Alternative Certification Routes for Career and Technical Education Teachers Matter: A Descriptive Study on CTE Teacher Efficacy and Retention in Pennsylvania

by
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Monastra, Stephen M. ***Alternative Certification Routes for Career and Technical Education Teachers Matter: A Descriptive Study on CTE Teacher Efficacy and Retention in Pennsylvania***

Abstract

This describes the experiences of alternatively certified Career and Technical Education (CTE) teachers who participated in the Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs. In addition, it identifies the perceptions of alternatively certified CTE teachers and Career and Technical Center (CTC) Directors about which specific competencies and practices within these programs affect CTE teacher efficacy and retention. The researcher utilized a descriptive, non-experimental mixed methods approach by distributing cross-sectional surveys to collect qualitative and quantitative data. The cross-sectional surveys revealed that alternatively certified CTE teachers feel the teacher preparation, induction, and mentorship programs mostly meet their needs to develop teacher efficacy and stay in the teaching profession. The respondents of both surveys did indicate the need for several changes to help increase teacher efficacy and retention. The greatest need for improvement was to make the programs more relevant to the needs of newly hired teachers and to have information, resources, and support provided to alternatively certified CTE teachers be more timely, and accessible. This study exhibited that alternatively certified CTE teachers need ongoing, meaningful, and accessible peer support embedded in all aspects of their professional learning to increase their self-efficacy and retention. The findings of this study advocate for more research on specific competencies and practices for teacher preparation, induction, and mentorship programs to determine why individuals choose to leave the teaching profession, and which competencies and practices lead to higher teacher efficacy and retention.

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Chapter I: Introduction

Declining teacher preparation programs in universities result in teacher shortages and low teacher retention (Gordon, 2014). A recent report by Pomerance and Walsh (2020), indicated that the number of teacher preparation programs declined by approximately one-third over the past eight years. Other negative factors such as teacher efficacy, co-worker relationships, professional growth, student motivation, lack of parental support, limited resources and autonomy, minimal administrative support, low salary, and student behavior and outcomes also influence teacher retention rates (Deever et al., 2020; Morris, 2006).

According to a study by Ingersoll (2003), an estimated 40% to 50% of new teachers quit teaching within five years of employment. Many teachers stated that their decision to leave was because of the absence of support and guidance from their school and administration (Deever et al., 2020; Ingersoll, 2003). In a separate study by the U.S. Department of Education on teacher attrition and mobility, approximately 25% of all new teachers leave within the first three years (Bottoms et al., 2013).

Low teacher retention rates span all states and subject areas. Career and technical education (CTE) teachers are no exception to this phenomenon. CTE teacher shortages affect high-priority and in-demand industries throughout the country and could impact economic growth (Deever et al., 2020; Wilkin & Nwoke, 2011). As states attempt to combat the shortages and help local businesses and industry to strengthen the economy, many of them have developed various routes to teacher certification, also known as alternative certification routes.

Alternative CTE teacher certification routes attempt to offset traditional education requirements with other requirements, such as work experience and training (Jacques & Potemski, 2014). While teacher candidates with little to no teaching experience or formal postsecondary education appeal to states that are desperate to fill CTE teacher openings, it is imperative that alternatively certified CTE teachers are provided sufficient and ongoing support, such as preparation courses, induction experiences, mentorship, and professional development. According to Bottoms et al. (2013), having the needed support helps make the transition to teaching successful and the CTE teachers more capable of meeting the demands and challenges of teaching while preparing students for careers and the workplace.

Improvement in these alternate certification routes and CTE teacher preparation, induction, and mentorship programs are needed as they are responsible for our CTE teacher pipeline. Many newly hired CTE teachers who follow the alternative certification route have no student teacher field-based experience and do not receive curriculum guides or any feedback or evaluation of their work at the beginning of their careers (Bottoms et al., 2013). Reducing the course requirements and allowing different certification requirements causes CTE teachers to be less academically prepared than core academic content teachers (Cramer, 2004). The lack of preparation produces problems for retention, pushing struggling teachers to leave the profession and consequently lowers CTE teacher retention rates (Bottoms et al., 2013).

