the needs and of CTE programs.

Indeed, CTE programs advanced to aligned with modern and competence job skills market. Serafini's (2018) study indicated that stakeholders allocated funds for resources and training. Nevertheless, support and alignment for their CTE programs were necessary for other countries, such as those indicated by Ananekwe (2020) and Pineda et al. (2019). The CTE programs may innovate their curriculum considering tasks and tools responsive to the 21st Century skills.

There is a need for administrative support in understanding CTE educational program. This need may create challenges for CTE educators and limit the ability to increase the budget to advance CTE programs in some countries. One essential challenge explained in by Hrmo et al.'s (2016) study findings was to facilitate training meeting the current global job skills demands. Akgunduz and Mesutoglu (2021) and Hrmo et al.'s (2016) studies agreed in that more attention should be provided to plan effective PD aligned to the demand of the 21st Century job skills demands.

Other challenges experienced by the educators include classroom limitations, lacking a comprehensive curriculum, limited chances to practical experiences, and low goal expectations. The findings of Quesada et al.'s (2020) study indicated that the participants did not report practical experiences taught in their CTE courses. Although, some authors found that PD were useful. Akgunduz and Mesutoglu's (2021) study findings indicated that PD increased the capacity of educators. The participants in

Quesada et al.'s (2020) study did not benefit from the PD facilitated to them because this study outcomes demonstrated poor satisfaction with PD.

Studies supporting the fact that PD was inadequate included Herranen (2021); Prabyai and Silalaiy (2020); Yirci (2019). Herranen (2021) found that PD was inadequate because the expectations of the training were not met. The participants did not accomplish basic expectations instructing new ideas and joint efforts. PD was inadequate due to irrelevant information and low expectation when selecting the participant (Yirci, 2019). There a was lack of alignment in PD and curriculum. According to these authors (Herranen, 2021; Prabyai & Silalaiy, 2020; Yirci, 2019), PD did not meet expectations and was ineffective and inadequate. International CTE teachers may experience challenges with their instructional practices. Some international CTE teachers may have similar issues with PD support to CTE teachers in our nation.

Self-Efficacy

Bandura's cognitive learning theory explained the concept of self-efficacy. According to Bandura (1997), educators' views on their self-efficacy to interest, influence, and support education impact the instructional atmosphere they build and the degree of educational advancement their student success. Self-efficacy could refer to the level of confidence individuals may have about themselves. The self-efficacy of an educator may influence the individual degree of commitment to advance skill advancement to teaching and learning development. Some of the authors who examined educators' or vocational student's self-efficacy in their studies included Fish and Jumper (2021); Hendrix et al. (2021); Byrd et al. (2020); Ferrand (2020); Chukwuedo and

Ogbuanya (2020); Lent and Brown (2019); Merrill and Lawver (2019); Whitley et al. (2019); Chen and Solberg (2018); Donohoo (2018); Yost et al. (2018). These will be reviewed in the following paragraphs.

In terms of teacher's knowledge of self-efficacy, research has shown that this improves teaching ability. First, Makopoulou et al.'s (2021) study outcomes revealed that participants' self-efficacy augmented meaningfully. Second, Merrill and Lawver's (2019) quantitative study findings included a different perception among their study participants' educators' belief on the significance of the subject matter. Some of the participants in Merrill and Lawver's (2019) study considered subject matter to be very important, and others did not. Third, Byrd et al.'s (2019) study results informed that the educators who participated in the study viewed there was no need for recruiting and extending task to enhance collaboration and support from the society for course related activities. Fourth, Hendrix et al.'s (2021) study outcomes indicated that their study participants boosted their self-efficacy. The participants needed the PD to enhance their competence (Hendrix et al.'s, 2021). Fifth, Whitley et al.'s (2019) study implications indicated that administrator advise may influence individual's self-efficacy. Overall, in Whitley al. 2019's study participants increased their self-efficacy finding a correlation between self-efficacy and participants scores in their educational teacher preparation assessment (edTPA, as mentioned in Whitley et al., 2019) scores. Sixth, Olson Stewart et al. (2021) included self-efficacy development as one of the topics to support the PD for novice educators from elementary schools in Arizona.

Fish and Jumper (2021) investigated if educators' beliefs of district aid in efficient conversations were associated with educators' beliefs. Fish and Jumper (2021) found that FCS educators combined online and paperwork in virtual learning. Also, Fish and Jumper (2021) found a statistically significant association between the district's constant communication and educators' informing about their support in their capacity to instruct and plan virtual instruction. Furthermore, Fish and Jumper (2021) found no statistically significant association between continuous information and the educators' ideas that the school informed them that the educators were performing well. Fish and Jumper's (2021) study was quantitative with 380 participants. The FCS represented the sample of the study (Fish and Jumper, 2021).

Participants felt low self-efficacy for their skill and had poor dispositions regarding providing education and evaluation of one standard regarding kitchen safety and sanitation of food. Merrill and Lawver's (2019) study revealed that educators' participants had poor skill dispositions in educating and evaluating Standard 1: Kitchen safety and sanitation of the food and nutrition curriculum. Similarly, Whitley et al. (2019) found that the participant of their study indicated a low self-efficacy for student engagement. Whitley et al. (2019) conducted a quantitative study to investigate the association between the current effectiveness of Agricultural and technology college educators' competence in academic assessment. The total number of participants in Whitley et al.'s (2019) study was 14 agricultural and 8 technology undergraduate educators from a southern university in the United States. Whitley et al.'s (2019) sample was a small sample for a quantitative study. Whitley et al. (2019) found that the self-

efficacy of the study participants increased significantly from the initial participation to the end of the study. Also, Whitley et al. (2019) reported that student participation had the lowest rate during the study from the initial to the end. Similarly, Whitley et al. (2019) explained that the actions of novice educators were essential in building their self-efficacy and achieving their CTE educational field. Also, Whitley et al. (2019) found a negative association between self-efficacy and the edTPA score of the participants, low edTPA score when self-efficacy was high. According to Whitley et al.'s (2019) study findings, their supervisor's advice could influence individual self-efficacy. According to Whitley et al. (2019), agricultural college students did receive recommendations from their supervisors to apply in their portfolios. On the contrary, Whitley et al. (2019) informed that the technology students did not receive any assistance, and their self-efficacy increased compared to the agricultural college students.

Merrill and Lawver's (2019) study showed an urgency to plan more PD, including self-efficacy for CTE educators applying standards alignment. Merrill and Lawver (2019) suggested more collaborative practices between CTE and math educators. Moreover, Merrill and Lawver (2019) concluded that additional PD in self-efficacy for STEM would enhance educators' capacity to teach STEM in their classroom by increasing their belief in their competence. Similarly, Lavallee and Litchfield (2019) explained in their final analysis that there was an absent of subject specific PD chances to develop full capacities of FCS educators. Chukwuedo and Ogbuanya (2020) found that self-efficacy, knowledge in self-efficacy, and persistence of work contributed to teachers' abilities. This improved ability enabled scholarly contentment, student achievement, and self-defeating job search

(SDJSB). Chukwuedo and Ogbuanya (2020); Merrill and Lawver (2019); Whitley et al. (2019) were small quantitative studies indicating that they may not be generalizable. These studies demonstrated that knowledge of self-efficacy increased individual achievement. Overall, it seems that teachers who are aware of self-efficacy become more capable.

Self-efficacy may contribute to an individual's attitude which therefore improves teaching and learning. For example, Yost et al. (2019) conducted an explanatory study to research CTE administrators' needs and develop a self-efficacy questionnaire tool for the CTE administrators. Yost et al. (2019) applied self-efficacy as their study's theoretical framework. According to Yost et al. (2019), 85 out of 88 participants answered all the survey questions, and 62 out of 85 participants taught CTE courses. One of the findings of Yost et al. (2019) study were the needs of PD for CTE administrators to strengthen successful CTE programs. A better understanding of the CTE program may help CTE administrators facilitate tools to support CTE educators' needs, including their self-efficacy.

Collective education may boost individuals' self-efficacy supporting teaching and learning. Donohoo (2018) investigated the association between collective educator efficacy and student success. Collective educator efficacy means the common conviction about their capacity to prevail over difficulties leading to practices toward educational success. Donohoo (2018) found that collective educator efficacy predicted educators' reasonable beliefs, work contentment, and better attitudes toward PD and educating students. Collective efficacy may contribute to educators' willingness towards teaching

and PD participation. According to Donohoo (2018), her study demonstrated the poor exercise of collective educator efficacy partly made clear with a collaborative competence plan. Therefore, Donohoo (2018) analyzed peer-reviewed articles issued after 2000. Donohoo (2018) reported that 34 peer-reviewed articles connected with the standards of their study. Nevertheless, Donohoo's (2018) study confined the selection of peer-reviewed articles to the studies written in English. The teamwork effort among colleagues could strengthen self-efficacy of the individuals.

Self-efficacy may contribute to an individual's attitude, which therefore improve teaching and learning. According to Donohoo (2018), the study's findings demonstrated that the high-level exercise of collective educator efficacy resulted in fewer student behavior problems. In addition, Donohoo (2018) informed that findings revealed that the high-level practice of collective educator efficacy produces more professional engagement of the educators, a positive attitude toward PD, and likely will likely stay in the professions. Moreover, Donohoo (2018) concluded that the study's findings recommended that the poor incorporation of study-based methods and approaches in CTE might be in part described through a collective efficacy foundation.

Self-efficacy could be a contributor to educator teaching dispositions. Self - efficacy may be associated with the outcome expectations. Lent and Brown (2019) discussed that self-efficacy was related to learning outcomes. Learning outcomes could denote the expected goals an educator may have impulse by their self-efficacy. According to Lent and Brown (2019) the degree of self-efficacy impact on learning outcomes. Learning outcomes and self-efficacy may relate influencing educators'

willingness to perform their instructional roles. Donohoo (2018); McNatt (2019); Yost et al. (2019) found that self-efficacy may had an effect on the on the expectations of the individuals, which could impact projected goals. In addition, Chen and Solberg (2018) conducted a quantitative study with 1579 participants from 14 high schools nationwide to investigate ways students' perceived approach to charming and kind adults related to their career decisions, which also told to their career search self-efficacy (CSSE). Chen and Solberg's (2018) study goals were to determine the importance of supportive and kind adults, including parents, counselors, and teachers, in determining their students' career choices if CSSE and objective efficiency regulate the connection among the students' beliefs of adult influence and their career choice. Chen and Solberg (2018) found that warmth and kindness effectively anticipated CSSE and skill objectives and career decisions significantly. Chen and Solberg (2018) reported that they analyzed participants' career interests using open-ended questions suggested by Escbroeck, a CSSE scale, and a rubric based on Marcia's personality Model (as mentioned in Chen & Solberg, 2018). The findings of Chen and Solberg's (2018) study indicated that adult assistance and how the students perceive them influence their career decisions. Rubenstein et al. (2018) performed a mixed method study with 525 participants to analyzed educator's views of imagination. Rubenstein et al.'s study findings indicated that years of teaching experience may related to educator' self-efficacy level. Also, Rubenstein et al. (2018) study results indicated that the perceptions of environmental support their study participants impacted their creative skills. Thus, for CTE programs, the program outcomes and student success may be affected by their self-efficacy, which may reflect student results.

The assistive help of an expert could influence positive learning outcomes in teaching and learning. Motto (2021) performed a quantitative investigation to examine if educators who engaged in individual, continuing PD throughout series of educational coaching showed advance technical, educational, and subject matter understanding in a school district in Pennsylvania. The total of participants in Motto's (2021) study were six CTE secondary educators and Motto (2021) who served as an instructional coach. Motto (2021) found that the educators who participated in the study advance their teaching. The findings of Motto's (2021) study revealed that the continued PD and coaching had a positive influence on student's commitment and teacher assurance. Although, the results of Motto's (2021) study indicated growth on teacher capacity impacting teaching and learning, data about student's perspectives and learning was reported by the teachers. Motto (2021) informed that the study measures included a TPACK survey, an open-ended question questionnaire, and the accelerated participation in a comprehensive PD with extended individualized coaching assistance. The open-ended questionnaire represented a qualitative part in the study since the study participants responded to the questions to inform about their experiences after incorporating what they learn from the PD and coaches. According to Motto (2021), the TPACK framework promotes the equilibrium of technology, pedagogy, and content knowledge. In Motto's (2021) study the data was analyzed with a paired t-*test*. The results indicated a slightly change among the pre and post surveys, but they were not significantly higher. Contrary, Motto (2021) indicated that the explanatory results of the open-ended questionnaire informed advance in teaching and learning. Herbst (2020) conducted a qualitative case study to investigate

with six participants to investigate methods that rural high schools in the state of Kansas applied to prepare their CTE students in rural areas. Herbst (2020) found that the rural high school in Kansas experience difficulties with resources, strengthening CTE curriculum with virtual instruction, shortage of CTE educators, and need to develop collaborative practices among high school and community college staff, one of the schools did not implement practices to explore alternatives and train CTE educators to help to retain them, focus still was on academic and high school graduation.

PD could include authentic practices adjusted to the need and reality of the CTE educators. Motto (2021) explained that educational guidance was advancing as a reasonable alternative to help and train educators and that additional studies in this field were necessary. The expected outcomes may involve organizing the specific training that advances teaching and learning and retaining the CTE educators in the area. Hendricks et al. (2021) performed a quantitative study applying data from the Virginia Department of Education (VDOE) to detect directions for participating in high school CTE programs and CTE program completion and the expected financial influence of the CTE completers yearly. Hendricks et al. (2021) wrote that the data obtained in their study was from the Bureau of Labor Statistics and the Virginia Labor Market. Also, Hendricks et al. (2021) explained that they used the Monkey survey as a program to survey available CTE administrators from Virginia and Texas to determine alignment by applying the point Likert survey. The sample of Hendricks et al.'s study was 18 Virginia chamber associations. Hendricks et al. (2021) found that the CTE completers in Virginia with industry certification can earn a median salary of $54, 311 increasing the state's fund by

$52,647,744.83 yearly. However, as expected, Hendricks et al. (2021) reported that a lower percentage of high school students earned industry certification. Arneson et al. (2020) reported that in the state of Oregon the CTE programs increased in .06 from the school years 2014 to 2018. Arneson et al. (2020) was a quantitative study to examine CTE program offerings in high schools in Oregon and their success. Arneson et al. (2020) reported that they analyzed Oregon's state CTE programs data from 2007 to 2018. The implications of Hendricks et al.'s (2021) study included that (a) the numbers of CTE completers were small, (b) innovation of CTE programs contributed to the state's financial prosperity, (c) the absence of enough CTE certified educators resulting in recruiting noncertified CTE educators. Hendricks et al. (2021) study implications also suggested that the state capital gained from the CTE completers entering the labor market could allocate to support CTE educators' PD. Moreover, Hendricks et al. (2021) concluded that this could help to recruit and retain effective CTE educators. The studies mentioned above (Hendricks, 2021; Herbst, 2020; & Arneson et al., 2020) discussed the expected outcomes and benefit of CTE programs, the importance of PD training, and found the need for certified CTE teachers.

Learning outcomes and expectations could contribute to program outcomes and students' success. A well-planned program could result in a positive learning outcome that could include multiple elements. A well-planned curriculum could consist of strategies that involve curriculum revision, adjustment, and a practical plan for PD. PD support can aid in consistently supporting self-efficacy and learning outcomes that benefit CTE educators and their students.

Synthesis of Self-Efficacy Research

Self-efficacy is the individual belief about their capacity to complete or perform a task. Bandura (1997) explained that individuals' confidence levels influenced by their self-beliefs relate to their self-efficacy, providing for the classroom climate and the level of student achievement. Some of the self-efficacy studies related to educators' competence and perceived capacity to know content taught were identified in the literature. Some of the studies found in the literature review included Chen and Solberg (2018); Chukwuedo and Ogbuanya (2020); Donohoo (2018); Ferrand (2020); Fish and Jumper (2021); Hendrix (2021); Lent and Brown (2019); Merrill and Lawver (2019); Whitley et al. (2019); Yost et al. (2018) investigated educators' or vocational student's self-efficacy. Merrill and Lawver (2019) and Chukwuedo and Ogbuanya (2020) studies found that there was a need for creating more PD for educators because of a lack of self-efficacy. Chukwuedo and Ogbuanya (2020); Merrill and Lawver (2019); Whitley et al. (2019) discussed the importance of understanding self-efficacy to advance teaching and learning. Finally, Makopoulou et al. (2021) reported that participants' self-efficacy improved significantly due to PD. In summary, it appears that CTE teachers lack self-efficacy, that they need PD to improve self-efficacy, and that some PD has been shown to improve self-efficacy.

In an interesting study, the findings of Fish and Jumper's (2021) study compared when the school district simply told teachers they were doing well teaching virtually to an alternative where teachers were given PD support to teach virtually. They found that the

PD resulted in self-efficacy, and the simply telling did not. Therefore, it is important to provide PD.

Self-efficacy may lead to increase of individual self-belief when increasing competence. Merrill and Lawver's (2019) findings indicate that practices among educators would strengthen their capacities, improving self-efficacy. Lavallee and Litchfield (2019) concluded that more studies were urged concerning evaluation of education, capacities, self-efficacy, and instructional practices of the FCS educators. Indeed, Hendrix et al.'s (2021) study findings reported that educators' capacities improved after participating in PD. Similarly, Motto's (2021) study showed that PD positively impacted teachers' teaching and learning. The study participants in Motto (2021) increased their competence. According to Motto (2021), the three months coaching sections helped their study participants to strengthen their content pedagogical, and technologically capacity. Furthermore, Motto (2021) reported that their study participants demonstrated innovative approaches in their classroom and enhanced their students' participation in class, practice more student-centered lessons. Chukwuedo and Ogbuanya (2020) and Merrill and Lawver (2019) were small quantitative studies. Still, Fish and Jumper's (2021) was an extensive quantitative study with an average sample of 380 participants.

Self-efficacy may improve when increasing competence, which therefore improve teaching and learning. Donohoo (2018) researched conducts and additional results from collective educator efficacy to comprehend the association between collective educator efficacy and student success. According to Donohoo (2018), the study's findings

demonstrated that the high-level exercise of collective educator efficacy resulted in fewer student behavior problems. In addition, Donohoo (2018) informed that findings revealed that the high-level practice of collective educator efficacy produces more professional engagement of the educators, a positive attitude toward PD, and likely will likely stay in the professions. Moreover, Donohoo (2018) concluded that the study's findings recommended that the poor incorporation of study-based methods and approaches in CTE might be in part described through a collective efficacy foundation.

The literature included studies concerning self-efficacy and learning outcomes. In fact, Donohoo (2018) researched conducts and additional results from collective educator efficacy to comprehend the association between collective educator efficacy and student success. McNatt (2019) investigated service leaning assessing the impact of service-learning on communicative capacity 188 postsecondary students. McNatt (2019) informed that participants 'self-efficacy was examined in their study. McNatt (2019) study findings informed that engaging in service-learning projects increased participant's self-efficacy. Lent and Brown (2019) explained associations between self-efficacy and learning outcomes. Thus, Yost et al. (2019) developed a CTE administrators' self-efficacy measuring tool. According to their study data, Yost et al. (2019) demonstrated the importance of need PD for CTE administrators by creating a pilot survey to measure their self-efficacy. Likewise, Yost et al.'s study data revealed that CTE administrators urged to understand workforce tendencies, CTE programs, and its specific to evaluate CTE educator's skills and identify PD needs of the CTE educators as well as develop CTE programs successfully. In summary, self-efficacy and learning outcomes were related

because self-efficacy could lead the people actions influencing the expected results. Donohoo (2018); McNatt (2019); Yost et al.'s (2019) research results indicated that self-efficacy may impact individuals' beliefs and outcome expectation. Also, Rubenstein et al. (2018) study outcomes indicated that perceived support may impact educator self-efficacy.

Arneson et al. (2020); Hendricks et al. (2021); Herbst (2020) discussed the learning outcomes and expectations of CTE programs. Hence, Arneson et al. (2020); Hendricks et al. (2021); Herbst's (2020) studies for PD indicated the need for CTE educators to boost educators' capacities to improve teaching and learning and CTE program expectations. Hendricks et al. (2021) gathered data from CTE administrators in Virginia and Texas. Arneson et al. (2020) analyzed their study data from CTE programs in Oregon. Authors Motto (2021) and Hendricks et al. (2020) discussed the urgency of developing PD adjusting to CTE educator's authentic experiences, which may contribute to the educator's self-efficacy resulting in multiple positive learning outcomes of CTE programs. Thus, PD was crucial to enhanced educators' capacity. PD may support educational practices boosting their competence.

Different Support for Educators

The literature review included research indicating different ways to support educators (Burrows et al., 2021; Chaney et al., 2020; Emerick, 2022; Harris & Girard, 2020; Mohammad-Hussain et al., 2018; Olson et al., 2021) to advance teaching and learning. Williams et al. (2018) conducted a quantitative study to compare CTE teachers' features and credentials in the seven areas commonly representing CTE programs to other

STEM educators. So too, Mohammad-Hussain et al. (2018) conducted a quantitative study with 510 CTE novice educators to analyze their readiness in the seven areas of Danielson's framework to determine the PD needs of their study participants in the following domains (a) classroom management, (b) applying multiple instructional approaches, (c) content knowledge, (d) application of technology, (e) lesson planning, (f) student's assessment, and (g) use and selection of curriculum materials (Mohammad-Hussain et al., 2018, p. 6). Likewise, Chaney et al. (2020) investigated novice educators' support through PD in their quantitative study with 170 participants. In the end, supporting educational instructional practices with PD could be productive for educators knowing their demands.