Newly hired, alternatively certified CTE teachers need instruction and assessment training to succeed in the classroom. In fact, nearly 75% of new CTE teachers need additional training in instruction and assessments (Bottoms et al., 2013; Devier, 2019). Newly hired, alternatively certified CTE teachers are less effective and leave the teaching profession at two to three times the rate of fully prepared teachers (Carver-Thomas & Darling- Hammond, 2017). According to Bottoms et al. (2013), "When new CTE teachers lack crucial skills, they often become so discouraged by the complexity of the work and lack of formal and informal organizational supports that they leave the profession" (p.1).

Some of these alternative certification routes require years of service in business or industry to become certified. This creates an older CTE teacher workforce as they enter the teaching profession at a higher age (Morris, 2006). The age disparity between new CTE teachers and core academic teachers who enter the teacher workforce straight out of college also causes educational gaps. Most newly hired, alternatively certified CTE teachers have been out of school for an extended period before being hired. They are also less likely to have a baccalaureate degree (Gray & Walter, 2002). If they have a degree, their focus of study probably required fewer academic courses (Cramer, 2004).

As a result, CTE teachers are viewed as less academically and pedagogically ready for the classroom than other teachers and need more pedagogical professional development (Bottoms et al., 2013; Cramer, 2004; Gray & Walter, 2002). CTE teachers not only need specific occupational skills, but they also require skills to meet the needs of special populations of students, to develop support with lesson plans, align content and academic standards, and prepare students for the workplace and secondary education (Chen & Ney, 2020; Morris, 2006). On top of requiring CTE teachers to learn new academic skills and pedagogy, they must also keep abreast of their specific occupational skills and new occupational developments to keep their curriculum up to date (Maurer, 2001). These additional tasks and expectations for someone with years of experience in a career field that just transitioned to education can create extra stress, worry, and concern compared to teachers who followed the traditional teacher certification route (Bottoms et al., 2013).

To support newly hired, alternatively certified CTE teachers in transitioning into education, teacher preparation and induction programs must provide the opportunity for instruction on the development of technical knowledge and skills, a repertoire of research-based instructional strategies and assessments, pedagogical knowledge, and reflection on their teaching practice (Maurer, 2001; Stephens, 2015). One way to do this is by including a quality mentorship program within the teacher preparation and induction program. These programs can be a valuable asset for supporting teachers transitioning from industry to education (Stephens, 2015). Teacher preparation, induction, and mentorship programs should offer social assistance and guidance with daily tasks such as lesson planning or redirecting student misbehavior (Lucksnat et al., 2022). When CTE teachers experience a teacher preparation, induction, and mentorship program that lacks quality, it, in turn, affects teacher efficacy, retention, and CTE teacher shortages (Bruening, et al.2001).

Less effective teachers and teachers with lower self-efficacy who fail to meet instructional challenges will struggle to improve student outcomes and leave the profession early (Jacques & Potemski, 2014). Schools with high teacher turnover and shortages negatively impact teacher efficacy and student success. Low teacher retention schools are more likely to have lower levels of student achievement and less positive student outcomes (Lucksnat et al., 2022; Nguyen et al., 2022). Deever et al. (2020) explain that

> Newer teachers have neither the knowledge nor the skills to teach to the best of their future abilities, and due to this limiting reality, it has been estimated that a student who experiences new teacher turnover three times over the course of a few years may have lost the equivalent of an entire year of schooling. (p.1)

The natural relationship between the CTE curriculum and real-world experience makes learning more meaningful. The perspectives that CTE teachers bring to the classroom and share with their students are very beneficial and give students the skills they need for the global workforce or continuing their education (Jacques & Potemski, 2014; Stephens, 2015). As teachers progress through their years of service, teacher efficacy will increase (Sass, 2013). To bridge the gap between when alternatively certified CTE teachers begin and when they have had years of experience to hone their craft of teaching, there needs to be quality preparation, induction, and mentorship programs to improve both the level of instruction and the retention of CTE teachers (Ruhland & Bremer, 2003).

According to a U.S. Department of Education's nationwide listing of teacher shortages, 32 states reported needs for CTE teachers (Deever et al., 2020; Devier, 2019). The reduction of CTE teacher preparation programs has partly contributed to the CTE teacher shortage (Bruening et al., 2001). States have been finding other ways to secure CTE teachers. Many of them have identified and implemented an alternative certification route as an effective way to help reverse the teacher shortage (Organisation for Economic Co-operation and Development, 2018b).

Bottoms et al. (2013) highlight that over 75% of CTE teachers in 30 states have used alternative certification routes. The states' alternative certification routes vary regarding coursework, induction, and mentorship programs. In addition, qualifications for candidates to enter the alternative teacher certification route can differ from state to state in terms of required work experience, current employment, and educational experience. It is unclear how effective these programs are in preparing and training newly hired, alternatively certified CTE teachers to educate their students.

The wide variety of qualification and preparation standards for CTE teaching candidates and the quality of the teacher preparation, induction, and mentorship programs affect teacher efficacy and retention. Bottoms et al. (2013) and Zirkle et al. (2007), concluded that there are 150 alternative certification routes, of which only 32 require a teacher preparation program equivalent to the traditional teacher certification route, and only 21 of them require an induction or mentorship program. CTE teachers who pursue an alternative certification need help with basic teaching tasks. Many need support with the curriculum and how to prepare lessons and follow proper procedures, and processes.

In the researcher's state of Pennsylvania, newly hired, alternatively certified CTE teachers with little teaching experience need to be successful and effective in the classroom to positively influence student outcomes. They need quality individualized preparation, induction, and mentorship programs. When preparation, induction, or mentorship programs do not meet the needs of CTE teachers, they struggle and leave the position (Bottoms et al., 2013). Because newly hired, alternatively certified CTE teachers come into the educational field directly from the industry with little to no teaching experience and are rare to find a replacement for, supporting and retaining these teachers is a conundrum that states are trying to solve (Deever et al., 2020).

Statement of the Problem

Currently, there is a lack of consensus on what specific competencies and practices should be part of preparation, induction, and mentorship programs for CTE teachers to help them increase their self-efficacy and in turn, increase CTE teacher retention (Bruening et al., 2001). As alternatively certified CTE teachers enter the profession with a wide range of backgrounds and skills and with very little, if any, pedagogical knowledge it is difficult for schools to develop the support and fulfill the needs for alternatively certified CTE teachers. This study will focus on the state of Pennsylvania. It is not known what the experiences of alternatively certified CTE teachers in Pennsylvania are within teacher preparation, induction, and mentorship programs, and it is not known what the various current practices are included across Pennsylvania for alternative CTE teacher preparation, induction, and mentorship programs. The problem to be addressed through this study is to determine the perceptions of alternatively certified CTE teachers and career and technical center (CTC) Directors about which specific competencies and practices within preparation, induction, and mentorship programs for alternatively certified CTE teachers affect CTE teacher efficacy and retention in Pennsylvania.

Deever et al. (2020), found that a greater number of first year CTE teachers chose to leave the profession than first-year traditionally certified core academic teachers. In addition, Deever et al. (2020), discovered that newly hired, alternatively certified CTE teachers had a greater chance of staying in education if they had a preparation, induction, and mentorship program that supported them in classroom management, communication with parents, and preparing lesson plans. This research could inform the future development of specific competencies and practices for professional teacher preparation, induction, and mentorship programs that states offering alternative certification routes could use.

Standardized competencies and practices for teacher preparation, induction, and mentorship programs help produce teachers who are supported and are part of a team striving for a common goal. This makes them successful and effective, have increased self-efficacy, stay in the classroom, and positively influence student outcomes (Morris, 2006). Based on the experiences of alternatively certified CTE teachers in Pennsylvania who participated in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs, this study was developed to close the gap in the knowledge on the effects that CTE teacher preparation, induction, and mentorship programs of alternative certification routes, and specific competencies and practices within these programs have on CTE teacher efficacy and retention in Pennsylvania.

Purpose of the Study

Pennsylvania is one of the states offering alternative certification routes for CTE teachers. This research aims to describe the experiences of alternatively certified CTE teachers in Pennsylvania who participated in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs. In addition, this study will provide a description of the competencies and practices within CTE teacher preparation, induction, and mentorship programs of alternative certification routes that are perceived as having an impact on CTE teacher efficacy and retention in Pennsylvania. By examining Pennsylvania's alternative teacher preparation programs for CTE teachers and the CTCs' induction and mentorship programs through mixed methods research, the findings will identify specific competencies and practices for each program that meet the needs of newly hired, alternatively certified CTE teachers.