Each CTE program may have its own curricular and instructional expectations particular to the career area that corresponds. Hence, the differences among each CTE program may contribute to the diverse needs of CTE educators. Indeed, Mohammad-Hussain et al. (2018) found statistical significance in the divergent preparation of their study participants by applying instructional methods, planning lessons, content knowledge, and managing their classrooms. Also, Mohammad-Hussain et al. (2018) found that more than a third of the participants were certified through alternative certification, and 47.7% of all participants had little practical teaching experience. Similarly, Williams et al. (2018) found that CTE educators were most certified alternatively. In the same way, Williams et al. (2018) found that the CTE educators were the group of educators who were most certified through alternative certification

programs. The alternative certifications seemed to be the most common for most CTE educators obtaining their teaching certificate.

The PD support for CTE educators may consider guidance to comprehend the curriculum, modeling of best practice approaches, technology in the classroom, and advice for behaviors in the school. Mohammad Hussain et al. (2018) found that alternative certified CTE novice educators and those with less practical teaching experience had similar PD needs, including content knowledge, classroom management, and the use of educational technology. Mohammad-Hussain et al. (2018) and Williams et al. (2018) were extensive quantitative studies, and their results implied that support through PD was essential to advance teaching, learning, and student success. Therefore, each CTE program could be diverse, demanding the specific needs of its educators.

Hence, Williams et al. (2018) found different levels relating to demographics, identity, age, years of practice, and educator's positions in the seven CTE areas. The total number of participants in Williams et al.'s (2018) study was 281 990 math teachers, 226 700 science teachers, and 133 480 CTE educators (12 220 SBAE teachers, 19 160 business and IT, 33 110 FCS, 7 490 health science, 6 690 marketing, and 46 600 technology and engineering educators. Williams et al. (2018) wrote that they used SPSS 23.0 and AM Statistical Software to examine the quantitative data gathered for their study. Williams et al. (2018) reported that they used a current school and staff survey (SASS) from the National Center for Educational Statistics (as cited by Williams et al., 2018, p. 17). For instance, Williams et al.'s (2018) study indicated that some CTE programs were more diverse ethnically and in the gender of the educators than others.

Consequently, Williams et al. (2018) showed that the marketing educators were the most equally represented. The FCS teachers had the most teaching experience, and the health educators had the lowest teaching experience. Also, Williams et al. (2018) found that the CTE educators had the lowest number of educators with postsecondary degrees compared to science and math educators. So, the CTE programs and their educators may be distinct, experiencing differences in their professional experience, age, gender, and preparation.

The CTE programs may have a higher enrollment of special needs and limited English proficiency (LEP) students. Williams et al. (2022) found that there were statistically significant in the caseload of students with individualized education plans (EIPs), LEP students, and at-risk students of CTE educators compared to other educators. Therefore, Williams et al. (2018) demonstrated that the technology and engineering education programs had more caseload students with EIPs, while that health and science education programs had the least number of students with IEPs. Contrary, math programs had fewer students with IEPs than CTE educators. Overall, Williams et al.'s (2018) study results indicated that (a) CTE and science educators had fewer LEP and IEP students than math educators, and (c) CTE educators were the group of educators with less postsecondary education and alternatively certified. Williams et al.'s (2018) concluded If CTE administrators know CTE educators' IEP and LEP status, they can make better decisions about their PD needs. Williams et al.'s (2018) suggested that more studies should be conducted to investigate educators' qualifications and PD to advance educational results and better serve LEP and students. Briefly, when looking at the caseloads of the educators, Williams et al.'s (2018) study indicated that CTE educators

had more unique needs and LEP students than other educators. Thus, PD for CTE educators to enhance their instructional practice leading to the success of special needs and LEP students, may be urgent.

The literature review identified the need to support educators (Burrows et al., 2021; Emerick, 2022; Harris &d Girard; Hira & Anderson, 2021; Harris &d Girard; 2020; Williams et al., 2018) with PD to enhance their capacity in different topics. For example, issues of PD need for assisting educators informed by some authors mentioned above-included curriculum, instruction, diversity, democracy, teaching special needs, and limited LEP students. Burrows et al. (2021) conducted a mixed-method study to compare educators' knowledge about astronomy as they participate in PD with 60 STEM educators in the west area of the United States. Burrows et al. (2021) evaluated the usefulness of PD building educators' astronomy education in their research. Burrows et al. (2021) showed that their study participants had active involvement in the PD, and they incorporated astronomy concepts and genuine science learned in PD. Also, Emerick (2022) performed a qualitative case study nationwide to explore how diversity and inclusion for bilingual students in CTE programs were idealized and demonstrated in educational assistance for bilingual students. Emerick (2022) found that CTE leaders coincided with their ideas of diversity when explaining the implications of diversity and perceived that they accomplished integrative educational environments for bilingual students. Emerick (2022) and Burrows et al. (2021) were both averages in size studies. Their findings indicated that PD for educators promoting educators' involvement with practical activities could aid educational practices and student achievement.

The framework underlying Burrows et al. (2021) study was the social constructionism theoretical framework (as cited in Burrows et al., 2021, p. 4). The instruments applied in Burrows et al. (2021) studies were pre- and post-assessment and open-ended questions, the MOSART test, STEBI survey, notebook feedback, lesson plans, and classroom observations. The data in Burrows et al. (2021) reported that they analyzed the quantitative data with *a t-test.* In addition, Burrows et al. (2021) informed that they used coding processes to analyze the qualitative data gathered, such as lesson plans, open-ended questions, and notebook feedback. Burrows et al. (2021) explained that they utilized qualitative data to comprehend educators' interest in the PD and their urgency for developing and incorporating astronomy, STEM, and incorporated STEM practice. Burrows et al. (2021) showed that PD was productive for the educators who participated in their study. Burrows et al. (2021) concluded that in their study, (a) PD served to facilitate support to integrate STEM concepts, (b) PD should be planned with particular objectives to strengthen comprehension and application of content, and (c) PD should allow the teacher to demonstrate content gained through oral reports, hand-on tasks, posters, and practical classroom application. Burrows et al. (2021) study implications indicated the urgency to analyze astronomy to enhance STEM education by facilitating educators' resources to provoke students' curiosity in hands-on activities and practice.

Conversely, Emerick (2022) found that their diversity views were not assuring that there was equity for bilingual students and that the educators lacked enough support to guarantee the academic achievement of the bilingual students, in defiance of the CTE

administrators' allegiance to equity and inclusion. Moreover, Emerick (2022) found that most study participants, including administrators and teachers, reported not having the training to teach bilingual students. Equally important, Emerick (2022) found that the support for bilingual students and teachers was insufficient, and some administrators indicated the urgency of PD and helped the staff. The total participants in Emerick's (2022) study were 35, including 7 administrators and assistants, 16 teachers, and 12 bilingual students (1 ESOL teacher, 1 Social Studies teacher, 2 English teachers, and 12 CTE educators). Emerick (2022) reported that they applied the diversity ideology theoretical framework to examine the data of their study, which included classroom observation, field notes, and interviews. After reading this data, creating analytic memos, and coding the data, Emerick (2022) identified one of the conceptual categories as teachers' challengers in supporting bilingual students (p. 237). Emerick's (2022) study findings implied that an appropriate support plan needs to develop for students and staff. Thus, chances for PD should be incorporated to help bilingual students and assist educators with instructional approaches to teach them.

Recently, Westheimer (2022) reported using study data from empirical research with educators in the United States that surveyed 2,750 educators and conducted 150 interviews. Westheimer (2022) found that the educator's ideas of economic disproportion did not foresee the prevalence of instructing students about discrepancies. Westheimer (2022) concluded that it was essential to support the significance of democracy and the advantage of everyone to fortify relationships among individuals in schools. Earlier, White et al. (2018) suggested alternatives for educators to develop practical assessments

in technology and engineering education. According to White et al. (2018), technology and engineering educators could advance their applicable evaluations by applying a Gareis and Grant model (as cited in White et al., 2018, p. 28). Indeed, White et al. (2018) suggested that educators should align their intellectual tests and the standards. For instance, educational technology standards indicate that this practice was crucial to producing information because limited financial support impact programs if the information is insufficient or not actual (White et al., 2018). Likewise, Harris and Girard (2020) conducted a qualitative analysis study to examine 51 secondary state history standards and the assistance of educators nationwide. Harris and Girard (2020) found differences in how states explained the options of the history standards. Harris and Girard (2020) found that 40 states had terminology that implied the selection of the subject or program plan for the standards in their departments: district choices. Also, Harris and Girard (2020) found that 27 states had terms that implied the selection of subject or program plan of the standards; the educators had the option to determine the criteria to be taught.

Harris and Girard's (2020) study findings could imply that the states determine the standards in the contents for the teacher and control the options for which the educators select the criteria that go beyond the means. Moreover, Harris and Girard (2020) found that for the states where the standards were explicitly indicated for educator options to prepare, commonly, the standards were attached to the state test. The limitations of Harris and Girard's (2020) study included that the authors only limited their analysis to analyze state standards, omitting the educational outline some states created to tie the bars.

Another limitation of Harris and Girard's (2020) study was that the authors did not explore how educators taught the standard in their classrooms. Thus, differences in standards selections may cause challenges with alignment creating the need for educators to apply instructional practices. In summary, Harris, and Girard (2020) concluded that their study findings saw chances and demand for educators utilizing the curriculum to direct their instructional choices.

CTE educators may face challenges implementing distance learning and instructing PBL during the pandemic. Also, the literature review identified studies concerning how educators encouraged PBL during the challenging times of the COVID-19 Pandemic (Hira & Anderson, 2021). Hira and Anderson (2021) investigated PBL during the COVID-19-Pandemic by exploring how educators virtually encourage students' learning through PBL education. The total number of participants in Hira and Anderson's (2021) qualitative study was 11 high educators from three states of the United States. Hira and Anderson (2021) found that educators who participated in their study indicated that students' work was adjusted to be completed at their student's pace.

Moreover, Hira and Anderson (2021) discussed that some educators informed having students who showed pride in their learning and completed the assigned tasks at their own pace, while others indicated that their students were doing the minimum. Others were completing their work and reporting their accomplished work to their teachers. According to Hira and Anderson (2021), relationships between mentors and peers were essential to contemplate through PBL. Hira and Anderson's (2021) study participants were high school teachers. Hira and Anderson's (2021) findings indicated

that they (a) made way for personal education tasks, (b) utilized technology to assist education, (c) inspired their students to be accountable for their education and learning, and (d) associations among peers and mentors were challenging to accomplish through virtual learning. Hira and Anderson's (2021) study limitations were that the study's data were collected during the adjustment to virtual learning. Also, Hira and Anderson (2021) research was a small quantitative study, and the students' opinions were not considered in their research. The CTE courses may require hands-on and practical experiences that may have been affected because of virtual instruction. Instructional alternatives such as distance learning during the COVID-19 pandemic may have impacted teaching.

Service learning and Project-Based Learning (PBL) were educational approaches that supported educators in advancing their students' learning. Hira and Anderson (2021) researched PBL implemented by educators during virtual education. McNatt (2019) performed the impact of service-learning projects in a longitudinal investigation to examine the implications of service learning. The total number of participants in McNatt's (2019) quantitative study was 188 college students. McNatt's (2019) study outcomes informed that service learning could increment participants' capacity and competence for social discourse. Also, McNatt (2019) reported that the outcomes of their study facilitated halfway support that the individuals with low self-efficacy could further advantage from service learning. McNatt's (2019) study implications indicated that McNatt (2019) suggested that service learning could be an option to sued by educators to advance students' learning. Hira and Anderson (2021) and McNatt's (2019) research findings may indicate that service learning and PBL could support instructional practices

advancing teaching and learning. Service learning and PBL may enhance instructional practices by involving students in innovative, practical experiences outside of traditional methods. The authors referenced in this section identified different ways to support educators. Still, more consistent approaches are needed to support educators' instructional actions, retention, and student success.

Synthesis of Different Support for Educators

Some studies relating to further support for educators found in the literature included Burrows et al. (2021); Chaney et al. (2020); Emerick (2022); Harris et al. (2020); Mohammad-Hussain et al. (2018); Olson et al. (2021). Chaney et al.'s (2020) and Williams et al. (2018) suggested more investigation to determine educators' demands. Chaney et al. (2020) and Mohammad-Hussain et al. (2018) investigated PD support and the needs of novice educators. Burrows et al. (2021); Olson Stewart et al. (2021); Chaney et al. (2020); and Mohammad-Hussain et al. (2018) researched the support for educators through PD, reporting that PD as a mechanism of support could be effective if addressing educator's demands, outline specific goals, encourage mentorships. Modeling practices would be beneficial to help educators. Mentorship could support educators in strengthening their instructional capacity.

Emerick's (2022) investigation explored perceptions of CTE administrators, and the support perceived by educators. Emerick's study findings informed that their study participants experienced challenges in supporting bilingual students and that most of them lacked the skills to instruct bilingual students. Burrows et al.'s (2021) mixed-method study explored the view of diversity from an admin perspective and the needs and

support for students that could lead to student success. Burrows et al.'s (2021) study indicated that PD should be developed with specific outcomes to enhance educators' understanding and attainable practice, which would benefit students' achievement. Emerick's (2022) and Burrows et al.'s (2021) study results coincided in that PD should be aligned to demands specific to the educators, course expectations, program, and student success. White et al. (2018) and Harris and Girard's (2020) study concluded that standard alignment was indispensable to improving teaching practice. Hira and Anderson (2021) and McNatt (2019) discussed instructional approaches such as PBL and service learning that support instruction advancing teaching and learning. Some of the different ways of support discussed by the authors mentioned above-included PD, mentoring programs, induction programs, technology integration, and modeling practices.

Justification of Literature Selection Rationale

The selection of the concepts used in this qualitative research focus on the challenges that CTE educators face. The CTE programs may include different disciplines or subjects. Some of the CTE disciplines (a) SBAE, (b) business, (c) health, arts media, and communication, (d) construction development, (f) consumer, services, hospitality, and tourism. Part of the reason for the selection of the concept of CTE educator challenges is because the literature indicated that the CTE administrators experience difficulties staffing and retaining CTE educators. In addition, the literature reviewed showed that some CTE educators experience a lot of difficulty because they lack skill and background as educators. Furthermore, retention is a problem because of this. Indeed, literature indicated inconsistent support for CTE educators (Anderson et al., 2018; Dyar,

2018; Lavalle & Litchfield; 2019; Smalley & Sands, 2018). Notably, PD support was inconsistent (Anderson et al., 2018; Dyar, 2018; Dymock, 2019; Lavalle & Litchfield, 2019; Smalley & Sands, 2018). In brief, it known that PD can be helpful to advance educators' skills improving teaching and learning. However, the controversy may include whether there is a lack of support and inconsistency in PD for CTE educators.

Studies of Hales (2017); Sabin et al. (2018); Hughes (2019); Widayati et al. (2020) have indicated that PD increased educator's capacity. On the contrary, this conclusion did not apply to Hicks et al. (2020); Wu-Rorrer 's (2017) study conclusions that more support with PD was needed. The results of Sabin et al. (2018); Hughes (2019); Widayati et al. (2020), contradict Hicks et al. (2020) results that PD was productive. Thus, PD may or may not be beneficial for some educators.

The studies referenced in this section connect to the inquiry of this study because their outcomes and implications indicated urgency of support with PD for educators, which is a problem of practice. The research question of this qualitative study points to exploring CTE teachers' experiences with PD support, how they implemented instructional methods to help their students' learning, and how PD may contribute to their decisions to stay in the field. The SCCT framework, specifically the interest and choice models, help me in developing the interview questions of this study. The interest and choice interest models of the SCCT framework aligned with the interview questions because the inquiry will explore person inputs, background context, learning experiences, interest, learning experiences, choice goals and actions of the potential participants of this study.

Summary and Conclusions

This qualitative study investigates how CTE educators' instructional practices are inconsistently supported by PD to serve students and help CTE educators remain in the field. The studies included in Chapter 2 informed studies related to the topic of study. The major themes identified in Chapter 2 are (a) CTE, (b) policy and reform, (c) shortage of CTE teachers, (d) retention, (e) retention of CTE teachers, (f) PD, (g) PD in CTE, (h) STEM CTE PD, (i) CTE international programs PD, (j) self-efficacy, (k) and outcome expectation. Also, some of the secondary terms used to locate sources in the literature were PD, teacher perceptions, teacher support, and self-efficacy.

The problems I found in the peer-reviewed articles through the literature review search indicated the lack of support for the CTE educators, PD for strengthening educational practice, the discrepancy in PD for CTE teachers, and PD to assist with retention issues for CTE educators. The CTE teachers' shortages was a problem known in the literature. More retention approaches are necessary, while disputes in the literature about PD effectivity by some authors (Anderson et al. 2018); Zirkle et al. 2019) indicate a call for research on PD to support educators. Besides, Werhan and Whitbeck (2017) pointed out about some states CTE leaders not informing the shortage of educators when they reported their study findings about teacher shortages of FCS educators. Bowling and Ball (2018) and McIntosh et al. (2018) agreed that teacher shortages impacted teaching and learning, while recently Chen and Ney (2020) asserted approaches to help with CTE educators' retention problems suggesting PD to support this issue. CTE, CTE teachers,

educators, staff or faculty were some of the terms applied to identify research that connected to the problem of this study.

The literature supported the need for research on CTE through the studies reviewed in Chapter 2. Multiple studies found by Bowen et al. (2019); Byrd et al. (2020); Chen and Ney (2020); Claflin et al. (2019); Ferand et al. (2020); Hendrix et al. (2021) Tucker and Hughes (2020) identifying the consideration of retaining, preparing, and supporting CTE educators as a topic of importance in the literature. Bassok et al. (2021); Dainty et al. (2011); De Jong and Campoli (2018); d McCandless and Sauer (2010); and Pulay and Tibbitts (2022b); investigated elements affecting teacher retention and attrition.

The problem that this study explored was how CTE educators are inconsistently supported with PD to serve students and help CTE educators to remain in the field. The literature review identified inconsistencies in PD as a problem for CTE educators. The issues found as challenges for CTE educators were:

- The lack of support for CTE teachers.
- Inconsistency in PD for CTE educators.
- PD for CTE educators to enhance instructional practices that serve students.
- PD for CTE teachers to support retention issues of the CTE educators.

In conclusion, the problem this study explored was relevant because it explored CTE educators perceived support with PD, which is one of the gaps of practice found in the literature. This study extended knowledge related to practice in the CTE discipline

because it intended to provide more resource the literature concerning CTE educator's needs and their experiences with support for their instructional practices.

Chapter 3 provided information on the data collection and analysis methods of the data gathered for this study. Besides, Chapter 3 described the methodology, instrumentation, procedures for recruitment the participants of this study, trustworthiness, ethical procedures, and summary of the Chapter.

Chapter 3: Research Method

The purpose of this qualitative study was to investigate how CTE educators' instructional practices are supported with PD to serve students and support CTE educators to remain in the field. The major sections of the chapter include the research design and rationale, the role of the researcher, methodology, trustworthiness, ethical procedures, and Chapter 3 summary. The methodology section includes the instrumentation, procedure for recruitment, participation, data collection, and data analysis plan.

Research Design and Rationale

The research question that guided this study was "How are CTE educators supported with PD to implement instructional practices to serve students and remain in the field?" The central concept of this study was how the CTE educators perceived their support with PD to serve the students and remain in the profession. Anderson et al. (2018), Dyar et al. (2018), Gordon et al (2020), Hendrix (2021), Smalley and Sands (2018), Stair et al. (2016), and Zirkle (2019) discussed that PD is highly recommended for CTE. Therefore, it is worthwhile to investigate if teachers perceive that PD is beneficial for teaching and improve retention.

In this qualitative study I explored CTE educators' perceptions about support for PD through semistructured interviews. Also, this study was more inductive because I applied the coding process to examine participants' responses to the semistructured interviews. The basic qualitative approach of this study was based on the perceptions of the participants who provided data for this study. The codes emerged from the data, for

which I used an inductive approach. As a result, the codes and themes that emerged from participants' experiences were framed by the interest and choice models of the SCCT framework. Braun and Clarke (2022) explained differences in reflexive TA, indicating the TA direction based on the type of examination performed with the data (Braun and Clarke, 2022, p. 10). For example, Braun and Clarke discussed that data direction was more deductive if subsets elements of a theoretical ideology framed the examination, that gave the insights through that understanding and coded the information emerged from themes. However, I used inductive coding to examine the data of this study. The interest and choice models of the SCCT framework were the methods that I used in this study, and the interview questions were designed based on this framework.

Role of the Researcher

My role in this study was that of an observer. I was an observer of participants' answers to semistructured questions. Patton (2015) wrote that the goal of qualitative interview is to obtain how individuals perceive their surroundings, know their languages and assessments, and represent their personal views and actions. The semistructured interviews involved interaction between the participants and me, providing insights and information to the researcher about the participants' activities and ideas.