Research Questions

To achieve the research purpose, the following research questions will guide this study:

1. How do Pennsylvania CTC Directors describe teacher efficacy and retention of alternatively certified teachers within their schools?
2. What are the experiences of alternatively certified CTE teachers in Pennsylvania who participated in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs?
3. What are the competencies in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs that are perceived by Pennsylvania CTC Directors and alternatively certified CTE teachers to affect alternatively certified CTE teacher efficacy and retention in Pennsylvania?

4. What are the current practices in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs that are perceived by Pennsylvania CTC Directors and alternatively certified CTE teachers to affect alternatively certified CTE teacher efficacy and retention in Pennsylvania?

Assumptions of the Study

For this study, several assumptions are present. The first assumption is that the CTE teacher survey participants fully understood the questions and were truthful and honest in their responses. Survey participants can respond confidentially, with responses having no bearing on their current employment. Second, The CTC Directors have a clear understanding of their CTE teachers' needs efficacy. Third, the data gathered from the CTC Director's survey is accurate and will elicit reliable responses. In addition, CTC Directors will provide CTE teacher outcomes with personal identity descriptors removed. Fourth, the researcher assumes that the research participants are a representative sample of CTE teachers throughout Pennsylvania. Pennsylvania only has three regional postsecondary institutions where CTE teachers can enroll in an alternative certification program (see Appendix A). The number of responses from those who attended the three regional institutions will be the same. Fifth, the sample size used from various schools is assumed to reflect the random effects of bias among teachers. The teachers' opinions about their colleagues, supervisors, and college professors will influence their answers to the survey. Sixth, it is assumed that participants in the teacher survey have different external factors influencing their responses. Some teacher participants will have family members or friends who are educators and are considered additional support for them during their transition from the workforce into education. Some participants might also have additional obligations such as childcare, being a caregiver of a parent, or other social and economic factors influencing their responses.

Significance of the Study

This study will further research on alternative certification routes for CTE teachers in Pennsylvania and the experiences of alternatively certified CTE teachers in Pennsylvania who participated in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs. This study will advance the knowledge of the effects that CTE teacher preparation, induction, and mentorship programs of alternative certification routes, and specific competencies and practices within these programs have on CTE teacher efficacy and retention in Pennsylvania. This study is of practical significance to various stakeholders on the local, secondary, postsecondary, and state levels, informing them about the importance of compliance and oversight of teacher preparation, induction, and mentorship programs and how to improve state and district programs for alternatively certified CTE teachers.

The results of this study could also further education policies and ensure that each newly hired teacher, regardless of certification route, previous industry experience, or educational background, receives quality education, training, and support that is consequential to teacher efficacy and retention.

Teachers who begin their careers unprepared, with little support and low self-efficacy, tend to have lower student outcomes, affecting teacher retention (DeSilver, 2017). In addition, this research could further the practice of teacher preparation program directors and school administrators in evaluating their preparation, induction, and mentorship program competencies to improve the outcomes of newly hired, alternatively certified CTE teachers entering the classroom and, in turn, affect their students.

Limitations of the Study

The goal is to have a representative sample of CTE teachers throughout Pennsylvania. At the same time, this study only sought input from CTE teachers who went through the alternative certification route and remained in teaching. Those who left the teaching profession were excluded from this study due to the challenge of obtaining responses from them. Not being able to contact those who left the teaching profession causes a limitation on responses about what specific competencies and practices within alternative CTE teacher preparation, induction, and mentorship programs affect CTE teacher efficacy and retention in Pennsylvania

Volunteering for the survey requires personal time to complete. Another limitation is the background of the participants. Depending on the experiences that the participants had, the timing of the survey during the school year and preparation courses, their feelings towards a professor, mentor, school, program, or a new initiative could influence the participation rate and cause biases to be included.

Methodology

Based on the research questions, descriptive mixed method research will best serve this study. Descriptive mixed method research methods will be used for the data collected from various CTCs in Pennsylvania. Quantitative research is used to obtain accurate and reliable data for which statistical analysis can be performed (Queirós et al., 2017). Qualitative research is used to identify how people describe their own experiences and define the meaning of the issue causing their experiences (Kamal, 2019).