My relationship with the participants was as a fellow CTE educator. I am an FCS educator teaching CTE courses in the discipline of education and human services and early childhood education. I am a classroom teacher. I did not hold any power or power relationship with potential participants. I followed the protocol established in the institutional review board (IRB) approved consent form to protect participants. I

informed participants about my role as researcher and their role as participants in this study.

The ethical procedure that I used is considering that all CTE educators might be a potential participant. Also, another ethical issue that I had included losing subjectivity because, as a practitioner, some of the participants' experiences might be like my personal experiences. In short, to address the ethical issues, I practiced reflexive activities, such as keeping a reflective journal (see Braun & Clarke, 2022, p. 18). Braun and Clarke (2022) wrote that a reflexive journal is like a memory for evidencing and maintaining concepts for later thinking, inquiry, and meaningful material. The reflective journal helped me examine study participants' responses while developing subjective actions towards the data. Also, the interview protocol assisted me in maintaining the logical sequence and asking the same questions to all participants. In conclusion, I shared my interpretations after completing the transcript analysis with the participants. I asked them to verify if what I did reflected their ideas. Doing this ensured that my personal beliefs and reflections were consistent with the essence of the participant's expressions. Along the same line, I respected participants' ideas and human rights. I assigned numeric pseudonyms to keep participants' confidentiality.

Methodology

Participant Selection

The participants for this study were nationwide CTE educators. The CTE educators that could be potential participants, but I might have had a connection were excluded to meet IRB criteria. The population from which I took the sample of this study

was national CTE educators teaching CTE courses. One of the factors of choosing these specific groups of teachers as potential participants for this study was because they were included in the subject specialty of teacher shortage. William et al. (2018) wrote about the descriptions for some workforce field CTE educators, and their teaching assignments include (a) FCS basic teaching assignment is FSC education and personal and public service including childcare, interior design, cosmetology, social work, protective services; (b) business and information educators educational assignment is business management; (c) education technology is business support; and (d) marketing education is marketing (William et al., 2018, p. 17). According to the Teacher Shortage Report, U.S. Department of Education (n.d.), there is a national shortage of CTE educators in areas of business education, business technology education, FCS, childcare and guidance, human services, TCWBL, business marketing, and IT educators. Indeed, the U.S. Department of Education (2017) stated that there has been a shortage of CTE teachers for at least 20 years.

The sampling strategy was purposeful and I used snowballing. This was justified because there must be CTE educators in the sample on purpose to answer the research questions. Also, I asked potential participants if they recommended other CTE educators who I could contact to participate in this study. Purposive sampling applied to this study as the method of selecting participants. Bullard (2020) discussed that purposive sampling was a type of nonprobability sampling. According to Bullard, nonprobability sampling is one way in which participants are intentionally selected. Trans et al. (2020) reported using purposive sampling to identify potential candidates. Similarly, Emerick (2022)

informed that their study participants of their research were recruited applying purposive sampling. I used purposive sampling to select the participants because it allowed for obtaining the necessary population (see Thomas, 2017).

In addition, I used snowballing as another alternative to select participants, because I asked participants to recommend other CTE educators when they responded to agree to participate in this study. Patton (2015) agreed that snowball sampling could be a practical and efficient route to create opportunity through social networking. I applied snowball sampling in this study to strengthen the chances to select participants for this study.

Participants were from the United States and had to be CTE teachers. There was a wide variety of CTE teachers including different areas such as construction and masonry, FCS, health, business, and IT disciplines. I determined the eligibility of the participants by obtaining informed consent via email and by asking them before beginning the interview.

Qualitative studies often have small participants. Per university guidelines, 10 participants could be acceptable for a qualitative study. In qualitative research, 1 to 40 participants are recommended (Patton, 2015, p. 265). Patton (2015) explained that qualitative study investigation commonly targets a small number of participants; indeed, one individual, chosen meaningfully, could be enough to comprehend an event.

The participants of this study were identified by CTE leaders, directors, supervisors, coordinators, department chairs, and teachers who might share the study invite and recommend participants that meet the criteria to participate in this study. I

relied on their honesty of self-disclosure. To conduct recruiting several steps took place. First, I posted an invite to recruit participants online in Bitmoji for Educators, FCS and Extension Educators, and on CTE educator platforms. I recruited participants through purposive sampling. The minimum number of participants for this study was 10 CTE educators. The Bitmoji Craze for Educators and FCS and Extension Educators Facebook websites provided the setting to recruit participants from different areas in the nation. For example, the Bitmoji Craze for educators has 573,799 members, with FCS and Extension Educators has 6,439 members and the CTE educator's Facebook page has 156 members. The study invitation informed study participants the purpose of this study description and their right as participants.

Instrumentation

The data collection instrument and sources were the interview protocol (see Appendix A) and observation notes that were used when conducting the semistructured interviews. I developed the interview questions with the committee chair assistance and approval. The basis for the alignment of the interview questions was the SCCT framework. Also, each interview question was designed to correlate to the SCCT framework and take into consideration to avoid hurting participants' feelings. According to Lambert (2012), the interview protocol design for this study has three sections: the introduction, the middle part, and the closure. Lambert recommended that the organization of the questions should include a preamble, intermediate, and closure. Each part of the interview protocol is explained in the next paragraphs of this section.

The semistructured interviews were used to gather the data for this study because they created an authentic dialogue between the participants and me. Patton (2015) discussed that the intention of interviewing was to permit individuals to probe one individual's view. Disberger et al. (2022), Dos Santos (2019), Draaisma et al. (2018), Graves and Hasselquist (2021), Hughes (2017), Piccott-Bryan et al. (2021), TeKippe et al. (2020), and Tran et al. (2020) used semistructured interviews or interviews to collect the data needed to answer the research inquiry of their investigation. The semi-structured interviews can facilitate genuine discussion, while exploring participant's perceptions responding to the inquiry base of this study. Rubin and Rubin (2012) discussed that in the semistructured interview, the investigator has to be familiar with the topic, develop a restricted inquiry, and take appropriate actions to organize the interview process. In other words, the researcher's awareness about the topic helped to set the right questions to ask in a semistructured interview. I used standardized open-ended interviews (see Patton, 2015). According to Patton, the open-ended interview method requires detailed and complete language inquiry before the interview. Also, I asked supplemental questions such as probing questions as suggested by Lambert (2012), Patton (2015), and Rubin and Rubin (2012) to have an active and inquisitive attention in the conversations with the participants. The semistructured interviews were the qualitative interviewing category (see Rubin & Rubin, p. 31) that I used to inquire about participants' perceived support with professional development.

The content validity refers to the analysis and discussion to approve the instrument through an expert panel review. Slonim (2023) wrote that the concept of

validity was a critical risk that goes to the heart of the researcher's decision-making. The content validity was established to assess the semistructured interview questions of the researcher-developed instrument. Kosloski et al. (2016) and Wafi et al. (2022) reported that they used an expert panel to validate the instruments and data of their studies. According to Kosloski et al., the expert panel of their study were CTE professionals involved in postsecondary education. My committee members were part of the expert panel who validated the interview questions.

The data collection instruments were the Zoom platform, the computer, and the interview protocol. The interviews were audio recorded with participant consent. I used the computer as a device tool to conduct the Zoom platform meetings and record the interviews. In addition, the interview protocol (see Appendix A) applied to guide the discussion between the participants and me in the interview process centered in the inquiry of this study.

Besides, I created a reflective journal for analytical engagement after conducting the semistructured interviews. Braun and Clarke (2022) explained that a reflective journal is essential for writing critical discernment, thinking about the feelings recalled by the study, and some difficulties and problems. The reflective journal helped me to exercise an analytical view of participants' information.

The semistructured interview questions for this study were focused on Lent and Browm (2019) interest and career choice framework of their SCCT. With this study, I used Lent and Brown theoretical framework to focus on the following: Person inputs, background context, learning experiences, outcomes, expectations, choice goals, actions,

and performance domains and attainments. The SCCT theoretical framework is a 25 year-old framework (New Vocational Findings from University of Maryland, 2020). The interest and choice models of the SCCT framework applied to this study because the concepts fitted expectations to answer the study inquiry. The semistructured interview questions aligned with the SCTT in that the questions developed matching the research question and concepts included in the SCCT. I created the alignment in the process. The interview questions were part of the SCCT framework of this study.

The semistructured interview questions were organized with SCCT the framework. Pena et al. (2022) and Dos Santos (2019) reported that they use the SCCT framework to investigate and inform their study's findings. The interest and choice model of the SCCT framework applied to create and categorize the interview questions based on the concepts of the framework. The questions were shared with experts and CTE professionals to validate their quality.

The connections between the interview questions, the SCCT framework, and the research question were that the SCCT framework included concepts such as background context, learning experiences, interest and choice, and outcome expectation. The research question included an inquiry into how CTE educators perceived their support with PD and how their perceived support contributed to their decisions to stay in the field of education. Also, their perceived assistance may strengthen their instruction to benefit their students. I divided the research question into three sections to create the research questions, with the committee chair's assistance. The first part of the interview questions determined participants' support of PD and their teaching assignments. For instance, the

first part of the questions asked how CTE educators are supported with PD. The initial part of the interview questions also corresponded to the learning experiences concept of the career and choice model of the SCCT framework. In addition, the background context concept of the interest and choice models of the SCCT framework pair with the inquiry about the CTE subject or teaching assignment of the participants. The interest and choice goals related to the inquiry of motivation to participate in PD. Besides, self-efficacy expectations and choice actions matched with the interview question about barriers and challenges faced in the classroom and areas of support. Then, the outcome expectation concept aligned with the research question about whether participation in PD is beneficial.

I followed an interview protocol. The interview protocol included the interview questions, selection of the participants, the interview (see Appendix A) explained to the participants and signed by them, set the Zoom invite to conduct the interviews, the open-ended questions to ask to the participants during the semi-structured interviews. I learned about the interview protocol template used in this study in a qualitative research doctoral coursework. Also, I revised the interview framework illustrated in the Appendix 1of Lambert's book and named *Project Sheet* 10: *Interview Framework* (as mentioned in Lambert, 2012, p. 126). All the actions mentioned in this paragraph were performed after committee chair approval and IRB consent given for this study.

The initial part of the semi-structured interview was the introduction. The introduction section of the interview protocol was the section where I told participants my name and thank them for agreeing to participate in the interview. Also, during this

part, I disclosed the participant's information previously shared in the study invite and the informed consent. The participants had a chance to clarify about any concerns about the study or their engagement before starting the structured interview. Also, this part of the semi-structured interview informed participants about the purpose of the study, how the information applied to the research, their rights to drop out from engaging in the discussion, and the approximate time of the interview section.

The second part of the interview consisted of inquiring about the participant's experiences with PD. The research question of this study was the fundamental ground of the interview questions. Moreover, the interview inquiry was framed in a way that aligns with the interest and choice models of the SCCT theoretical framework. The interview questions were developed with the assistance of the committee chair.

The third part of the interview wase the closure. Lambert (2012) suggested that the closure section should be the part to rounding off the interview permitting participants to tell more, while ensuring that their contribution to the study was valuable (Lambert, 2012, p. 124). The closing section of the interview allowed me to thank participants for their time, engagement, and contribution in this study. The closure section l provided a chance for participants to ask any question they might have about the study.

As documented in the alignment Table in Appendix C, each interview question's classification aligned with a particular concept of the interest and choice models of the SCCT framework, considering the subject of inquiry of the questions and how the participant's responses may fit in the interest and choice models of the SCCT framework. The inquiry leading the development of the interview questions to include the three parts

that were inquired by the research that includes the following: (ways of support with PD, (b) perceive support with PD to implement instructional practices to serve students, and (c) how participants perceived support with PD contribute to participants decisions to remain the field.

Procedures for Recruitment, Participation, and Data Collection

I requested IRB approval for this study. The procedures for recruitment, participation, and data collection involved various steps explained below in this section. First, I posted an invite on the online platforms of the FCS and CTE educators. The study invite included the information about the study purpose.

Second, I shared the informed consent to participate in the study with the potential participants. I emailed the informed consent to the participants. The informed consent explained the purposes of the study, IRB approval, and how the information gathered was used. Then, I scheduled the date and time for the semi-structured interview. I sent the Zoom invites to participants of this study.

The participants received the informed consent electronically and provided consent by replying to the email. In addition, the informed consent was included in the study invite when I contacted the participants to schedule the interview date. The participants informed their consent to participate in the study by responding to the email as instructed in the informed consent. Also, I told participants about the informed consent on the day of the interview in the introduction part of the interview. The participant's informed consent was essential before they get involved in this study. The participants should have the right to know the purpose of this study and how their engagement

applied to the study. Lambert (2012) wrote that participants' consent could be active or passive. According to Lambert (2012), active consent was when participants tell or sign a consent form. With passive consent, the researcher informed participants concerning the study, asking them to declare their agreement to participate. If the participants did not respond, it could be assumed that they consented to participate in the study (Lambert, 2012, p. 141). The participants consented their willingness to participate in this study via email. Participants received the informed consent with the study invitation before the date of the scheduled interview and the day before starting the discussion. Thus, I expected the participant's enthusiastic support for this study and active consent from them to be part of this study.

Third, I conducted semi-structured interviews. I asked participants if they consent to audio record the interview. The participant agreed to record the discussion, a Zoom business account automatically transcribed data collected in the semi-structured interviews. If they disagreed to record the conversation, I could use the computer device to type their responses. This action was not necessary. Patton (2015) discussed that the intention of interviewing was to permit individuals to probe one individual's view.

Fourth, I listened the recorded interviews multiple times. However, for the first time of data revision I made the necessary corrections to the transcripts to make sure that the information transcribed reflects what the participant said during the conversation.

Fifth, I selected a coding system to examine the qualitative data and for analytical triangulation. Besides, I created a reflective journal for the data gathered from the semi-

structured interviews. I intended to read the transcript several times. The multiple reading helped the researcher ensure this study's reliability measures.

The location of data collection occurred electronically. I conducted the semi-structured interviews using a Zoom business account that was also audio recorded and transcribed the conversations with the participants. I used an isolated quiet and secluded space where I was the only person to conduct the interviews.

The frequency of the data collection was one interview per participant. I conducted ten semi-structured interviews. The duration of the data collection could be determined until the minimum number of 10 participants expected for this was reached. Also, the Zoom business platform was used for recording of data and transcribing semi-structured interviews. The collection of the recording data was filed electronically, and the information wase protected with password. Also, I kept the reflexive journal, notes, or any hard copy data of this study locked in a security box my house office.

I interviewed the participants of this study using the interview protocol. The participants received a thank you message for participating in the study and an Amazon electronic gift card for $30.00 after they completed the interview. I recorded and had Zoom transcribe the interviews. Ravitch and Carl (2016) wrote that examining the qualitative data obtained from semi-structured interviews could necessitate coding systems for analytical data triangulation. However, triangulation was not required per university procedure. The Zoom business account created transcripts from the interviews. I read and reviewed the data, conducted a reflexive TA, coded the data, categorized the data, identified themes, and verified their appropriateness and relationship with the

inquiry of this study. Also, I practiced a dialogic engagement process by sharing with the committee chair the interview excerpts to receive feedback on the methods used, the information gathered, and the ways follow-up questions or interactions do not reflect bias. I wrote personal notes from the data. I read the transcript while watching the interview recording and fixed any inaccuracies. Then, I read the transcript several times to ensure reliability.

Member checking-in was done after analysis was complete for each individual person. After codes were generated for each participant, I emailed a table listing their codes, the definitions of each code, and a quote form a transcript illustrating that code. They were asked if they were accurate or need changes.

Data Analysis Plan

The connection of the data with the research inquiry of this study was that the participant's responses might provide authentic feedback of their experiences with PD, the ways whether the PD might impact their instructional practice, how they served their students, and if support contributed to their decisions to stay in the education profession. The participants of this study provided insights that reported for the research question. Interview questions were elaborated to allow study participants to respond to the questions from their individual view and experience, that permitted for authentic expression of their perceptions rather than predicted responses (Franklin, 2013, p. 178). Consequently, the data gathered from participants was transcribed and analyzed applying coding approaches.

Coding is a natural and progressive method, a revealing procedure (Braun & Clarke, 2022, p. 54). Moreover, Braun and Clarke (2022) explained that coding understands as reasoning develops. Braun and Clarke (2022) wrote that the purpose of coding is to assist the investigator comprehending the significant connection with the information in a more diverse manner than previous, obtaining awareness that directs the research inquiry. Coding may generate the words and phrases from the data in an evolutive relationship between the data gathered from this study participants.

I included different types of coding approaches for coding the data gathered from participants. I used the first and second types of coding. The line-by-line coding and value coding applied as a first cycle coding. Then, the axial, eclectic, and pattern coding were the three – second cycle coding processes that applied to this study to analyze the data. In the first cycle, the values coding reflected participant values, conduct, and views, and perspective of the participants (Saldaña, 2016, p.130). Saldaña (2016) explained that axial coding added from the primary examination to focus coding (p. 244). In the second cycle, according to Saldaña (2016), axial coding helped to connect groups with subgroups and inquiry in the way they are associated.

In addition, Saldaña (2016) wrote that eclectic coding applies a meaningful and comparable mix of more than one first cycle coding, with the comprehending critical note and second cycle coding made synthesis of multiple codes into putting together a design (p. 212), while pattern coding grouped the comprehensive information from the first cycle coding into few classifications, themes of concepts (p. 236).

Procedure for Coding:

1. I had Zoom business for $200 a month to transcribe the interviews using the computer system. Dos Santos (2019); Hughes (2017) reported that they used semi-structured interviews in their investigations. Besides, Disberger et al. (2022) and Wagner et al. (2021) reported that they utilized semi-structured interviews, indicating that their studies data were coded. Also, I created a reflexive TA for data analysis and reflection on the semi-structured interview questions and participant's responses to these questions, in which their answers were transcribed using the interview protocol (see Appendix A).
2. I performed a reflexive TA and created a reflective journal. Braun and Clarke (2022) agreed that reflexive TA was a big qualitative method. Furthermore, Table 9.1 (as cited in Braun & Clarke, 2022, p. 269) showed the process and criteria of reflexive TA, indicating that transcription, coding and theme development, overall, and written report as process of reflexive TA.
3. I read the transcripts multiple times and look at line-by-line inductive coding. I looked for repeated words, ideas or concepts. I performed reflexive TA.
4. I applied axial coding.
5. I created a reflective journal.
6. I fixed errors in the transcripts. I did second cycle coding, like eclectic coding. as a second cycle coding to reduce information that did not relate to the research question of this study. I replied and re-read the transcript at the same time.
7. I shared the data with my committee chairs for proofreading and guidance.

8. I coded and categorized the data. I used MAXQDA a qualitative data analysis program. The coding processes was conducted using both the interview protocol template, transferring the information into a word document as coding process applied and applying an electronic coding platform.
9. I used first cycle coding (line-by-line coding (Dos Santos, 2019; Hasselquist & Graves, 2020; Saldaña, 2016) and values) and second cycle coding (eclectic, pattern, and axial). I created a systemic coding procedure.
10. I established groups of concepts. I practiced a dialogic engagement process.
11. I performed a reflexive TA.
12. I validated participants through member-checking.

To review, the data analysis plan for this basic qualitative study included semi-structured interviews. After interviewing participants, I analyzed data closely by applying reflexive TA and then using different coding methods, including in MAXQDA. I utilized various types of coding such as line-by-line, values, eclectic, axial, and pattern. The coding method was to identify applied concepts and exclude information that might not apply to refine data finding out what the words and categories really speak for aligning the information getting and getting the pieces that speak for participant's experiences.

Lastly, treating discrepant cases included maintaining transparency and preparing accurate reports. I kept consistency during the process. I reviewed the interview questions. I read and reviewed the data multiple times to ensure accuracy, exercise an analytical, and consult with the committee chair if an issue was identified. Also, I

considered participant validation and member checks to keep open discussion, the opportunity for feedback, clarify misconceptions, and data validation.

Trustworthiness

Trustworthiness may refer to reliable methods to be responsible, transparent, and careful during and after the research process. Merriam-Webster (n.d.) defined the word trustworthiness as worthy of confidence; dependable. Lindhein (2022) wrote that trustworthiness was essential for the investigators, the participants who provided to the study and for the readers (Lindhein (2022, p. 225). Trustworthiness could be fortified with participant validation. Lindhein (2022) wrote that participant validation was a mechanism to solidify the trustworthiness of an investigation. Trustworthiness may refer to the actions taken by the researchers that make their studies valid and honest. Participants validation and member-checking accounted to address trustworthiness in this study. According to Ravitch and Carl (2016), credibility, transferability, dependability, and confirmability were essential recognized ideas to evaluate in the qualitative study; assist the investigator in viewing and planning for multiple valid factors. Trustworthiness could include credibility, dependability, and confirmability.

The strategies to establish the credibility of this study consisted of triangulation of the data, prolonged contact, member checks, reflexibility, and saturation. Rubin and Rubin (2012) agreed that the researcher accomplishes credibility by demonstrating discussion with individuals who know about the research solicitude. I ensured that study participants provide insights about their experiences because I asked them nicely if their information was based on their educational experiences (Rubin & Rubin, p. 65).

According to Rubin and Rubin (2012), the introductory questions of the interview protocol will inquire about study participants' experiences. The different ways to analyze the data might support credibility and reflexibility. I reviewed the study data by applying multiple coding procedures and reflexive TA; this allowed me to triangulate the information gathered from the participants. I created a reflective journal because I kept notes during the interview (Lambert, 2012, p. 168) of each interview to keep notes of personal perceptions. So too, I am a practitioner in the CTE field; the actions that I experienced as a CTE educator might help to better reflect on the data while staying close to the study data. Besides, I examined the data multiple times; this might facilitate a more analytical perspective for data triangulation. The study's saturation might reach when the data gathered from the coding process and reflexive TA indicated the same results in the different ways examined, indicating redundancy or analysis explicate consistent results. Braun and Clarke (2020) defined that saturation is the general explanation for stopping to collect information. The common results and similar ideas identified because of the coding and reflexive TA process might indicate that this study reached saturation.

Transferability may refer to the action of being able to report capturing the reader's curiosity and reflective thought comparable to their personal experience. Merriam-Webster (n.d.) informed that transferability is conveying or generalizing the answers learned from one circumstance to others. Tracy (2010) explained that transferability is met when the readers sense the report of the study connecting with their practices. Transferability could be performed when the study's information causes the readers to visualize their experiences as they read the study.

I demonstrated transparency by keeping the data save password protected, maintaining a log of the interviews and recordings differentiating how the transcripts are created whether from notes, from tapes, and from memory (Rubin & Rubin, 2012, p. 68). Franklin (2013) explained that transcripts of the interviews are the rough information. The committee members had access to the data. Moreover, I kept study participants informed about how their responses were interpreted and contributed to the analysis of this study. I informed study participants about how their responses were analyzed and contribute to the research of this study for prolonged contact. Also, I shared the interview transcripts with the committee for member check-in to meet credibility criteria.

Member check-in, participant validation, dialogues between experts, committee, and researchers allowed for trustworthiness and internal validity supporting the credibility of the results of the study. Bowling and Ball (2018) report that they applied a coding process to determine the similarities, triangulated the codes, and members discussions to guarantee credibility and trustworthiness (Bowling & Ball, 2018, p. 113). I respected the use of the interview protocol when conducting the interview to keep consistency in the inquiry and close to the research questions of this study. I checked the data staying close to participants' responses when examining the results. In addition, the external validity of this study was through participant's specific characteristic selection such as being a FCS, business, and cosmetology and barbering educators teaching CTE courses in the following national career clusters: Business management and administration, education and training, finance, hospitality and tourism, human services, information technology, or STEM (Advance CTE, n.d.). The business educators taught

courses in the finance area or business management and administration. The FCS educators taught courses in the clusters of education and training, finance, hospitality and tourism, or childcare.

The study's dependability might refer to the ability to maintain honesty towards the data. Kakar et al. (2023) explained that dependability was a factor contributing to increase the trustworthiness of a qualitative study. Triangulation and audit trails might be the factors that strengthen the reliability of the study. The coding process allowed for the organization of the data into categories and themes. At the same time, the TA helped to build an analytical view of the data indicating the meaningful content of the information. Also, this study met dependability criteria by keeping records of the collected data, such as the interview protocol, the coding processes applied, the codes and themes that emerged from the data, and the reflective journal. I communicated and reported data analysis with the committee member for discussion and collective research that will support the study's dependability.

Confirmability might refer to the elements that support reflexibility. Kakar et al. (2023) told that quoting participants in presenting data would support the study's confirmability. I integrated quotes of the participants in the data discussion of this study. Also, I created artifacts such as a reflective journal, codes, themes, and reflexive TA grounded on the study data to represent the study's confirmability. I shared the interpretation that I made from the interview with the study participants, because this might allow study participants to validate the data and correct misinterpretations of their ideas and start the coding process. Briefly, member checking-in and participant validation

could support confirmability because I allowed data revision by allowing for reflection and trust verification.

Ethical Procedures

The ethical procedures that involved this study included getting Institutional Review Board (IRB) approval. Indeed, respecting the human rights of the participants was also ethical. After attaining the Walden University's IRB approval for proceeding with the study, I began data collection. I submitted the proposal and completed the required forms to the IRB to request permission to start recruiting participants. In other words, the collection of data for this study depended on the IRB approval status. Therefore, I sent an invite to potential participants after meeting ethical requirements to conduct this study and the IRB permission to collect data.

One ethical concern was that participants should be informed of their rights for participating in this study. I shared the informed consent and the voluntary consent for the interview both included in the Appendix A and Appendix B section of this paper. Also, I had the participants read the informed consent form which can be shared electronically and indicated if they consented to their participation. I used the consent form (see Appendix B) from Walden University's the pre-approved materials. In brief, participant's permission to provide data for this study was voluntary. I respected their decisions to withdraw from this study at any time. Participants confidentiality was respected, and audio recordings were saved electrotonically with protected password. I would keep the data for five years and I will permanently destroy both hard copies and

electronic evidence after five years, once I have met the required time to keep the data gathered.

The secondary data such as the interview transcripts and coding analysis documents was anonymous. I assigned a code or pseudonym to each participant instead of using their real names. In the same way, I carefully reviewed the transcripts to make sure that information that could reveal or associate participants identity or setting name of each participant was omitted from the primary data to the secondary data. I revised the study before sharing the information for participant validation, member checking-in, and publications of this study. I protected participants' identities by assigning numbers or numeric pseudonyms to the interview protocol and the interview transcripts. Also, I reviewed the data from the interviews for careful revision of details that could reveal participant's information before sharing information with them to validate and discuss data examination and explanation. Lindheim (2022) agreed that some study's ethical procedures include keeping participant's confidentiality and equilibrium when investigating issues that target unfairness to avoid prejudice.

I protected the data by creating an electronic folder to keep documents filed. The interview transcripts did not include participants names because I assigned a code/numeric pseudonym to each participant. Also, I secured the data by designating password-protected documents to encrypt the information gathered from the interviews, notes, coding, and analysis. I put hard copy materials from written notes, reflexive journal, external hard drive locked in a security box located in my home office.

Other ethical issues that might apply included participants' compensation for participating in this study. The study participants received compensation for participating in the study. According to Patton (2015), experts in multiple areas argued about the compensation for study participants. The study participants received a gift card that IRB approved it as compensation for the time they gave to this study (Patton, 2015, p. 500). The reward might be an ethical consideration because it could influence study participants' decision to participate. However, it might be a way to show respect to the study participants who voluntarily participated in the study.

Summary

This study was a basic qualitative investigation that aimed to explore how CTE educators were supported with PD to serve students and support CTE educators remain in the field. Chapter 3 provided an explanation of the methodology of this study. The sections included in Chapter 3 were an overview of the sections of the chapter, the study design and rationale, the role of the researcher, methodology including participant selection and data analysis plan. Also, Chapter 3 had an explanation of trustworthiness and ethical procedures. Chapter 4 is the next chapter of this paper. The results of this study were explained in Chapter 4.

Chapter 4: Results

In this qualitative study, I investigated how CTE educator's instructional practices were supported by PD to serve students and help CTE educators remain in the field. I intended to understand CTE educators' perceptions of PD support for their instructional practices to teach their students. The research question addressed the stated problem of this study was "How are CTE educators supported with PD to implement instructional practices to serve the students and remain in the field?" In this chapter, I explain the findings of this study. The main headings of this chapter are settings, data collection, data analysis, results, evidence of trustworthiness, and summary.

Setting

The setting of this qualitative study was the Zoom platform. After receiving IRB approval, the study flyer was posted online on educators' websites such as High School FACS Pathways: ECE Education and Training, Family and Consumer Sciences Education and Extension Training, and CTE Educators on Canvas' Facebook groups and LinkedIn websites. I requested approval to post the study invite on Walden's Participant Pool as another way to expand the chances to find potential participants. In detail, two participants learned about the study through the Walden Participant Pool. Two more were recruited using the snowball sampling, and the remaining six had knowledge about the study from the flyers posted on Facebook groups. Briefly, the participant recruitment was through social media, snowball sampling, and Walden Participant Pool, an alternative for participant selection.

The participants' races included White, African American, African, and Hispanic. All participants were CTE educators from the following regions of the United States: Midwest, Northeast, South, West, and U.S. territories. All participants were females. The years of teaching experience of the participants range from 3 to 28 years teaching CTE courses. Their experience as educators ranges from 3 to 32 years. The CTE programs represented by the participants were cosmetology, culinary arts, business, early childhood education, and family and consumer sciences. The participants were Kindergarten to Grade12 educators. Specifically, CTE high school teachers. Table 1 displays each participant's CTE cluster, program, and teaching experience.

Table 1

Participants CTE Program and Teaching Experience

Participant (p)	CTE cluster	CTE program	Years of experience teaching CTE program	Overall teaching experience
P 1	Human services	Cosmetology	3	3
P 2	Human services	Cosmetology and barbering	22	22
P3	Education and training	Family and consumer sciences	20	20
P 4	Hospitality and tourism	Culinary arts Child development	5	5
P5	Education and Training – Childcare	Family and consumer sciences	4	4
P6	Business management	Business and finance	4	4
P7	Education and training	ECE pathway	13	32
P8	Family and consumer sciences	Family and consumer sciences	17	28
P9	Business management and administration	Business and marketing	14	22
P10	Marketing, sales, and service	Business and marketing	28	32

Data Collection

I collected data from 10 participants. The participants in this study were nationwide CTE teachers. The data collection process began at the end of March, after receiving approval from the IRB on March 14, 2023. The IRB approval number of this study was 03-14-23-0492523. The data collection process lasted approximately 8 months.

The study was conducted on the Zoom platform. I provided participants with electronic informed consent after they expressed their willingness to participate via email. I performed interviews with participants only after they indicated their consent electronically.

The Walden pre-approved forms were the documents use for informed consent in this study, and their participation was voluntary. To protect their identities, each participant each participant was assigned a numeric pseudonym, and their names were not revealed during the audio recorded interviews. All interviews were conducted via Zoom and recorded for analysis.

The interview transcripts of the audio recorded semistructured interviews were saved with password protected. To ensure the security of the semistructured interview transcripts, I encrypted them and stored them in an electronic folder. My written notes were saved on a secure hard drive that was locked in a security box. As a form of compensation, each participant was given an Amazon gift card worth $30.00. Additionally, I kept study data confidential, granting access only to my committee chair.

There were no variations from the data collections as presented in Chapter 3. All the participants selected for this study were CTE educators in the United States. They

informed that they were certified CTE educators. Unusual circumstances were not encountered during the data collection. All semistructured interviews were audio-recorded for transcript purposes. I was the person who conducted the semistructured interviews in isolated and secluded spaces. The information gathered from the interviews was filed electronically and password protected. The devices used were owned by me in my sole control and locked when not in used.

Data Analysis

In this section I explain the process I used to move from coded data to categories. First, after the audio recorded semistructured interview, I obtained the interview transcripts from Zoom. I listened to the recording and made sure that the transcripts match the audio. I cleaned transcripts from errors because the Zoom feature of transcribed data was a little challenging to capture some words as it could be biased into the system to transcribe language spoken with a different accent. Wassink et al. (2022) explained that it is necessary to practice prudence while examining features of speech technology. Bias in speech recognition can result in transcription errors that may cause confusion by mixing up the spoken words.

Second, I imported the data into the MAXQDA periodically. After I cleaned each interview, I uploaded it. The process took 4 months. I created a project using the MAXQDA Analytics Pro 2022 student license to analyze the data with a qualitative analysis program. I watched tutorials and attended MAXQDA webinars to learn how to use the program and observed how to perform qualitative data analysis. I did not use the words included in the SCCT framework which helped me to build the interview protocol

questions. Instead, I applied a more inductive coding process. I developed codes that emerged from the data.

Third, I shared a table of codes including excerpts with participants to validate the data. Besides, data was shared with my committee chair. I heard back from most participants and all who replied approved the codes. According to Braun and Clarke (2022), participant validation referred to the process of ensuring the accuracy of the researcher's interpretation of the participants experiences. It may involve seeking the participant's recognition and confirmation of the researcher's interpretation. On the other hand, Lambert (2012) discussed that presumed or passive consent was applied by researchers to inform participants of their involvement in the study. If the participant did not respond, I assumed that the information shared with them was validated. The purpose of my inquiry was to determine if participants recognized the accuracy of my interpretations of their experiences (see Braun & Clarke, 2022). I was performing a reflexive TA and keeping a reflective journal. Briefly, after the initial codes emerged, I was reading the data multiple times and replaying the audio recording to fix in transcripts. Thus, this process helped me maintain accuracy, understand the data better, improve my coding analysis, reduce any bias, and validate of my interpretation and analysis.

Fourth, I did line-by-line inductive coding. In line -by-line inductive coding, I was coding with the research question in mind, and leaving aside the emotional part, positive or negative, to ensure that what participants responded was captured based on the research question, and not my own interpretation. For example, Participant 9 said

"money, money, money", I coded that under retention because it was one of the reasons, she gave for staying in the profession. I was trying to be close to the data as it was recommended by Braun and Clarke (2022). Finally, I applied second cycle coding as suggested by Saldaña (2016). I applied first cycle coding (line-by-line and values) and second cycle coding (pattern, eclectic, and axial). Then, I moved from coding to categories. I was performing a reflective TA and keeping a reflective journal.

I used the MAXQDA Analytics Pro 2022 for coding and analysis during the stages of reflexive thematic analysis (Braun & Clarke, 2022). These stages include familiarization with the data, initial codes, searching for themes, reviewing the themes, defining, naming themes, and producing a report. In conclusion, I applied the recommendations discussed by Braun and Clarke (2022) to analyze and by Saldaña (2016) to code the information. I exported the data report from MAXQDA into Microsoft Excel spreadsheet and did a data analysis as well.

Codes

I coded 1,263 segments throughout all the transcripts of the initial data analysis using MAXQDA. I read the excerpts, analyzed the data, and made interpretations while frequently coding the data with the MAXQDA qualitative tool and Excel data analysis features. Also, the codebook (See Appendix C) included the code systems with definitions, frequency, and subcode suggestions. I kept a list of the codes and evaluate the relevance of the codes with the research question.

Initially, there were 52 codes including words coded as sentiment. Then, I assigned codes to the words and phrases that I identified as sentiments. As a result, I had

created 41 codes from the data of this study. Table 2 showed some of the examples of the earliest codes. Appendix C and Appendix D illustrate the codebook and the categories, category meaning, aligned codes. During the analysis process, the codes were reduced to 19 and then further reduced to seven codes. The specific codes from the data were needs, PD, support, challenges, lack of support, self-efficacy, motivation, beliefs, retention, benefits, teaching and learning, technology, retention, dissatisfaction, technology serving the students, and partnering and advisory. Finally, the first cycle coding open codes included words as needs, PD, challenges, motivation, benefits, retention, and lack of support.

Table 2

Initial Codes: Parent Codes and Codes

Parent code	Code	Coded segments	Participant excerpt
	Professional development (PD)	160	"Not only specific in our needs is that who will be offering the PD is really prepared to offer the PD." (Participant 8)
Retention	Teaching and learning	24	"Nowadays, I need to teach with the SEL in mind." (Participant 9)
	Opportunities to grow	33	"There is something that I can use, and professional development always be important, because that is a way that we have to improve in our careers." (Participant 9)
Preparation and expertise	Professional organizations	16	"The American Association of Family and Consumer Sciences. So, the abbreviation is an AAFCS" (Participant 4)
	Dissatisfaction/annoying	53	"…And so, it bothers. It does bother me." (Participant 2)
	Needs	96	"We need more professional development. In person, professional development." (Participant 9)
Years of experience	Teaching and learning	66	"I have implemented things that I have learned at professional development." (Participant 4)
	Support	98	"I love the mentor program." (Participant 5)

The word *need* was the most frequent code revealed from the data analysis with a count of participant number of 51 times. Also, the word need was for the first cycle coding, while skills-based PD was the code that most appeared when applying second cycle pattern coding. I defined the code need as the things that were essentials and necessary to advance. I asked Participant 2 how PD advanced her teaching and learning. In essence, Participant 2 responded that the learning from PD that she could apply to her instructional practice was a result of attending PD other than the ones offered by her school. During my inquiry about how PD enhanced her current instructional practices, she responded the following:

> I don't. I don't see how most of my district professional development does not really address the need or give me tools that I can carry back to my classroom most of the professional development that I can apply to my classroom. I have had to take outside of my school district provided professional development.

During the coding process, the phrases "poor support" and "lack of support" were the identified phrases in the second cycle pattern coding. Additionally, the PD specific to their CTE education needs was for the most mentioned in the second cycle eclectic coding, and it appeared most often for first cycle value coding. The second cycle coding axial "relevant and applicable PD" were the phrases resulted from this process.

Participant 3 answered "So, the professional development that they have provided I think, help very little in terms of my content area." So too, Participant 5 stated that "The PDs that we have to do all of the PD days. I haven't found those very helpful at all.". At first, I labeled the responses of Participant 3 and Participant 5 as "Professional

Development". Later on, I added the label "need" to those excepts because I felt that it was not enough to just mention irrelevant PD. Instead, I interpreted the need for applicable or relevant PD as an area of support that need attention. In sum, it appeared that they did not find their experience with PD helpful.

Some participant's responses represented their beliefs needs when I asked them. To take a case in point, Participant 7 expressed "I need a logo and I need money so that I can promote my program and the certifications that I can offer my students." By extension, Participant 4 expressed that "Our students have a lot of needs and concerns that cannot always be met by me, the mental health kind of avenue. I am concerned as sometimes about safety.". In saying that Participants 4 and Participant 7 expressed those areas of need support. Again, another area of need support that need attention.

The *Relevant PD* was often word for the first cycle value coding. Similarly, during the second cycle axial coding the often words were relevant PD or applicable PD. This reflected the needs for relevant PD appearing most often on the transcripts that corresponds to Participant 3 and Participant 6. Table 3 displays an illustration of the codes, categories, themes, and examples of some of the participant responses that represent the alignment with the codes. In addition, Table 4 illustrates an overview of most of the codes, a count of the total of coded segments, and the total number of documents.

Table 3

Second Cycle Coding Axial, Category, and Themes Emerged

Participant Number	Count of participant number	Excerpt from transcript (participant quotations)	Line Number	Second cycle axial code	Category	Theme
P4	8	"But I would say, for the vast majority at my district focuses on PD that influences the whole school and not just career and technical education."	86-87	Need for Relevant PD/Applicable PD	Areas of need support	PD shows lack of support for CTE programs.
P3	7	"But the professional development really isn't geared toward CTE classes in the school."	127-128	Relevant PD/Applicable PD	Areas of need support	PD shows lack of support for CTE programs.
P5	3	"Give us actual techniques or strategies that we could use or incorporate into our classroom…" – "…investing one that we did and responding to my concerns…"	240-241	Relevant PD/Applicable PD	Areas of need support	PD shows lack of support for CTE programs.
P6	1		411-412	Relevant PD/Applicable PD	Areas of need support	PD shows lack of support for CTE programs.

Categories

I moved from code to categories by reading the data identifying connections and patterns between the data and the emergent codes. I was looking for relevant information in the data that correlated with the inquiry focus of this study. Also, I used the MAXQDA qualitative tools to support my analysis. The data analysis led to the formation of 10 categories as follows.

- Support Perceived/Received
- Areas of Need Support
- Barriers to Succeed
- Unhealthy Meetings
- Partnering and Networking
- Lack of Support
- Retention Challenges
- Justifications for CTE's Retention
- Bureaucratic Actions
- Technology Aid

First, the data gathered from participants resulted in the identification of support perceived or received as one of the categories. To put in another way, some participants perceived they received support from administration, while other perceived that their support were from the professional organizations. Herranen et al.'s (2022) study findings indicated that it was crucial to know educators' needs from the view of PD. Participant 2 indicated discomfort with the administration expressing that all the learning gained was

from her being actively involved in professional organizations. She said, “But as far as the support, no” (Participant 2) in reference to the school support.

Participant 4 affirmed that that she was well supported, indicating that her classroom was renovated. So too, Participant 7 mentioned that “TEA is very supportive of our program right now through the grant, because we are receiving curriculum as well opportunities for professional development where does features as well as the State is working together to implement programs”. Participant 4 stated that “I feel very supported. However, sometimes teaching and do like our students I feel, are not as supported”. In sum, Participant 4 expressed satisfaction with the support received by the administration. On the contrary, Participant 2 indicated that support from the school was poor. Admittedly, Participant 4 and Participant 7 mentioned areas of still support needed. For example, Participant 4 told “The challenges or barriers in my classroom are discipline and attendance”, while Participant 7 said “I want textbooks.”

The analysis showed that the most common category resulting from the second cycle coding was the need for support, where relevant PD appeared most frequently. As an illustration, Participant 2 stated that “relevant PD, PD for real world experiences” was necessary. Participant 9 expressed that “more in- person professional development” was needed. Also, Participant 5 indicated the need for current professional development when she responded that “give us actual techniques or strategies that we could use or incorporate into our classroom.” Participant 4 expressed that “the mental health kind of avenue.” could be one of the areas of need support and she was “concerned as sometimes about safety.”. Admittedly, Participant 6 that “need more on public speaking and more

issues to deal with how to be a unique teacher. Hence, some areas that may urge support include safety, public speaking skills, mental health, and skill-based training.