Cross-sectional surveys will be conducted as a descriptive mixed method research strategy. The surveys will be distributed to current CTC Directors and current students and graduates of the three Pennsylvania alternative CTE certification teacher programs. Questions on the survey will be focused on the participants' experiences and perspectives on the supports provided, and the level of preparation for the classroom they were afforded. Data from both the quantitative and qualitative research will be analyzed concurrently.

Definition of Terms

The following words and acronyms are defined as they may be perceived to have meaning that differs to persons unfamiliar with them.

Alternative Certification Route

A certification program in which candidates who want to enter the teaching field but do not hold an undergraduate degree in education from a teacher preparation program are simultaneously hired as professional teachers and enroll in a postsecondary certification program (Devier, 2019).

Career and Technical Center

A grade 9-12 public educational facility with the primary purpose of providing career preparation programs and other forms of career and technical education, either as a stand-alone institution or in conjunction with collaborating secondary schools (State of Rhode Island Department of Education, n.d.)

Career and Technical Education

A program under public supervision and control that provides integrated academic and occupational skills and learning experiences including knowledge, attitudes, work habits, and leadership skills for entry-level employment and participation in postsecondary education and training (Pennsylvania Department of Education, n.d.a).

Career and Technical Education Teacher

Professional employees or temporary professional employees who provide direct instruction to students in grades 7^{th}-12^{th} in various technical and vocational subjects, such as auto repair, healthcare, and culinary arts (U.S. Bureau of Labor Statistics, n.d.).

Core Academic Teacher

Professional employees or temporary professional employees who provide direct instruction to students related to academic subjects such as English, math, and science (Morris, 2006).

Student Outcomes

Any change or consequence occurring to a student as a result of enrollment and involvement in a particular educational program (Ewell, 1983).

Teacher Efficacy/Self-Efficacy

The belief someone holds about their ability to show necessary behaviors to fulfill their duties successfully as a teacher and to be a decisive factor in student outcomes (Kurt et al., 2014).

Teacher Induction

An orientation to support the professional growth of new teachers. These programs include district policies, mentorship, formative feedback on practice, and professional learning. Induction programs can vary in quality and scope (Jacques & Potemski, 2014).

Teacher Mentorship

A program to support novice teachers in learning a new job, reduce the stress of a career transition, and improve instructional performance by pairing the novice teacher with a top performer to model (Vierstraete, 2005).

Teacher Preparation

An approved postsecondary program to prepare professional personnel for employment in public schools (Pennsylvania Department of Education, n.d.c).

Teacher Retention

The proportion of teachers in one year who are still teaching in the same school the following year (Madden-Dent & Oliver, 2021).

Traditional Certification Route

A certification program in which candidates who want to enter the teaching field enroll in a postsecondary certification program that includes a combination of coursework, student teacher field-based experience, and a state-approved content area exam before being hired as a professional teacher (Uriegas et al., 2014).

Chapter II: Literature Review

This chapter will present research-based information about teacher retention and certification pathways in Pennsylvania, the United States, and other countries around the world. Findings from studies on teacher preparation, induction and mentorship programs will also be discussed. The facts, details and knowledge from previously peer-reviewed published literature and theoretical framework that is referenced in this chapter will describe the effect teacher preparation, induction and mentorship programs have on teacher efficacy and retention.

Since 2005, the U.S. teacher retention rate has consistently been around 92% which amounts to about 90,000 openings each year (Carver-Thomas & Darling-Hammond, 2017). There have been several reported reasons for low teacher retention including insufficient preparation time, lack of classroom management and discipline skills, dissatisfaction with testing, accountability and working conditions, and an inability to properly motivate students (Arnett-Hartwick & Cannon, 2020). In addition to those, a lack of administrative support and low teacher pay are considered to be workplace conditions that are highly correlated to predicting teacher retention (Boyce & Morton, 2023; Kearney, 2008). One of the most important variables that affect teacher retention though is the type of preparation and the amount of support a teacher receives prior to entering the teaching profession (Carver-Thomas & Darling-Hammond, 2017; Berger & D'Ascoli, 2012).