Third, the barriers to succeed was another category. Some of the participants talked about barriers or challenges faced to succeed in the classroom. For example, "So that the same limitations that they give to humanity teachers, don't, always correspond with CTE like they'll say for CTE teachers" (Participant 2). "For the teacher in my instance, not having support and the office just not buying supplies (Participant 3). As a result, participants faced barriers in the classrooms that hindered their abilities to succeed based in their lived experiences.

Fourth, the category identified as "unhealthy meetings". Most of the participant's responses expressed poor satisfaction with the efficiency of the meetings. For example, Participant expressed the desire that "the time could be better utilized" and Participant 3 said "but the professional development really isn't geared toward CTE classes in the school". Similarly, Participant 2 said, "no professional development geared me to help me.". Therefore, participants reported that their experiences with PD in schools were unhelpful for their teaching practices.

Themes

I identified five themes for this study (see Appendix E) after completing the data analysis. The first theme was unhelpful PD experiences. It seems that approaches with PD lack of relevancy and the participant's perceptions of their support with PD experience maybe unproductive. "The efficiency of the meeting is not well done." (Participant 5). Similarly, Participant 8 said that "Some PD waste the time" (Participant

8). The efficiency of the meetings could be better. Hence, their experiences with PD, based on participants perceptions, lack of relevancy and could have been more useful.

The second theme was PD shows lack of support for CTE programs. It seems that PD "aren't' really relevant or applicable to the actual situations" (Participant 3) which was the reality or content taught by the participants in their classrooms. Moreover, Participant 3 said that the PD in the district "lack of real relevance". Although, Participant 9 told that "well, but there is something that I will always learn". It follows, then, that most participants felt that the PD offered to them was irrelevant, poorly planned, and failed to address their needs or connect better planned and address their needs or connect with their curriculum.

The third theme revealed was that technology is used to help with getting professional development. All participants expressed that they get support from the online platforms. For instance, Participant 3 "would rather have spent time signing up for professional development online, taking an online class, or little workshop instead" of attending the PD offered at her school. Thus, participants have utilized technology to receive training and support their skills-based and professional needs.

The data gathered from the participants reveled a theme that although not directly with the research question, was important. The theme was that technology tools are available in the classroom but not enough training on the tools or virtual learning. This theme did not answer the research question. However, it seemed that there was lack of training on these tools or virtual learning. For example, Participant 10 expressed the need for technological support for PD. She said, "more on technology" was needed in

reference to support with PD. Similarly, Participant 1 said that “more on the resources in terms of using the internet”. Types of PD that were needed included the use of modern technology and skills-based training as expressed by Participant 6. Consequently, participants felt that more training on the tools or virtual learning was necessary because understanding how to manage the resources and materials could increase their competence, which related to their motivation and self-efficacy.

The fifth theme was that retention was a problem due to lack of support in several areas. Moreover, the lack of support in different areas such as administration, logistic, and certification, was a major issue. All participants expressed some factors that contributed to the retention problem. Participant 1 said, “renumeration and opportunities” having a supportive management is very key”. Also, Participant 2 responded “rigor, relevance, and relationships”. “Support and administration” (Participant 3). Similarly, Participant 4 responded “school district support and administration” and Participant 5 said “having support on logistically how to actually get the certification”. Briefly, participants emphasized the importance of supportive management, relevant and rigorous curriculum, and positive relationships.

Additionally, financial constraints were identified as factors impacting the teacher retention, with many participants citing low salaries and limited opportunities for advancement. However, some participants noted that the passion and dedication to the students were important factors in retaining CTE educators. For example, Participant 10 told that “the love to the profession, the love for the students, and what they do” were factors impacting CTE teacher retention.

Participant 7 and Participant 9 both said that "money" was an impacting element for CTE retention. Participant 1, 2, 6, 8, and 10 indicated that financial part was also a factor that impact teacher turnover. In sum, participants felt that money, relevancy, rigor, support from administration and district were impacting elements for CTE retention. Overall, participants felt that financial considerations, relevancy, rigor, and support for the administration and the school district were all essential elements affecting teacher retention. Two participants reported receiving PD support from their administration, resulting in two discrepant cases in the data for this study. Their perception of support was positive as they confirmed through their responses. They expressed that they have been supported as that "I am kind of spoiled" and "they assigned me a mentor, it was late, but I had a mentor". Although, they identified needs areas of still need support. Their responses and attitudes toward the organization were indication that they had been applied learning from professional development into their classes.

Results

This study has been guided by the research inquiry of how CTE educators perceived their support with PD to implement instructional practices, while also remaining in the field and serving the students. The support for CTE educators had been inconsistent. PD teachers have been poorly supported with PD to enhance their practice serving the students and remaining in the field. The data analysis indicated that five different areas of concern for CTE program and its teachers. They were as follows: (a) unhelpful PD experiences, (b) PD shows lack of support for CTE programs, (c) technology is used to help with getting professional development themselves, (d)

technology tools are available in the classroom but not enough training on the tools or virtual learning, and (e) retention is a problem due to lack of support in several areas. Appendix E shows the themes as aligned to answer the research question, the themes meaning, and the alignment of the categories with the themes.

Theme 1: Unhelpful PD experiences

The first theme represented participant's perceptions indicating that the PD was impractical to their content. During the conversation about PD, several participants shared their opinions. Participant 7 questioned the achievability of some PDs "lofty goals" due to the lack of resources to make them happen. Similarly, Participant 3 expressed discouragement with PDs that "lacked real relevance" and were repetitive of previous topics. Participant 2 also shared that the PDs offered by their school were irrelevant to her teaching reality. They emphasize the importance of relevant PDs and highlighted the need for collaboration with business people, which is expected as part of the goals of the CTE program.

Theme 2: PD Shows lack of support for CTE Programs

Most participants mentioned that PDs did not corroborate with their practices in their classroom. Participant 2 and 5 pointed out that to get a "great" PD they should go out of their way instead of getting the learning from the school. Participant 8 stated that "the experiences they had with the public school system were not the best in term of support". The school system lacked a noticeable PD that connect with the needs of the CTE educators.

Theme 3: Technology is Used to Help with Getting Professional Development Themselves

Technology has been an area advancing educational practices. Some participants expressed importance of innovate in the classroom and found online resources to be beneficial. One participant, Participant 2 mentioned that she earned a smartboard certification attending a PDs offered by a professional organization. According to her, knowledge and skills she gained from the smart board PD are being applied in the classroom. Another participant, Participant 9 highlighted the advantages of using the online platforms such as "WhatsApp, YouTube, Chat GPT". She found these tools to be useful but stated that in-person PD programs were still necessary. The online platforms and resources available on the internet have been useful for supporting participant's educational and professional needs.

Theme 4: Technology Tools are Available in the Classroom but not Enough Training on the Tools or Virtual Learning

The technology tools available in the classroom appeared inadequate for some participant and beneficial for others. Most participants stated the need for more training on technology. Participant 1 and Participant 10 told that more training on technology Participant 8 expressed that she received modern equipment such as computerized sewing machines but needed more training on how to use the machines and resources to keep the sewing machine updated. She also said that she had challenges with the virtual learning. However, Participant 4, stated that her school was up to date with technology and had an in- school information technology person who took care of all her technical concerns as a

support. Hence, most participants needed more training on learning how to use the devices that are in the classroom to produce competent students.

Theme 5: Retention is a Problem due to Lack of Support in Several Areas

The fifth theme was that poor support in some areas have an effect on retention. The lack of support in various areas emerged as one of the common reasons for the high turnover rate. All participants agreed that expressed that supportive approaches and respectful professional relationships contributed to their decisions to remain in the field. Participant 2 mentioned that the extra workload, the staff shortages, and no resources could be the reasons for teacher turnover. Similarly, Participant 4 indicated that being overworked and ta and administration was also a significant concern. Relationships and relevance of the support were also crucial factors.

Similarly, Participant 3 stated that the lack of professional respect and support from the administration affected their job satisfaction and retention. By extension, Participant 3 shared that some teachers in their building are leaving the school. The lack of support, extra workload, poor relationship and professionalism, and job satisfaction have been factors impacting CTE educators' turnover.

Participant 5 reported that financial concerns, lack of resources support from colleagues, and administration, and support for teacher certification were critical issues. In the same way, for Participant 6, retention could be improved by investing in teachers and providing training opportunities that address their concerns. Participant 8 highlighted the importance of comfort in the school environment and positive relationships. Participant 9 motioned that the financial incentives played a significant role in retention,

and Participant 10 stressed the importance of commitment, job satisfaction, and adequate compensation. In conclusion, financial consideration, PD relevancy, support from administration (school and district) were essential factors affecting CTE teacher retention.

This study findings related literature review and Lent and Brown's (2019) SCCT theoretical framework. The literature review revealed several issues concerning to CTE education, including poor support for CTE educators was poor, the need for professional development to enhance instructional practices, and the urgency for professional development to address retention issues. The study findings by Bassok et al. (2021) and Olson Stewart et al.'s (2021) also highlighted the need to provide support with professional development and resources to aid retention. However, Bassok et al. and Miller and Young (2021) also recognized that CTE teacher support and their retention were problems in CTE programs.

Pulay and Tibbitts' (2022b) study findings indicated that the classroom setting significantly impacted the disposition of the teacher to teach. Claflin et al. (2019) identified that retention was also impacted by overworking tasks, while Holland and Coleman (2017) highlight the importance of collaboration with partners as the lack of funding can make difficult for schools to facilitate resources. Finally, Hughes and Partida (2020) found that it was necessary for their study participants to have more PD time to increase their cognitive knowledge and teach their classes effectively.

Based on my understanding, there were two distinct cases that had differed from the other 8 participants. The first case inferred that there were two discrepant cases in this

study. The first discrepant case was Participant 1 who reported receiving support from the administration. However, Participant 1 also identified areas where they still need support such as, modern technology and mentioned seeking help from the management of the school. The second discrepant case was Participant 4, who mentioned having implemented what learned from professional development.

Evidence of Trustworthiness

reviewed the transcripts of the semi-structured interviews multiple times to ensure the accuracy of the transcribed information. I created a reflective journal and kept reading the transcripts multiple times for reliability purposes. Also, I became familiar with the data as I read and review it multiple times. Besides, I wrote personal notes from the data. I used the MAXQDA as a qualitative program platform to analyze the data of this study. I bought the student license of MAXQDA Analytics Pro 2022 for data analysis. I created a coding system and a codebook from the MAXQDA features assistance. I created a table of codes (See Appendix C). I informed participants with the interview protocol. Each participant received a table of codes listing the codes generated from their data, the definition of the codes, and their quotes or excerpt from the transcripts illustrating the codes to each of them. This way the way for validating their responses. Also, this process was the way in which participants exited the study.

I shared excerpt with the committee to practice dialogic engagement and feedback on the methods applied the follow-up questions or interactions to avoid reflecting bias. I read and reviewed the data. I performed reflective TA, coded the data, categorized the

data, identified themes, and determined connections with the research questions. I shared the interview transcripts and data analysis with committee members.

Credibility was endured throughout the data triangulated, prolonged contact, member checks, reflexibility, and saturation, all these steps as mentioned in the previous chapter, Chapter 3. I applied Rubin and Rubin's (2012) recommendations that were to accomplished credibility by showing who understand about the study matter. I ensured that participants data provided was based on their educational experiences. Thus, I asked them about their experience as CTE educators through interview questions and they confirmed being CTE educators in the U.S. who taught in a public school. Their responses were based on their experiences and perceptions. Their participation in the study was voluntary. They consented their participation in this study.

Also, the data was analyzed in different ways and this process support credibility and reliability. I analyzed the data applying multiple coding procedures. I took notes from when I conducted the semi-structured interview capturing participants' expressions and tones as they responded to the interview questions. I listened to their responses. Furthermore, each time I heard the audio-recorded semi-structured interviews helped me to perform the reflexive TA. Moreover, the step of listening to the audio-recorded interviews and re-reading the interview transcripts support to familiarization with the data, which aided keeping the reflexive journal. Since, the process of sanitizing the data took four months and I had analyzed the data multiple times beyond that time. While the data collection process lasted approximately eight months, the coding process and thematic analysis in five months. I shared all the data gathered and analysis with

committee chair, practice dialogic engagement, and applied feedback for the methods that I applied in the analysis process.

I have ensured transferability of the data by keeping it password protected. I have also informed about how I interpreted the data and how it contributed to my analysis. I analyzed the data from participant's experiences and reported their perceptions, which could be applied to the reality of other CTE teachers. In summary, I have protected and examined the data based on the participants' interpretations rather than of my own ideas. In addition, I have discussed the transcripts and analysis with the committee members to reach the credibility criteria.

Throughout this study, I have been committed to maintain the dependability by being honest and transparent with the data. I ensured accuracy when I performed the coding process multiple times and used reflexive thematic analysis to develop a thoughtful analysis of the data highlighting important themes that emerged from both the data and the reflective journal. In addition, I kept detailed records of the data I gathered including the interview protocol, the codes, the categories, and the themes. Furthermore, I communicated with committee members to report my analysis and discuss it with them.

The confirmability of this study has been ensured through the factors that supported the reflexibility of this study. For instance, I created a reflective journal, codes, categories, themes, and a reflexive TA based on the data gathered for this study representing confirmability. Besides, I shared the table of codes, meaning of the codes, with participants excerpts, and interpretations with all participants resulted from the semi-structured interviews to validate the data and facilitating participants with the chances to

revise, validate the data, and made corrections if applicable if there were misinterpretations of their ideas before I start the coding process. Hence, the checking-in and participant validation could support confirmability because all participants have been provided with the chance to revise and reflect on the data which could allow for accuracy of the information gathered for this study.

Table 4

Overview of Codes

Parent code	Code	Coded segments (all interview transcripts)	Total of documents
	Professional development (PD)	160	10
Retention	Teaching and learning	24	7
Preparation and expertise	Opportunities to grow	33	9
	Professional organizations	16	8
	Dissatisfaction/annoying	53	10
	Retention	37	10
	Motivation	63	10
	Needs	96	8
Years of experience	Teaching and learning	66	9
	Lack of support	73	9
Professional development	Limitations	97	9
Years of experience	CTE program	40	10
	Technology	29	8
	Commitment	49	9
	Technology serving the students	12	5
	Self-efficacy	52	9
Teaching and learning	Challenges	60	8
	Beliefs	120	10

Summary

The answer to the research question is that the CTE teachers perceived their support is inconsistent. Therefore, data analysis reported that participants had experienced unhelpful PD. Also, PD showed lack of support for CTE programs. Besides, technology was used to help with getting professional development themselves. Hence, retention is a problem due to lack of support in several areas.

In chapter 5, the key findings of this study will be summarized and presented. The chapter will also explain how these findings confirm, contradict, CTE educators' perceived support with regards to professional development, instructional practices, and retention. Additionally, Chapter 5 will compare findings of this study with what was previously discovered in the literature review, which is chapter 2. The sections included in Chapter 5 are introduction, interpretations of findings, limitations of the study, recommendations, implications, and conclusions.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose and nature of the qualitative study was to investigate how CTE educators' instructional practices were supported by PD to serve the students and help CTE educators remain in the field. I conducted the study to explore CTE educator's experiences with PD, their support, and retention because it was unclear what was causing the turnover of CTE educators. I found that CTE programs have not been adequately supported by PD.

Interpretation of the Findings

The conclusions explained in Chapter 2 indicated challenges found by other researchers were the following:

- The lack of support for CTE teachers.
- Inconsistency in PD for CTE teachers.
- PD for CTE educators to enhance instructional practices that serve students.
- PD for CTE teachers to support retention issues.

The information gathered from participants could confirm the lack of support for CTE teachers. Most of the participants indicated that they were poorly supported by the administration. The findings of this study revealed that participants had unhelpful PD experiences. PD showed lack of support for CTE programs. Chey and Ney (2018) reported difficulties experienced by the administrators in facilitating PD for their CTE teachers. Also, technology was used to help with getting professional development themselves. Hence, retention is a problem due to lack of support in several areas.

The findings of this study confirmed the issues highlighted in Chapter 2. The results of this study were consistent with the research conducted by Anderson et al. (2018), Dyar (2018), Dymock (2019), Lavalle and Licthfield (2019), and Smalley and Sands (2018) which reported that PD support was inconsistent. Therefore, I interpreted that support with PD for CTE educators may be still a problem. Moreover, the literature revealed that retention is also a major issue problem, owing to the challenges of staffing and retaining CTE educators. Hira and Anderson (2021), Chey and Ney (2018), McNatt (2019), and Pulay and Tibbitts (2022b) informed about the challenges faced by the educators in this regard. Therefore, regular support is required to enhance instructional practices and innovative resources to support CTE educators' practices, retention, and their success.

In the context of the theoretical framework, I used the interest and choice models to guide the creation and alignment of the interview protocol. The SCCT framework was also helpful in organizing the data gathered from participants, allowing for exploration of their inputs, their background contexts such as their CTE content taught, their learning experiences, their interest, their choice goals, and their actions. In addition, the codes, categories, and themes emerged from the data gathered were planned according to the interest and choice model of the SCCT. The interest and choice model of the SCCT served to classify the interview protocol questions. Appendix A illustrates the how each question relates to the contexts such as person inputs, background context, learning experiences, interest outcome, outcome expectation, self-efficacy expectation, choice actions, choice goals, and performance domains and attainments.

The SCCT framework served as the theoretical framework in which I organized the data gathered to explain the inquiry of this study. The responses of the participants informed about their perceived actions, interest, and choices. For instance, participants' responses to the question about the type of support they received aligned with the learning experiences content part of the SCCT theory. The responses to the question about their motivation to participate in professional development were part of the interest outcome part of the SCCT. In addition, the participants responses in whether PD helped advance their instructional practices corresponded to self-efficacy expectation of the SCCT.

Limitations of the Study

During the study, I faced some challenges in finding participants who met the inclusion category, which was being a CTE teacher in the United States. The process to find suitable participants took 8 months. The semistructured interviews were held virtually, and audio recorded. Since the camera was turned off during the interviews, I could only hear the participant responses. I could not capture participants' gestures or facial expressions. Besides, this study has been limited to the perceptions of CTE teachers in one particular area and may not be representative of other areas. This qualitative study was a small in nature with 10 participants nationwide.

Recommendations

The recommendations for further research are that future research should be conducted on one specific CTE area of study and use a bigger sample. Also, the development of specific and relevant PD based on the CTE educator's instructional and

technical needs with a continual follow up to investigate the impact of the PD on CTE program's success is recommended. Furthermore, a study to examine the relationship and effects of PD, academic expectations, core subjects, business demands, and CTE teacher's self-efficacy on their student success could be beneficial. The CTE educators experienced lack of support and as a result, CTE educators often used technology and professional organizations to access needed PD. In addition, it is important to investigate how CTE is being implemented in different school districts in alignment to federal distribution of allocated resources that might ensure that each program across the nation is equally available to everyone. The findings of this study supported the literature's indication that there are discrepancies in PD for CTE teachers, poor support for CTE educators, and the need for enhancing instruction and retention. The results of my study reflect Tuckers and Hughes (2020) who found that schools have failed CTE programs due to the lack of actions from some CTE leaders. It follows, then that the support for CTE educators was inconsistent.

Similarly, Hicks et al. (2020) and Wu-Rorrer (2017) indicated that more support with PD was needed. Hales (2017), Sabin et al. (2018), and Widayati et al. (2020) suggested that PD enhances educator's competence whileBurrows et al. (2021) and Emerick's (2022) demonstrated that PD should be developed with specific outcomes to enhance educator's competence and meet the needs particular to their courses and the success of their students. These conclusions discussed in the studies mentioned above, along with the findings of this study, add weight to the argument that CTE educators have been poorly supported with PD to enhance their instructional practices, serve the

students, and remain teaching. CTE educators support with PD, materials, and resources should be inclusive, considering the relevance of the CTE subject that includes academic core subjects. Partnership and collaboration may help with retention issues.

Implications

The implications of this study suggest that CTE leaders should identify the specific needs of each CTE teacher to create a responsive support system that increases their competency, helps the students succeed, and retains teachers in the field of education. Based on the findings of this study, it is recommended that more PD support should be provided in areas such as social-emotional support, mental health, virtual learning, classroom management and safety, instructional engagement, innovative materials, and updated textbooks. Mohammad-Hussein et al. (2018) found that the PD needs for CTE educators included content knowledge, classroom management, and the use of technology. Briefly, the implications for social change include finding guidance to provide PD opportunities for CTE educators and advancing teaching and learning by understanding how current resources apply to be applied to CTE education.

Conclusion

In conclusion, CTE educators need training that could enhance their instructional practice to better serve the students, and more instructional materials and resources with extended support should be provided to serve the students. The need for PD always exists. However, it could be better addressed through research-based that consider educational pedagogy, knowledge of the CTE programs, and CTE teacher's needs and strengths.

References

Advance CTE. (n.d.). *Career clusters.* https://careertech.org/career-clusters

Advance CTE. (2021, July). *Perkins V supports teacher recruitment and retention.* https://careertech.org/resource/2021-PerkinsV-teacher-recruitment-retention

Akgunduz, D., & Mesutoglu, C. (2021). Science, technology, engineering, and mathematics education for industry 4.0 in technical and vocational high schools: Investigation of teacher professional development. *Science Education International, 32*(2), 172–181.

Ali, S. R., Brown, S. D., & Loh, Y. (2017). Project HOPE: Evaluation of health science career education programming for rural Latino and European American youth. *Career Development Quarterly, 65*(1), 57 71. https://doi.org/10.1002/cdq.12080

Ananekwe, M. C. (2020). Acquisition of skills in science, technical and vocational education (Stve) for a knowledge-based economy in Nigeria: Status, constraints and the way forward. *Bulgarian Journal of Science & Education Policy*, *14*(1), 54–70.

Anderson, K., Anderson, R. G., & Swafford, M. (2018). Effects of a professional development session on career and technical education teachers' perceptions of two-stroke engine inspection and testing: A preliminary study. *Career &Technical Education Research*, *43*(3), 259–274. https://doi.org/10.5328/cter43.3.259

Arneson, A., Hodara, M., Klein, S., Regional Educational Laboratory Northwest (ED), & Education Northwest. (2020). Career and technical education in Oregon:

Exploring who participates in high school and the outcomes they achieve. *Regional Educational Laboratory Northwest.* https://eric.ed.gov/?id=ED607349

Association for Career and Technical Education. (2020). *Teach CTE: A national teacher recruitment and retention summit*. https://www.acteonline.org/wp-content/uploads/2020/11/Teach-CTE-ConveningDocument-FINAL.pdf

Asunda, P. A., Finnell, A. M., & Berry, N. R. (2015). Integration of the common core state standards into CTE: Challenges and strategies of career and technical teachers. *Career and Technical Education Research, 40*(1), 48–62. https://doi.org/10.5328/cter40.1.48

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*, 117–148. https://doi.org/10.1207/s15326985ep2802_3

Barkhuizen, G. (2022). Ten tricky questions about narrative inquiry in language teaching and learning research: And what the answers mean for qualitative and quantitative research. *LEARN Journal: Language Education and Acquisition Research Network, 15*(2), 1–20. https://eric.ed.gov/?id=EJ1358745

Bartholomew, S. R., Bullock, E., & Nadelson, L. (2018). A route less traveled: Principals' perceptions of alternatively licensed CTE teachers. *Journal of Education & Training, 5*(2), 12–20. https://scholarsarchive.byu.edu/facpub/5564

Bassok, D., Markowitz, A. J., Bellows, L., & Sadowski, K. (2021). New evidence on teacher turnover in early childhood. *Educational Evaluation and Policy Analysis, 43*(1), 172–180.

Bowen, B., Marx, A., Williams, T., & Napoleon, L., Jr. (2017). School influence and classroom control: A comparison of career and technical education, Science, and mathematics teachers. *Career and Technical Education Research*, *42*(3), 183–192. https://doi.org/10.5328/cter42.3.183

Bowers, J., & Myers, L. A. (2019). A national collaborative approach to recruit, prepare, and support family and consumer sciences educators. *Family & Consumer Sciences Research Journal*, *48*(2), 131–137. https://doi.org/10.1111/fcsr.12339

Bowling, A. M., & Ball, A. L. (2018). Alternative certification: A solution or an alternative problem? *Journal of Agricultural Education*, *59*(2), 109–122. https://doi.org/10.5032/jae.2018.02109

Brand, B. R. (2020). Integrating science and engineering practices: Outcomes from a collaborative professional development. *International Journal of STEM Education*, *7*(1), 1–13. https://doi.org/10.1186/s40594-020-00210-x

Braun, V. & Clarke, V. (2022). *Thematic analysis: A practical guide*. SAGE Publications.

Brunsek, A., Perlman, M., McMullen, E., Falenchuk, O., Fletcher, B., Nocita, G., Kamkar, N., & Shah, P. S. (2020). A meta an analysis and systematic review of the associations between professional development of early childhood educators and children's outcomes. *Early Childhood Research Quarterly*, *53*, 217–248. https://doi.org./10.1016/j.ecresq.2020.03.003

Bullard, E. (2020). Purposive sampling. In *Salem Press Encyclopedia*. Retrieved August 7, 2021from https://eds.p.ebscohost.com/eds/detail/detail?vid=7&sid=3999a167-

2317-440c-905a8865428697e0%40redis&bdata=JkF1dGhUeXBlPXNoaWImc2l0ZT1lZHMtbGl2ZSZzY29wZT1zaXRl#db=ers&AN=119214123

Bureau of Labor Statistics, U.S. Department of Labor. (2017). *Occupational outlook handbook: Career and technical education teachers.* https://www.bls.gov/ooh/education-training-and-library/career-and-technical education-teachers.htm

Burrows, A. C., Borowczak, M., Myers, A., Schwortz, A. C., & McKim, C. (2021). Integrated STEM for teacher professional learning and development: "I need time for practice". *Education Sciences*, *11*(1). https://doi.org/10.3390/educsci11010021

Byrd, A. P., Saucier, P. R., & Anderson, R. G. (2019). Laboratory management needs of Iowa school-based agricultural mechanics teachers. *Career & Technical Education Research*, *44*(3), 37–51.

Castillo, J. M., Wolgemuth, J. R., Ginns, D. S., Latimer, J., Scheel, N., McKenna, M., March, A. L., Moulton, S., Wang, J., Thoman, S., Jenkins, A., Henson, K., & Ferron, J. M. (2018). Protocol for the systematic review of research on professional learning to promote implementation of a multitiered system of support in education. *BMJ Open*, *8*(11), e024057. https://doi.org/10.1136/bmjopen-2018-024057

Chaney, B., Braun, H., & Jenkins, F. (2020). Novice middle school teachers' preparedness for teaching, and the helpfulness of supports: A survey of one state. *Education Policy Analysis Archives*, *28*(107).

Chen, S., & Ney, C. (2020). Strategies to increase CTE teacher recruitment, engagement and retention through professional development. *Techniques: Connecting Education & Careers, 95*(5), 14–17.

Chen, Z., & Solberg, V. S. H. (2018). Pathways from caring and engaging adults to youth vocational identity: The mediational roles of career search self-efficacy and goal capacity. *Youth & Society, 50*(6), 780-800. https://doi.org/10.1177/0044118X17725459

Chukwuedo, S. O., & Ogbuanya, C. T. (2020). Fostering academic major satisfaction, career curiosity, and job search behaviors among electrical/electronic technology education undergraduates. *Journal of Career Development, 47*(5), 495-508.

Claflin, K., Sorensen, T. J., Velez, J. J., & Stewart, J. (2019). Examining the relationship of work-family conflict and turnover intentions of Oregon CTE teachers. *Career & Technical Education Research*, *44*(2), 114–143. https://doi.org/10.5328/cter44.2.114

Dainty, J.D., Sandford, B.A., Su, S.-H., & Belcher, G.G. (2011). Factors influencing the retention of secondary family and consumer sciences teachers. *Journal of Career and Technical Education, 26*(2). http://doi.org/10.21061/jcte.v26i2.524

Davis, S., Ravitz, R., & Blazevski, J. (2018). Evaluating computer science professional development models and educator outcomes to ensure equity. *Research on Equity and Sustained Participation in Engineering, Computing, and Technology (RESPECT)*, 2018, 1-4. https://doi.org.10.1109/RESPECT.2018.8491716

De Jong, D., & Campoli, A. (2018). Curricular coaches' impact on retention for early

career elementary teachers in the USA: Implications for urban schools. *International Journal of Mentoring and Coaching in Education*, *7*(2), 191–200. https://doi.org/10.1108/IJMCE-09-2017-0064

Devier, B. H. (2019). Teacher shortage and alternative licensure solutions for technical educators. *Journal of Technology Studies*, *45*(2), 48–59.

Didier, N. (2018). About the (non) existence of a lifelong education system in Chile. *Journal of Adult and Continuing Education*, *24*(2), 229–249.

Disberger, B., Washburn, S.G., Hock, G., & Ulmer, J. (2022). Accomplishments and challenges experienced by beginning agriculture teachers in their first three years: A collective case study. *Journal of Agricultural Education*, *63*(1), 115-131. https://doi.org/10.5032/jae.2022.01115

Dogan, Z. Y., & Altun, S. (2018). The effects of the research lesson study (RLS) model on teachers' professional development. *International Online Journal of Educational Sciences*, *10*(3), 215–229. https://iojes.net/

Donohoo, J. (2018). Collective teacher efficacy research: Productive patterns of behaviour and other positive consequences. *Journal of Educational Change*, *19*(3), 323–345.

Dos Santos, L. M. (2019). Recruitment and retention of international school teachers in remote archipelagic countries: The Fiji experience. *Education Sciences*, *9*(2), 132. https://doi.org/10.3390/educsci9020132

Doyle, J., Sonnert, G., & Sadler, P. (2020). How professional development program features impact the knowledge of science teachers. *Professional Development in*

Education, *46*(2), 195–210. https://doi.org/10.1080/19415257.2018.1561493

Draaisma, A., Meijers, F., & Kuijpers, M. (2018). The development of strong career learning environments: The project 'Career Orientation and Guidance' in Dutch vocational education. *Journal of Vocational Education & Training*, *70*(1), 27–46. https://doi.org/10.1080/13636820.2017.1392995

Duncan, J., Werhan, C. R., & Bergh, K. (2017). All hands on deck: Research needed to examine the educator shortage in family and consumer sciences. *Family & Consumer Sciences Research Journal*, *46*(2), 99–109. https://doi.org/10.1111/fcsr.12239

Dyar, A. (2018). Use of CREDE standards among career and technical education teachers with large percentages of hispanics students. *Career and Technical Education Research*, *43*(2), 123–148.

Ellis, J., Wieselmann, J., Sivaraj, R., Roehrig, G., Dare, E., & Ring Whalen, E. (2020). Toward a productive definition of technology in science and STEM education. *Contemporary Issues in Technology and Teacher Education (CITE Journal)*, *20*(3).

Emerick, M. R. (2022). Diversity ideology and school leadership: Obscuring inequities for emergent bilingual students in career and technical education. *Educational Administration Quarterly*, *58*(2), 223–257. https://doi.org/10.1177/0013161X211052510

Eroglu, M., & Özbek, R. (2021). Teachers' perceptions about school characteristics supporting professional development: A scale development study. *Shanlax*

International Journal of Education, *9*(4), 325–337.

Ferand, N. K., DiBenedetto, C. A., Thoron, A. C., & Myers, B. E. (2020). Agriscience teacher professional development focused on teaching STEM principles in the floriculture curriculum. *Journal of Agricultural Education*, *61*(4), 189–202. https://doi.org/10.5032/jae.2020.04189

Fish, B. A. & Jumper, R. L. (2021). Examining self-efficacy of FCS teachers following the Covid-19 switch. *Family & Consumer Sciences Research Journal, 113* (3), 18-26. https://dx.doi.org/10.14307/JFCS113.3.18

Franklin, M. (2013). *Understanding research. [electronic resource]: coping with the quantitative-qualitative divide*. Routledge. https://proquest.libguides.com/ebookcentral

Giani, M. S. (2019). Does vocational still imply tracking? Examining the evolution of career and technical education curricular policy in Texas. *Educational Policy, 33*(7), 1002–1046.

Gordon, H. R. D., Shaw, S., & Xue Xing. (2019). Analysis of subject matter topics presented at AERA's CTE annual meetings. *CTE Journal, 7*(2), 35–43.

Gore, J., & Rickards, B. (2021). Rejuvenating experienced teachers through quality teaching rounds professional development. *Journal of Educational Change*, *22*(3), 335–354. https://doi.org/10.1007/s10833-020-09386-z

Graves, N. A., & Hasselquist, L. (2021). A case study of CTE teacher retention: Transitioning from mid-career to veteran teacher status. *Journal of Family & Consumer Sciences Education, 38*(1), 1–12.

Green, C., & Moore, C. G. (2016). Professional learning: What CTE teachers want. *Techniques*, *91*(5), 40.

Güneri, O. Y., Orhan, E. E., & Aydın, Y. Ç. (2017). Professional development needs of junior faculty: A survey study in a public university in Turkey. *Journal of Higher Education /Yükseköğretim Dergisi*, *7*(2), 73–81. https://doi.org/10.2399/yod.17.005

Haddad, B., Velez, J. J., & Stewart, J. (2019). What moves you? How SBAE teachers navigate program migration. *Journal of Agricultural Education*, *60*(3), 246. https://doi.org/10.5032/jae.2019.03246

Hales, P. (2017). Shifts in teacher talk in a participatory action research professional learning community. *Studia Paedagogica*, *22*(4), 31–53. https://doi.org/10.5817/SP2017-4-3

Harding, J. F., Connors, M. C., Krauss, A. F., Aikens, N., Malone, L., & Tarullo, L. (2019). Head Start teachers' professional development, well-being, attitudes, and practices: Understanding changes over time and predictive associations. *American Journal of Community Psychology*, *63*(3/4), 324-337. https://doi.org/10.1002/ajcp.12327

Harris, L. M., & Girard, B. (2020). Evaluating the support of teacher choice in state history standards. *History Teacher*, *53*(4), 613-633.

Hasselquist, L., & Graves, N. A. (2020). CTE teacher retention: Lessons learned from mid-career teachers. *Career & Technical Education Research* 45 (1): 3–15. https://doi.org/10.5328/cter45.1.3

Hasselquist, L., & Kitchel, T. (2019). Factors of influence on classroom literacy practices. *Career & Technical Education Research*, *44*(2), 32–54.

Haviland, S., & Robbins, S. (2021). Career and technical education as a conduit for skilled technical careers: A targeted research review and framework for future research. ETS Research Reports Series, 2021(1), 1–42.

Hendricks, A., Myran, S., Katsioloudis, P. J., Owings, W., & Kaplan, L. (2021). Career and technical education industry credentials and its potential impact on a state's economy. *Journal of Applied Business & Economics*, *23*(8), 1–10.

Hendrix, J. D., Campbell, Y. L., Zhang, X., Downey, L. H., Jagger, C. B., & Schilling, M. W. (2021). Delivery and evaluation of a food science professional development training for Mississippi career technical education teachers. *Journal of Food Science Education*, *20*(4), 197–207.

Henry, K. A., Talbert, B. A., & Morris, P. V. (2014). Agricultural education in an urban charter school: Perspectives and challenges. *Journal of Agricultural Education*, *55*(3), 89–102.

Herbst, A. (2020). Case study: Career pathways in rural Kansas redesign schools. *Educational Considerations*, *46*(2).

Herranen, J.K., Aksela, M.K, Kaul, M., & Lehto, S. (2021). Teachers' expectations and perceptions of the relevance of professional development MOOCs. *Education Sciences*, *11*(240), 240. https://doi.org/10.3390/educsci11050240

Hicks, J., Dewey, J., Abebe, M., Kramer, M., & Schuchardt, A. (2022). Teasing apart the impacts of curriculum and professional development on teaching assistants'

teaching practices. *PLoS ONE, 17*(2), 1–18. https://doi.org/10.1371/journal.pone.0262841

Hira, A., & Anderson, E. (2021). Motivating Online Learning through Project-Based Learning during the 2020 COVID-19 Pandemic. *IAFOR Journal of Education, 9*(2), 93–110.

Hirano, K. A., Khurana, A., Lindstrom, L., & DeGarmo, D. (2022). Examining the role of peer support on work experiences for young women with disabilities. *Journal of Career Development, 49*(3), 632–646. https://doi.org/10.1177/0894845321991647

Holland, J. M., & Coleman, L. (2017). Training FCS educators to incorporate extension curricula in the classroom. *Journal of Family & Consumer Sciences, 109*(3), 50 54. https://dx.doi.org/10.14307/JFCS109.3.50

Hrmo, R., Miština, J., & Krištofiaková, L. (2016). Improving the quality of technical and vocational education in Slovakia for European labour market needs. *International Journal of Engineering Pedagogy, 6*(2), 14-22. https://dx.doi.org/10.3991/ijep.v6i2.5369

Hughes, A. J. (2017). Educational complexity and professional development: Teachers' need for metacognitive awareness. *Journal of Technology Education, 29*(1), 25–44. https://doi:10.21061/jte.v29i1.a.2

Hughes, A. J. (2019). Measuring metacognitive awareness: Applying multiple, triangulated, and mixed-methods approaches for an encompassing measure of metacognitive awareness. *Journal of Technology Education, 29*(2), 3–20.

http://scholar.lib.vt.edu/ejournals/JTE

Hughes, A. J., & Partida, E. (2020). Promoting preservice STEM education teachers' metacognitive awareness: Professional development designed to improve teacher metacognitive awareness. *Journal of Technology Education*, *32*(1), 5–20. https://doi.org/10.21061/jte.v32i1.a.1

Imperatore, C., Hyslop, A., & Association for Career and Technical Education (ACTE). (2018). *2018 ACTE Quality CTE Program of Study Framework*. Association for Career and Technical Education (ACTE). https://files.eric.ed.gov/fulltext/ED605974.pdf

Isik, E. (2013). Perceived social support and locus of control as the predictors of vocational outcome expectations. *Educational Sciences: Theory and Practice*, *13*(3), 1426–1430.

Kakar, Z. U. H., Rasheed, R. Aamir Rashid, & Akhter, S. (2023). Criteria for Assessing and Ensuring the Trustworthiness in Qualitative Research. *International Journal of Business Reflections, 4*(2), 150–173 https://doi.org/10.56249/ijbr.03.01.44

Kelley, T.R., Knowles, J.G. A conceptual framework for integrated STEM education. *IJ STEM Ed* 3, 1 (2016). https://doi.org/10.1186/s40594-016-0046-z

Kim, J., Youngs, P., & Frank, K. (2017). Burnout contagion: Is it due to early career teachers' social networks or organizational exposure? *Teaching and Teacher Education, 66*, 250-260. https://doi.org/10.1016/j.tate.2017.04.017

Kohli, R. (2019). Lessons for teacher education: The role of critical professional

development in teacher of color Retention. *Journal of Teacher Education*, *70*(1), 39. https://doi.org/10.1177/0022487118767645

Kosloski, J. M. F., & Ritz, J. M. (2016). Research needs: Career and technical education. *Career & Technical Education Research*, *41*(2), 117–140. https://doi.org/10.5328/cter41.2.107

Kramarski, B., & Heaysman, O. (2021). A conceptual framework and a professional development model for supporting teachers' "triple SRL–SRT processes" and promoting students' academic outcomes. *Educational Psychologist*, *56*(4), 298–311. https://doi.org/10.1080/00461520.2021.1985502

Lambert, M. (2012). *A beginner's guide to doing your education research project*. SAGE Publications.

Lanford, M., & Maruco, T. (2017). When job training is not enough: The cultivation of social capital in career academies. *American Educational Research Journal*, 55(3), 617–648. https://doi.org/10.3102/0002831217746107

Lavallee, J., & Litchfield, R. E. (2019). Nutrition nuggets for the family and consumer sciences classroom: An experiential Approach to professional development. *Journal of Family & Consumer Sciences Education*, *36*, 1–14.

Lent, R. W. (2016). Self-Efficacy in a Relational World. *Counseling Psychologist, 44*(4), 573–594. https://doi.org/10.1177/0011000016638742

Lent, R. W., & Brown, S. D. (2019). Social cognitive career theory at 25: Empirical status of the interest, choice, and performance models. *Journal of Vocational Behavior, 115*. https://doi.org/10.1016/j.jvb.2019.06.004

Lent, R. W., & Brown, S. D. (2019). Social cognitive career theory at 25: Empirical status of the interest, choice, and performance models. Chart. *Journal of Vocational Behavior*, *115*, *3*. https://doi.org/10.1016/j.jvb.2019.06.004

Lent, R. W. (2016). Self-Efficacy in a Relational World. *Counseling Psychologist*, *44*(4), 573–594. https://doi.org/10.1177/0011000016638742

Lent, R. W., Hackett, G., & Brown, S. D. (1999). A social cognitive view of school-to work transition. *Career Development Quarterly*, *47*(4), 297–311. https://doi.org/10.1002/j.2161-0045.1999.tb00739.x

Lent, W., Lopez, F.G., & Bieschke, K. J. (1993). Predicting mathematics-related choice and success behaviors: Test of an expanded social cognitive model. *Journal of Vocational Behavior 42*, 2, 223-236. https://doi.org/10.1006/jvbe.1993.1016

Lindheim, T. (2022). Participant validation: A strategy to strengthen the trustworthiness of your study and address ethical concerns. In: Espedal, G., Jelstad Løvaas, B., Sirris, S., Waeraas, A. (eds) *Researching values*. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-90769-3_13

Lyons, P. & Bandura, R. (2018). Self-efficacy: core of employee success. *Development and Learning in Organizations: An International Journal*, *33*(3), 9–12. https://doi.org/10.1108/DLO-04-2018-0045

Makel, M. C., Meyer, M. S., Simonsen, M. A., Roberts, A. M., & Plucker, J. A. (2022). Replication is relevant to qualitative research. *Educational Research & Evaluation*, *27*(1/2), 215–219. https://doi.org/10.1080/13803611.2021.2022310

Makopoulou, K., Neville, R. D., Ntoumanis, N., & Thomas, G. (2021). An investigation

into the effects of short-course professional development on teachers' and teaching assistants' self-efficacy. *Professional Development in Education*, *47*(5), 780–795. https://www.tandfonline.com/doi/full/10.1080/19415257.2019.1665572

Martin, L. E., Kragler, S., Quatroche, D., & Bauserman, K. (2019). Transforming schools: The power of teachers' input in professional development. *Journal of Educational Research* and *Practice*. https://scholarworks.waldenu.edu/jerap/vol9/iss1/13

Martino, L. M. (2021). Postsecondary teacher quality and student Achievement in Florida's career certificate programs using a causal comparative study. *Career & Technical Education Research*, *46*(1), 16–33. https://doi.org/10.5328/cter46.1.16

McCandless, D. and Sauer, A. (2010). Retention of construction teachers engaged in Missouri's secondary school system. *Journal of Career and Technical Education*, 25(2). https://journalcte.org/article/10.21061/jcte.v25i2.480/

McDonald, A. E., Dawkins-Moultin, L., & McWhinney, S. L. (2020). Food preparation literacy education for children and adolescents: A systematic literature review and synthesis of evidence between 2010 and 2019. *Journal of Family and Consumer Sciences, 112*(4), 13–28. https://dx.doi.org/10/14307/JFCS112.4.13

McIntosh, B., Morrish, D., & Wakefield, D. (2018). Secondary agriculture science teachers: Factors affecting who will stay and who will go. *NACTA Journal*, *62*(3), 249–253.

McNatt, D. B. (2019). Enhancing public speaking confidence, skills, and performance: An experiment of service-learning. *The International Journal of Management*

Education, *17*(2), 276–285. https://doi.org/10.1016/j.ijme.2019.04.002

Merriam-Webster. (n.d.). Transferability. In *Merriam-Webster.com* dictionary. https://www.merriam-webster.com/dictionary/transferability

Merriam-Webster. (n.d.). Trustworthiness. In *Merriam-Webster.com* dictionary. https://www.merriamwebster.com/dictionary/trustworthiness

Merrill, C. A., & Lawver, R. G. (2019). Integration of science, technology, engineering, and math into a food and nutrition curriculum in Utah. *Family & Consumer Sciences Research Journal*, *48*(1), 37–51. https://doi.org/10.1111/fcsr.12326

Miller, J. M., & Youngs, P. (2021). Person-organization fit and first-year teacher retention in the United States. *Teaching & Teacher Education*, *97*, N.PAG. https://doi.org/10.1016/j.tate.2020.103226

Mohammad Hussain, M. A., Mohd Zulkifli, R., & Nicholas, J. (2018). Teaching preparedness and the professional development needs of novice career and technical education (CTE) teachers in the United States. *International Journal of Pure and Applied Mathematics*. 118. https://www.researchgate.net/publication/337048049

Morgan, B. M., Rodriquez, A. D., Jones, I., Telez, J., & Musanti, S. (2020). The collaboration of researchers and stakeholders: Transforming educator preparation. *Journal of Curriculum and Teaching*, *9*(3), 182–189.

Moser, E. M., & McKim, A. J. (2020). Teacher retention: A relational perspective. *Journal of Agricultural Education*, *61*(2), 263–275. https://doi.org/10.5032/jae.2020.02263

Motto, M. (2021). Instructional coaching cycles and career and technical educators' TPACK. *Issues and Trends in Learning Technologies, 9*(2). https://doi.org/10.2458/itlt.2367

Nelimarkka, M., Leinonen, T., Durall, E., & Dean, P. (2021). Facebook is not a silver bullet for teachers' professional development: Anatomy of an eight-year-old social-media community. *Computers & Education, 173*. https://doi.org/10.1016/j.compedu.2021.104269

Newton, K. J., Fornaro, E., & Pecore, J. (2020). Program completion and retention of career changers pursuing alternative teacher certification: Who drops, who commits, and why? *Journal of the National Association for Alternative Certification, 15*(1).

New Vocational Science Findings from University of Maryland Discussed (Social cognitive career theory at 25: Empirical status of the interest, choice, and performance models). (2020, January 3). *Science Letter*, 1061 https://link.gale.com/apps/doc/A609991848/EAIM?u=minn4020&sid=ebsco&xid=3378c55

Olson Stewart, K., Rotheram-Fuller, E., & Liou, D. D. (2021). Beginning teacher support model: Elementary teachers' resilience and retention in Arizona. *International Journal of Modern Education Studies, 5*(1), 49–74.

Park, K. A., & Johnson, K. R. (2019). Job satisfaction, work engagement, and turnover intention of CTE health science teachers. *International Journal for Research in Vocational Education and Training, 6*(3), 224-

242. https://doi.org/10.13152/IJRVET.6.3.2

Parr, K., Parr, B., & Mohon, V. (2019). The impact of mathematically enhanced curriculum on career and technical education student math scores. *Career and Technical Education Research*, *44*(2), 4–31. https://doi.org/10.5328/cter44.2.4

Patton, M. Q. (2015). *Qualitative research & evaluation methods: Integrating theory and practice (4th ed.).* SAGE Publications.

Pena, L., Curado, C., & Oliveira, M. (2022). The contribution of LinkedIn use to career outcome expectations. *Journal of Business Research*, *144*, 788–796. https://doi.org/10.1016/j.jbusres.2021.09.047

Perry, A. (2019). Making the Most of Perkins V. *State Education Standard*, *19*(3), 15–17.

Piccott-Bryan, H., Jones, D., & Wattam, D. (2021). Career and technical education teachers integrating literacy and the support administrators provide. *Journal of Instructional* Pedagogies, 26.

Pineda-Herrero, P., Ciraso-Calí, A., & Arnau-Sabatés, L. (2019). La FP dual desde la perspectiva del profesorado: Elementos que coincidan su implementación en los centros. (Spanish). *Educación XX1*, 22(1), 15–43. https://doi.org/10.5944/educXX1.21242

Plasman, J. S., Gottfried, M. A., & Klasik, D. (2020). Trending up: A cross-cohort exploration of STEM career and technical education participation by low-income students. *Journal of Education for Students Placed at Risk*, *25*(1), 55–78. https://doi.org/10.1080/10824669.2019.1670066

Prabyai, S. & Silalaiy, K. (2020). A study of STEM education's integration in vocational

school teacher's instruction guidelines. *E3S Web of Conferences, 210,* 18057. https://doi.org/10.1051/e3sconf/202021018057

Pulay, A. & Tibbitts, S. (2022a). Exploring how FCS educators teach interior design in Idaho, Utah, and Washington. *Family &Consumer Sciences Research Journal, 50*(3), 231-243. https://doi.org/10.1111/fcsr.12429

Pulay, A. & Tibbitts, S. (2022b). FCS teacher recruitment and retention as related toclassroom environment and teacher productivity. *Family & Consumer Sciences Research Journal, 114*(1), 20-26.

Quesada, H., Mazzola, J., & Sherrard, D. (2020). Implementing experiential learning in high school agriculture and forestry curriculum: A case study in Guatemala. *Journal of Experiential Education*, *43*(4), 381–397.

Ravitch, S. M., & Carl, N. M. (2016). *Qualitative research: Bridging the conceptual, theoretical, and methodological.* SAGE Publications.

Reese, S. (2010). Bringing effective professional development to educators. Techniques: Connecting Education and Careers, 85(6), 38– 43.

Regional Educational Laboratory Appalachia (ED), SRI International, & National Center for Education Evaluation and Regional Assistance (ED). (2020). Assessment of the alignment between West Virginia's high school career and technical education programs and the labor market. Appendixes. REL 2020-019. *Regional Educational Laboratory Appalachia*

Rubenstein, L. D., Ridgley, L. M., Callan, G. L., Karami, S., & Ehlinger, J. (2018). How teachers perceive factors that influence creativity development: Applying a Social

Cognitive Theory perspective. *Teaching and Teacher Education, 70*, 100–110. https://doi.org/10.1016/j.tate.2017.11.012

Rubin, H. J., & Rubin, I. S. (2012). *Qualitative interviewing: The art of hearing data* (3rd ed.). SAGE Publications.

Ruhland, S. K., & Bremer, C. D. (2002). Professional development needs of novice career and technical education teachers. *Journal of Career and Technical Education, 19*(1), 18–31.

Sabin, M., Smith, A., Dubow, W., & Deloge, R. (2018). Creative computing challenge: teacher professional learning to enhance non computing career and technical education curricula with engaging computational practices for all students. *2018 Research on Equity and Sustained Participation in Engineering, Computing, and Technology (RESPECT)*, https://doi.org/10.1109/RESPECT.2018.8491714

Saeger, K. (2019). Perception of satisfaction in a CTE teacher preparation program. *CTE Journal, 7*(1), 2.

Saldaña, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). SAGE Publications.

Schmidtke, C. (2017). Commonly used theories in CTE research: Toward a core theory base for CTE. *Career and Technical Education Research*, *42*(3), 193-217.https://doi.org/10.5328/cter42.3.193

Serafini, M. (2018). The professional development of VET teachers in Italy: Participation, needs and barriers. Statistical quantifications and benchmarking in an international perspective. *Empirical Research in Vocational Education and*

Training, 10(1), 1–42. https://doi.org/10.1186/s40461-018-0064-9

Shernoff, D.J., Sinha, S., Bressler, D.M. & Ginsburg, L. (2017). Assessing teacher education and professional development needs for the implementation of integrated approaches to STEM education. *IJ STEM Ed* 4, 13 (2017). https://doi.org/10.1186/s40594-017-0068-1

Slonim, A. (2023). Common Threats to validity: What every leader needs to know. *Physician Leadership Journal, 10*(1). 12-13 https://doi.org/10.55834/plj.9308111984

Smalley, S. W., & Sands, K. (2018). Perceptions of career and technical education by pre-service students. *Journal of Research in Technical Careers, 2*(1), 52–58.

Smith, A. R., & Smalley, S. (2018). Job stress, burnout, and professional development needs of mid-career agricultural education teachers. *Journal of Agricultural Education, 59*(2), 305–320.

Stair, K., Hock, G., Warner, W., Levy, N., & Conrad, M. (2017). The CORE community: Career and technical education teachers' perceptions of the common core state standards after a professional development training. *Career and Technical Education Research, 42*(2), 117–130.

Stair, K. S., Warner, W. J., Hock, G., Conrad, M., & Levy, N. (2016). The core community: Career and technical education teachers' perceptions of the common core state standards. *Career & Technical Education Research, 4*1(2), 141–154. https://doi:10.5328/cter41.2.141

Sturko, P. A., & Gregson, J. A. (2008). Learning and collaboration in professional

development for career and technical education teachers: a qualitative multi-case study. Journal of STEM Teacher Education, 45(3), 5.

Teacher shortage report, U.S. Department of Education. (n.d.). *Teacher shortage areas*. https://tsa.ed.gov/#/reports

TeKippe, S. S., Bechtel, M., Faga, K. K., & Szabo, M. R. (2020). The 3CM Approach: A pedagogy based in theory and experience to move beyond the "what" into the "how" toward a pathway of lifelong learning and teaching. *International Journal of Pedagogy & Curriculum*, *27*(1), 39–52. https://doi.org/10.18848/2327-7963/CGP/v27i01/39-52

Thomas, G. (2017). *How to do your research project: A guide for students* (3rd ed.). SAGE Publications.

Toombs, J. M., & Ramsey, J. W. (2020). Potential mentoring impacts on Oklahoma induction-year school-based agricultural education teachers: A modified delphi study. *Journal of Research in Technical Careers*, *4*(2), 39–54.

Tracy, S. J. (2010). Qualitative quality: Eight "big-tent" criteria for excellent qualitative research. *Qualitative Inquiry*, *16*(10), 837–851. https://doi.org/10.1177/1077800410383121

Tran, H., Hardie, S., Gause, S., Moyi, P., & Ylimaki, R. (2020). Leveraging the perspectives of rural educators to develop realistic job previews for rural teacher recruitment and retention. *Rural Educator*, *41*(2), 31-46.

Tran, L. T. & Rinos Pasura, R. (2021) The nature of teacher professional development in Australian international vocational education, *Journal of Further and Higher*

Education, 45:1, 16-29, https://doi.org/ 10.1080/0309877X.2019.1702153

Tripp, P.J. & Ownbey, S.F. (2016). Creation of a new family and consumer sciences education program at Oklahoma State University. *Journal of Family and Consumer Sciences Education, 33*(Special Edition 1), 41-46.

Tucker, S. L., & Hughes, A. J. (2020). Endorsement of career and technical education: Phenomena influencing core-subject teacher perceptions. *Journal of Technology Education, 31*(2), 40–55.

Tyler, M., & Dymock, D. (2019). Maintaining industry and pedagogical currency in VET: Practitioners' voices. *International Journal of Training Research, 17*(1), 4 20. https://doi.org/10.1080/14480220.2019.1602218

U.S. Department of Education. (n.d.). *Legislation and regulations: Perkins IV*. http://cte.ed.gov/legislation/about-perkins-iv

U.S. Department of Education. (2017, June). Teacher shortages areas nationwide listing 1990-1991 through 2017 -2018: 2017 TSA nationwide compendium. https://www2.ed.gov/about/offices/list/ope/pol/bteachershortageareasreport201718.pdf

U.S. Department of Education. (2019, September). *Bridging the skills gap: Career and technical education in high school*. https://www2.ed.gov/datastory/cte/index.html

Utah State Board of Education. (2024). *Career and Technical Education (CTE):Special Populations*. https://schools.utah.gov/cte/specialpopulations

Wafi, A. A., Subri, U. S., Zulkifli, R. M., Mohamed, S., Hanapi, Z., Che' Rus, R., & Kamal, M. F. M. (2022). "You are Hired": Technical and Vocational Education

and Training Graduate Employability and Experts' Views. *Pertanika Journal oSocial Sciences & Humanities, 30*(2), 859–878. https://doi.org/10.47836/pjssh.30.2.23

Wassink, A. B., Gansen, C., & Bartholomew, I. (2022). Uneven success: Automatic speech recognition and ethnicity-related dialects. *Speech Communication*, *140*, 50–70. https://doi.org/10.1016/j.specom.2022.03.009

Werhan, C. R., & Whitbeck, D. A. (2017). Family and consumer sciences teacher shortage inaccuracies: Collaborating to set the record straight. *Journal of Family & Consumer Sciences Education, 34*(Special issue), 24–28.

Westheimer, J. (2022). Can teacher education save democracy? *Teachers College Record*, *124*(3), 42–60. https://doi.org/10.1177/01614681221086773

White, J. W., Moye, J. J., Gareis, C. R., & Hylton, S. P. (2018). Improving teacher-made assessments in technology and engineering education. *Technology and Engineering Teacher*, *77*(5), 23–28.

Whitley, V. P., Park, T. D., Warner, W. J., & Horne, E. T. (2019). Relationship between career and technical education student teachers' self-efficacy and edTPA performance. *Career and Technical Education Research*, *44*(2), 88–113. https://doi.org/10.5328/cter44.2.88

Widayati, A., MacCallum, J., & Woods-McConney, A. (2021). Teachers' perceptions of continuing professional development: A study of vocational high school teachers in Indonesia. *Teacher Development, 25*(5), 604–621. https://doi.org/10.1080/13664530.2021.1933159

Williams Jr., T. O., Ernst, J. V., & Clark, A. C. (2018). Profile of workforce development educators: A comparative credential, composition, and characteristic analysis. *Journal of Technology Studies*, *44*(2), 14–27. https://doi.org/10.21061/jots.v44i1.a.2

Wu-Rorrer, R. (2017). Filling the gap: Integrating STEM into career and technical education middle school programs. *Technology and Engineering Teacher*, *77*(2), 8–15.

Xing, X., Shaw, S., & Gordon, H. R. D. (2017). Quality indicators guiding secondary career and technical education programs of study. *Journal of Research in Technical Careers*, *1*(2), 47–60. https://doi.org/10.9741/2578-2118.1012

Yeagley, E. E., Subich, L. M., & Tokar, D. M. (2010). Modeling college women's perceptions of elite leadership positions with Social Cognitive Career Theory. *Journal of Vocational Behavior*, *77*(1), 30–38. https://doi.org/10.1016/j.jvb.2010.02.003

Yirci, R., Durna, Ş., & Kocabaş, İ. (2021). The current status of in-service trainings for teachers and expectations: Do they match? *International Online Journal of Education & Teaching*, *8*(2), 762–777.

Yost, D. M., Conrad, M., Watkins, L., Parr, K., & Gordon, H. R. D. (2019). A pilot survey of a self-efficacy tool for career and technical education administrators. *Journal of Leadership Education*, *18*(3), 70 81.

Zirkle, C., Jeffery, J., & Shrewe, L. (2019). A longitudinal study of alternatively licensed career and technical teachers. *Career & Technical Education Research*, *44*(1),

23–47. 10.5328/cter44.1.23

Appendix A: Interview Protocol

Interview Protocol

Date:

Time:

Interview Code/Numeric Pseudonym:

Location of Interview: (In person, Zoom, or phone interview)

Parts of the Interview and the questions:	SCCT Framework Interest and choice model of the SCCT framework (concepts): Person inputs, background context, learning experiences, interests, outcome expectation, self-Efficacy expectation, choice actions, choice goals, and performance domains and attainments	Comments
Introduction *Hello, this is Neyla Rivera. Thank you very much for agreeing to participate in this study. As you know, this study aims to explore the experiences of instructional practices, professional development, and support perceived by CTE educators.		

Participants of this study must be CTE educators, specifically family and consumer sciences, business, and information technology (IT) educators who are currently teaching or taught a CTE program of study. *This should last about 60 minutes. After the interview, I will be examining your answers to gather data for this study. The data analysis, and your answers will be shared with my committee chair. However, I will not identify you in my documents, and no one will be able to identify you with your answers. You can choose to stop this interview at any time. Also, I need to let you know that this interview will be recorded for transcription purposes. Do you have any questions? Are you ready to begin?		
Research Question:		

How are CTE educators supported with PD to implement instructional practices to serve students and remain in the field?		
Part 1: How are CTE educators supported with PD? Interest and choice model of the SCCT framework (concepts): Person inputs, background context, learning experiences, interests, outcome expectation, self-efficacy expectation, choice actions, choice goals, and performance domains and attainments Question 1: **Person inputs** 1. Can you please tell me about yourself? Question 2: **Background context** 2. What CTE subject do you currently teach? a. How many years have you been teaching? b. How many years have you been teaching CTE? Question 3: **Learning Experiences** 3. What type of support have you received? a. From whom? Question 4: **Interest/Choice goals** 4. What was your motivation to participate in PD? What discourages you?	Person Inputs: Background Context: Education Teaching Experience Industrial Experience Learning Experiences: Training Professional Development Interest/Choice Goals: Motivation Aspiration Goal	

Part 2: PD to implement instructional practices to serve students? Question 5: **Self-efficacy expectation** 5. Do PD advance your current instructional practices to teach CTE classes? How so? a. Can you please give me some examples? or practices that you integrate? Question 6: **Self-efficacy Expectation** 6. How do you perceive that your participation in PD is serving the students?	Self-efficacy Expectation	

Part 3: PD help remain in the field? Question 7: **Choice Action** 7. Was PD and support important to you in making your decision to stay teaching? a. What are the areas of support that you still need?	Choice Action	
Question 8: **Learning Experiences/Self-efficacy expectations** 8. What are the barriers/challenges faced to succeed in your classroom? a. What resources are needed? b. How do you seek support to improve teaching and learning?	Learning Experiences/Self-Efficacy	
Question 9: **Outcome Expectations/Choice Goals** 9. What are/were the goals of the PD if attended? What types of support have you received with PD?	Outcome Expectation/Choice Goals	
Question 10: **Performance domains and Attainments** 10. What are the impacting elements for CTE teacher retention?	Performance Domains and Attainments	
Question 11: **Outcome Expectations** 11. Why is it beneficial to participate in PD? Why is it not beneficial?	Outcome Expectations	
Closure: 12. Thank you for your answers. Do you have anything else you'd like to share? 13. Do you have any questions for me? Thank you for your time.		

Appendix B: Research Design Alignment Table

Table B1

Research Design Alignment

Research Problem, Purpose, and Framework	Research Question(s), Method, & Design List one or more RQs, as needed; select method; identify design. Use a separate form for additional RQs.	Data Collection Tools & Data Sources List the instrument(s) and people, artifacts, or records that will provide the data for each RQ.	Data Points List the variables, specific interview questions, scales, etc. that will be used for each RQ.	
Problem: The problem that will be addressed through this study is that CTE educators are inconsistently supported with professional development (PD) to implement instructional practices that serve students and support CTE educators to	RQ1: How are CTE educators supported with PD to implement instructional practices to serve students and remain in the field? Design: Basic Qualitative	Instrument - Researcher Participants: CTE Educators Data Collection: Semi-structured interviews *Interview Protocol (Interview Questions)	Introduction, Interview questions, and closure: Interview protocol guide Interview questions: 1. Please tell me about yourself. (SCCT Person Input) 2. What CTE subject do you currently teach? (SCCT Background Context) a. How many years have you been teaching? b. How many years have you been teaching CTE?	Interview transcripts, Coding Process. MAXQDA Thematic analysis (TA)/Reflective TA Codebook Coding: Line-by-line (First cycle) Axial, eclectic, and pattern coding (second and third coding methods)

Research Problem, Purpose, and Framework	Research Question(s), Method, & Design List one or more RQs, as needed; select method; identify design. Use a separate form for additional RQs.	Data Collection Tools & Data Sources List the instrument(s) and people, artifacts, or records that will provide the data for each RQ.	Data Points List the variables, specific interview questions, scales, etc. that will be used for each RQ.
remain in the field. Purpose: The purpose of this qualitative study is to investigate how CTE Educator's instructional practices are supported with PD to serve students and support CTE educators to remain in the field. Framework: The framework that this study will address will be the SCCT.			3. What type of support have you received? (SCCT Learning Experiences) a. From Whom? 4. What was your motivation to participate in PD? What discourages you? (SCCT Interest/Choice Goals) Part 2: PD to implement instructional practices to serve students? 5. Do PDs advance your current instructional practices to teach CTE classes? How so? (SCCT Self-Efficacy Expectation) a. Can you please give me some examples? or practices that you integrate? 6. How do you perceive that your participation in PDs is serving the students? (SCCT Self-Efficacy Expectation)

Research Problem, Purpose, and Framework	Research Question(s), Method, & Design List one or more RQs, as needed; select method; identify design. Use a separate form for additional RQs.	Data Collection Tools & Data Sources List the instrument(s) and people, artifacts, or records that will provide the data for each RQ.	Data Points List the variables, specific interview questions, scales, etc. that will be used for each RQ.
			Part 3: PD help remain in the field? 7. Was PD and support important to you in making your decision to stay teaching? - (SCCT Action Choice) a. What are the areas of support that you still need? 8. What are the barriers/challenges faced to succeed in your classroom? (SCCT Learning Expectation/Self-Efficacy Expectation) a. What resources are needed? b. How do you seek support to improve teaching and learning? 9. What are/were the goals of the PDs if attended? What types of support have you received with PDs? (SCCT Outcome Expectation/Choice Goals) 10. What are the impacting elements for CTE teacher retention? (SCCT

Research Problem, Purpose, and Framework	Research Question(s), Method, & Design List one or more RQs, as needed; select method; identify design. Use a separate form for additional RQs.	Data Collection Tools & Data Sources List the instrument(s) and people, artifacts, or records that will provide the data for each RQ.	Data Points List the variables, specific interview questions, scales, etc. that will be used for each RQ.
			Performance Domain and Attainments) 11. Why is it beneficial to participate in PDs? Why is it not beneficial? (SCCT Outcome Expectation) 12. Thank you for your answers. Do you have anything else you'd like to share? 13. Do you have any questions for me? Thank you for your time.

Appendix C: Codebook

Table C1

Codebook

Code	Code description	Sample quote
1. Administrative Support	This code captured participant's expressions of perceived support by the administration. This could include having the "assistant principal was helping us to identify what certifications were available, and then we were there." (Participant 7)	I would say that the support that I'm lacking is with students. Our students have a lot of needs and concerns that cannot always be met by me, and if they're very full classrooms. It's hard for me to, you know, have a good relationship with each of those students, so I would say, as a professional. I feel very supported. However, sometimes teaching and do like our students I feel, are not as supported. But unfortunately, that's a growing concern across the nation. (Participant 4)
2. Advance Skills	This code represented the interpretation of the PD or actions that may improve teaching skills. For example, "PD where we're kind of like highlighting, how we can use different you know, skills or information in our classrooms." (Participant)	"You must advance your skills and training." (Participant 1)
3. Beliefs	This was a value code. This code was representing attitudes, beliefs, believes, and opinions of the participants. The "opinion: "Let's not act like this is really awesome because it's like not even the bare minimum in my opinion."	Participant 5: I think is really helpful, because obviously we don't make a ton of money. And it's, you know, not only rewarding financially, but also, I'm going to say emotionally, but the connections are really, really fulfilling, I think for me.

Code	Code description	Sample quote
	(Participant 5)" of the participants.	
4. Benefits	This code represented the new learning gained, benefits of networking, and opportunities to grow by participating in PD or strengthening relationships with industry partners or professional organizations. This code meant how participants have been "growth in talent to grow as a person in terms of skills (Participant 6)" and benefits from participating in PD.	"It helps me to better communicate to the students' opportunities available to them if they maintain in the pathway." (Participant 7)
5. Better Resources	The code "better resources" meant providing adequate supplies, materials, and professional development to support CTE educators' instructional practices. This code included participant's expressions such as, "I can't squish that many kids in one little space so providing other opportunities and other equipment, it throughout the room may be a benefit." (Participant 4)	"It's not beneficial when lofty goals are set that are unattainable, because we don't have the resources to make that happen." (Participant 7)
6. Bureaucratic	This coded meant to the words or phrases use by the participants to refer to the group of	"It's so like it's so much red tape." (Participant 2)

	Code	Code description	Sample quote
		people's voice and power to determine actions and execute their power to make decisions. "Then, because it is bureaucratic everything is affected (Participant 10)."	
7.	Challenges	This code represented the words or phrases that may affected teaching and learning. Also, it may refer to the obstacles or circumstances that may limit their abilities to perform. This may include to "deal with different classes." (Participant 6)	"Not having support and the office just not buying supplies. It was definitely a challenge, for our sewing projects we wouldn't have the fabric on time. We didn't get enough fabric It. Those were challenges." (Participant 3)
8.	Challenges to get materials	This code represented struggles expressed by the participants to obtain instructional materials. Then, it is like they did not give me anything. Some students have but not others." (Participant 10)	The school would not buy that for us. I had put my order in. They said they were going to, and then they wouldn't spend the money on it. So, I wound up, you're going to laugh at me. But what the heck I wound up going to Goodwill and getting some dolls for like a couple of bucks each baby dolls. (Participant 3)
9.	Commitment	This code was defined as the dedication to the profession. The participant responses that showed commitment. For example, "teachers give what we called "the extra mile." (Participant 10)	"I have the commitment to teach them this must live in the minds of all teachers." (Participant 8)

Code	Code description	Sample quote
10. Communication	This code referred to exchanging information, identifying benefits for professional development and networking, and addressing miscommunication. The "teachers we're all together, and all speaking the same languages or the same language on behalf of the kids in the good way for the community." (Participant 9)	"Being able to communicate with the students." (Participant 6)
11. Community lens	This code represented the alliance between the parents, the school, and the community. Also, highlights the area that possible may need attention to strengthen the CTE program between the school and community. For example, "The relationship of the parent to the school. And in these programs more because you look at that you need the parent." (Participant 8)	"And I think a little bit more of a community lens that may be a little bit more beneficial than how to approach or teach the community that's within my classroom." (Participant 4)
12. CTE Program	This code represented the CTE program or cluster name. For example, "the business administration program (Participant 9)", and "Family and	"I teach human services, personal care, cluster, which is barbering and cosmetology with the licensure examination for students when they graduate high school" (Participant 2)

Code	Code description	Sample quote
	Consumer Sciences/CTE" (Participant 8) programs. Also, this code constituted the teaching experience of the participant in the CTE program.	
13. Dissatisfaction/Annoying	This code represented the words or phrases of participants responses interpreted as indication of dissatisfaction or concerns that may annoy participants. It can represent "the frustrating part, because usually when they have those professional developments (Participant 2)".	"Having wasted days on the PD is really frustrating, especially for me, because I do only have one conference time. I don't have any extra time to spare during my day." (Participant 5)
14. Extra Tasks	This code represented the overworked tasks and additional activities the CTE teacher may perceived, "The other thing is, it's put on the teachers a lot." (Participant 5)	I understand how they would want us to share that information with our other with our colleagues, but also, it's like If you're a high performing teacher, your plate is hugely full, so the last thing you want to do is like, do something else extra, because the chances are you're already doing so many other extra things. (Participant 5)
15. Frustration with PD	This code represented the discomfort and unhappiness with professional development. For example, "Give us actual techniques or strategies that we could use or incorporate into our	I think support from administration and just time to actually get tasks done for, like what I was mentioning like having wasted days on the PD is really frustrating. (Participant 5)

Code	Code description	Sample quote
	classroom." (Participant 5)	
16. Limitations	This code represented the factors that prevent participation or involvement in PD or prevent participants to advance teaching and learning. For example, "Defaced, does not keep pace with the transition." (Participant 10)	"It is a little bureaucratic and that also sometimes limit to major realization of our educational role." (Participant 10)
17. Lack of Relevancy	This code represented the interpretation of participant's responses of poorly content related PD. "But now I sit on the last while they are there, talking about things that do not interest you." (Participant 8)	"They're not really relevant" (Participant 3)
18. Lack of Support	This code represented the poor support. It may be slightly negative. It involved participants responses indicating lack of support PD, technology, curriculum, CTE program, resources, relevancy, funding, administration, and curriculum. "The support, that, the support has been minimal." (Participant 3)	"How do I seek support? Let me say. Well, I don't." (Participant 7)
19. Mentorship	This code represented the	"I have had different mentors who are actually my friends." (Participant 1)

Code	Code description	Sample quote
	assistance from an experienced colleague with teaching experience. This could be like "having someone to push you … even a mentor …keeps you motivated anytime you need help anytime you feel like things are not working." (Participant 1)	
20. Misunderstanding	This code meant the lack of knowledge about the CTE program. "They are not supportive of the program at all. I think they don't truly understand it." (Participant 3)	"Look, these programs are badly seen by the base. The organization has not work with the rest of the teachers, so that the teachers understand the vocational program (CTE program)." (Participant 8)
21. Motivation	This code represented participant willingness to do something and keeping their interest. Besides, this code may include eagerness to do things such as networking, gaining skills, serving students, and advancing. For example, if "there is a time where you feel like you also need to grow." (Participant 1)	"The motivation are the students and what you can you do for the students. Because what you can do for a student is a legacy." (Participant 10)
22. Needs	This code represented the urgency or things that were essentials and necessary to	"Need more professional development. In person, professional development." (Participant 9)

Code	Code description	Sample quote
	advance. It could be the "better support in getting supplies." (Participant 3)	
23. Opportunities to grow	This code represented the chances to improve. This may include other job opportunities. The opportunities to grow "because that is a way that we have to improve in our careers." (Participant 9)	"I found the mentors program super helpful on both ends as a Mentee and a Mentor." (Participant 5)
24. Retention	This code outlined reasons why CTE teachers leave or stay in their professions. If the "The teachers stay for what they are or feel comfortable in terms of what it is like to be in a school." (Participant 1)	We tend to have a large turnover, because people do have the desire to come and teach but they're not always told the amount of paperwork and red tape and other things that come with this job just to be able to teach. (Participant 2)
25. Technology	This code represented advances in computer technology. It referred to the applied sciences, trainings to be incorporated in the classroom, tools to advance education, and electronic devices. "It is the modern technology is being embraced in terms of having the equipment available even in class." (Participant 6)	"Now, with technology because technology can be positive and negative because it limits." (Participant 10)

Code	Code description	Sample quote
26. Technology Serving the Students	The code technology serving the students and advancing teaching and learning. Also, this included the technical tools and platform mentioned by the participants. For example: "Some of the worksheets on the Promethean board." (Participant 3)	"So, when they go on an interview, they can actually say, this is my digital portfolio." (Participant 2)
27. Partnering/Advisory Boards	This code represented partnerships and connections among CTE educators, their programs, and their organizations. The partnerships with industry partners. For example, "The employer tells us first-hand what is needed with the students for the students we have already brought." (Participant 10)	"You have to have Advisory board, so you get outside information on how to design your labs." (Participant 2)
28. Preparation and Expertise	This code referred to the benefits, degrees, and educational achievements. This included being "certified" (Participant 3, Pos. 19) CTE educator or "a national board-certified teacher." (Participant 2)	"I am a certified business education teacher. I am also a certified a SPED teacher, and a certified Spanish Teacher. I have a doctoral degree." (Participant 9)
29. Professional Development (PD)	This code represents the words and phrases meaning that reference training to help develop	"Not only specific in our needs is that who will be offering the PD is really prepared to offer the PD." (Participant 8)

Code	Code description	Sample quote
	new skills. It "is a way that we have to improve in our careers." (Participant 9)	
30. Professional Organizations	This code was given to the words or phrases that participant mentioned such as the" State Teachers Associate and the Association." (Participant 3). Also, educational professional organizations. For example, "association of teachers." (Participant 7) Most of the participants acknowledge the professional organizations when referring sources for support and PD offerings. "But any anything I do is with my professional organization" (Participant 2)	"Okay, so like the Association for Career and Technical Education, which is ACTE." (Participant 2)
31. Self-Efficacy	This code represented participants believes in their capacities. It is building confidence. It also meant to believe in their competence. "It's a term of confidence and also in terms of skills how you are able to perfect the skills how you are able to be unique." (Participant 1)	"I just won a national award." (Participant 4)

Code	Code description	Sample quote
32. Support	This code represented the aid, assistance, and help perceived by the participants. The support "in terms of mentorship (Participant 6)" and the having the assistance that implies "I'm here with you" (Participant 9) to help.	Our administration is very supportive for the CTE classes. Previously our district just went through a huge renovation, and all of the CTE classes got updated in one way, shape or form. So, my classroom is actually brand new as of last year. (Participant 4)
33. Tasks and Activities	This code represented the activities and tasks performed by the CTE teachers. The "duties would vary." (Participant 5)	"But CTE teachers, we still have to collaborate with business people. So that's that. That's important to me, and that is what will keep me in the classroom." (Participant 2)
34. Teaching and Learning	This code referred to the participants practices impacting education. Also, it did include that "we can teach to so many usable things that students can actually apply in their lives and in their future careers" (Participant 5)".	"Some more project-based learning opportunities because in CTE we don't necessarily have as many formative assessments." (Participant 4)".
35. Time Wasted	This code represented the perceptions of some participant's perceptions regarding how their time was used for PD, specifically if is lacking pertinence "That's what it was discouraging. It almost felt like a waste of time." (Participant 3)	"Some PD waste the time." (Participant 8)

Code	Code description	Sample quote
36. Skills-Based PD	This code meant the specific trainings or professional developments that could strengthen CTE teachers' abilities related to their CTE teaching content. This could include "use of modern technology and skill-based training." (Participant 6)	"Instead of making play dough, like so many other FCS teachers do to demonstrate knife skills." (Participant 4)
37. Social Emotional Learning (SEL)	This code represented participant's expressions that correspond to mental health and SEL. It meant managing emotions in a positive way for learning success. Because "Nowadays, I need to teach with the SEL in mind. (Participant 9)	"Our students have a lot of needs and concerns that cannot always be met by me the mental health kind avenue" (Participant 4)
38. Unproductive PD	This code related to the participant experiences towards the PD. Moreover, this code related to the efficiency of PDs. "The professional development that they have provided, I think help very little in terms of my content area." (Participant 3)	"So, I understand that we have to have some meetings, but the efficiency of the meetings is not well done." (Participant 5)
39. Urgency of PD to Enhance Content	This code represented the necessity. It meant the need of having professional development that relates to the CTE content. For	"They don't have professional development that we can actually take and use directly in our classes most develop professional development are geared for the humanity features." (Participant 2)

Code	Code description	Sample quote
	example, “PD for real world experiences.” (Participant 2)	
40. Technical Support	This code represented assistance needed with technology. It meant “To see in your classroom what resources are needed I think more of the technological support more of the resources in terms of using the Internet.” (Participant 1)	“More on the computer resources, tablets, or just yeah, for the students for the class, photocopies. photocopiers, presenter presentations done virtually to the students.” (Participant 6)
41. Years of Experience	This code constituted the teaching experience of the participant in the CTE program. This code meant teaching experience, “in the public-school setting” as a teacher. (Participant 2).”	“I've been teaching for a very long time, and CTE has been transitioning into my teaching career for about the last 10 years.” (Participant 7)

Appendix D: Categories, Category Meanings, and Aligned Codes

Table D1

Categories, Category Meanings, and Aligned Codes

	Category	Category meaning	Aligned codes
1.	Support received/perceived	This category means the perceived and received support by the participants, on how they expressed the help facilitated by the administration. "TEA is very supportive of our program right now through the grant, because we're receiving curriculum as well as opportunities for professional development where does features as well as the State is working together to implement programs." (Participant 7)	Administrative support Mentorship
2.	Areas of Need Support	This category includes the areas that participants identified as still need support told by the participants. "Now again, the professional development that is provided by my district does not cater well I won't, even say cater does not take into consideration career and technical ed courses…" (Participant 2)	Lack of Relevancy Misunderstanding Needs Professional development Teaching and Learning Skills-based pd SEL Urgency of PD to Enhance Content Community lens
3.	Barriers to Succeed	This category includes the challenges mentioned by the participants. "The infrastructure in schools is bad." (Participant 10)	Challenges Better resources Challenges to get materials Limitations
4.	Unhealthy meetings	This category includes the factors cause discomfort, frustration, poorly content related meetings, and inefficient time management expressed by the participants. So, having extra tasks, or eliminating any time, or if I feel like my time is being wasted, that's very frustrating, because it is so limited and, like our staff monthly meetings, are outside of	Dissatisfaction/annoying Frustration with PD Lack of Relevancy Time wasted Unproductive PD

	Category	Category meaning	Aligned codes
		our contract hours. So, I feel like it's like basically forced labor, because they're making us stay for a meeting which could be during school hours during our contract time. But it's not so. Those are points of frustration for kind of learning related things. The PD related things, I feel like the time could be better utilized. (Participant 5)	
5.	Partnering and Networking	This category includes participant's beliefs, opinions, and relationships with industry partners and professional organizations. "So, a lot of our labs the way that we design our labs for any CTE program in our State. You have to have Advisory board, so you get outside information on how to design your labs." (Participant 2)	Beliefs Benefits Partnering/Advisory boards Professional organizations Tasks and Activities
6.	Lack of Support	This category pertains to the participant's responses regarding to poor support and unmet needs. "So, there's just not a whole heck of a lot of support for the CTE classes in this particular district, and I'm going to say that goes to administration for not ensuring that there's that support." (Participant 3)	Lack of Support Needs
7.	Retention challenges	This category includes factors that participants have identified as potential challenges to retain CTE teachers. "Money!" (Participant 9)	Retention Extra tasks
8.	Justifications for CTE's Retention	This category includes factors that participants have expressed as reasons for staying in education. "Now, because I'm staying, I stayed here because I have, for my union relationship, for love to my students, for knowing that I have been able to make changes in the lives of my students." (Participant 8)	Advance skills Commitment Communication Mentorship Motivation Preparation and Expertise Professional organizations Self-efficacy
9.	Bureaucratic actions	This category includes protocols that interfere with teaching and	Bureaucratic

Category	Category meaning	Aligned codes
	learning. “The most demotivating is the bureaucratic, that I mentioned already and the lack of knowledge of the people…” (Participant 10)	
10. Technology aid	This category includes terms and technology identified by participants as assistive or needed. “Sure. So, mine individually, I would say that is unique to CTE classes would be more like technology based like we are an Apple school.” (Participant 4)	Technical support Technology Technology serving the students

Appendix E: Research Question, Themes, Theme Meanings, and Aligned Categories

Table E1

Research Question, Themes, Theme Meanings, and Aligned Categories

RQ1: How are CTE educators supported with PD to implement instructional practices to serve students and remain in the field?	Theme meaning	Aligned categories
Theme 1: Unhealthful PD experiences	This theme includes the aligned categories with reporting participants' experiences with PD and how their perceived the advantages and disadvantages of support with PD. This theme is that all the participants shared that PD was not helpful. Discrepant Cases: One participant shared that it is like "we have some professional development that impact our day-today teaching." (Participant 4)	Unhealthy meetings Lack of support
Theme 2: PD show lack of support for CTE Programs	All participants shared reasons why PD did not support their CTE classroom practices. Discrepant cases: Two participants found some helpful PD support. "Oh, in terms of demonstrations I didn't know previously that I can do a PowerPoint presentation until I got to this professional development or courses where they were using the modern technology …" (Participant 1)	Areas of need support Barriers to succeed Support received/perceived
Theme 3: Technology is used to help with getting professional development themselves.	All participants use technology to get help with professional development from professional organizations nationwide. Joining professional groups.	Technology aid

RQ1: How are CTE educators supported with PD to implement instructional practices to serve students and remain in the field?	Theme meaning	Aligned categories
Theme 4: Technology tools are available in the classroom but not enough training on the tools or virtual learning.	Discrepant Cases: Two participants were looking at content instead of professional groups. Downloading lessons for example. Most participants were saying they needed more training in technology tools such as smartboards. They go online and YouTube, but they don't get in person PD from the school. Note: Teachers has different ideas about how to use technology in the classroom. Discrepant case: One participant "Earned a smartboard certification attending PDs offer by the professional organization." (Participant 2)	
Theme 5: Retention is a problem due to lack of support in several areas.	People has leave because the lack of money, hidden extra workload, and lack of support for CTE programs in general. I think it's the same as for all retention of teachers. We need to get paid a living wage. They right. Please pay us. We want money so that we can feed our families and not have to work 2 and 3 and 4 jobs. (Participant 7)	Justifications for CTE retention Lack of support Retention challenges