Teachers who have gone through a traditional teaching certification route studied the art of teaching, observed experts in the field of teaching, and practiced teaching with one-on-one support, increasing self-efficacy and foundational, entry-level skills needed to enter the teaching profession. Traditionally certified teachers feel more prepared to handle their teaching responsibilities, such as classroom management, choosing instructional materials, and using assessment to inform instruction than alternatively certified CTE teachers (Carver-Thomas & Darling-Hammond, 2017). Alternatively certified CTE teachers undertake the teaching profession with very little training, observation, and practice, with little knowledge of pedagogy if any, and a lack of understanding of the processes and laws of education as several states do not require alternatively certified teachers to have the preparation or qualifications as traditionally certified teachers (Zirkle et al., 2010).

This lack of requirements and qualifications from states for alternatively certified teacher preparation and training programs create knowledge and skill deficits for alternatively certified CTE teachers (Arnett-Hartwick & Cannon, 2020; Bottoms et al., 2013). Among the teachers who have left the teaching profession, those who were certified through alternative routes leave at a rate higher than their peers who were certified through a traditional teacher preparation program (Claflin et al., 2020). Postsecondary institutions and schools need to fill these deficits by providing a teacher preparation program that builds human capital, a teacher induction program that reinforces the structural capital, and a mentor program that develops social capital in order to raise psychological capital and teacher efficacy and retention (Mason & Poyatos Matas, 2015).

Theoretical Framework

The theoretical framework of teacher retention will guide this research study. This theory of teacher retention was proposed by Mason and Poyatos Matas (2015) in their peer-reviewed publication “Teacher Attrition and Retention Research in Australia: Towards a New Theoretical Framework.” Mason and Poyatos Matas (2015) argue that teacher retention is a complex phenomenon, consisting of positive psychological capital, human capital, structural capital, and social capital. Used as a theoretical framework for studying alternatively certified teachers’ efficacy and retention, this conceptual framework is applied through the analysis of specific competencies and practices of alternative CTE teacher preparation, induction, and mentorship programs in Pennsylvania.

Positive Psychological Capital

Self-efficacy is one's belief in their ability and the outcomes they are able to achieve. Bandura (1986) defines self-efficacy as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391). When comparing a teacher's self-efficacy and positive psychological capital, they can be viewed as having the same characteristics. Positive psychological capital theory refers to the constructs of hope, confidence, resilience, and optimism of an individual (Luthans & Youssef-Morgan, 2017). Several studies found there was a correlation between an individual's self-efficacy and psychological behavior, and their performance and retention in the workplace (Mason & Poyatos Matas, 2015).

From their research Luthans et al. (2004) defined each construct of positive psychological capital. Hope is seen as having the motivation and willpower to attain one's goals. Confidence is defined as the level of effort and belief in one's ability to obtain specific outcomes. Resilience is described as the capacity to bounce back from adversity and persevere. Optimism is interpreted as cognitively attributing positive external events to internal causes.

Positive psychological capital can be attributed to a teacher's self-efficacy by the amount of motivation, effort, perseverance, and positivity one will put forth to achieve their goals (Kumar et al., 2022). The development of positive psychological capital theory has proven to have a beneficial impact on workplace performance and retention. This also demonstrates that self-efficacy and internal variables can factor into a teacher's career path choice (Luthans et al., 2008). Though many accept positive psychological capital theory, it is still in its infancy and requires further exploration and development (Page & Donohue, 2004).

Human Capital

Human capital, defined as an individual's abilities, knowledge, and skills developed through formal and informal education, aligns with aspects of postsecondary teacher preparation programs (Leana & Pil, 2006). The educational process, school characteristics, family background, and an individual’s decisions about the amount and kind of education one receives are factors in educational attainment (Fleischhauer, 2007). When individuals acquire knowledge and skills through education and training, it increases productivity and self-efficacy in the workplace (Tan, 2014).

Human capital plays an important role in modern workplaces. According to Almager et al. (2021), schools must grow human capital by developing instructional practices and pedagogy. Postsecondary teacher preparation programs and school districts should prioritize instructional development and teacher preparation as it affects teacher efficacy and retention.

Human capital theory promotes the assumption that education solely determines productivity and retention. This use of a singular theoretical lens fails to acknowledge the interdependent variables between education and work (Marginson, 2017). Because of this, it is important to recognize other components and factors of teacher efficacy and retention throughout the teacher certification process.

Structural Capital

Structural capital theory is the institutionalized knowledge and culture of an organization. The structural capital used to manage teachers' schedules, classroom routines, student behavior, curriculum and administrative procedures all contribute to the organizational structure and school culture (Mason & Poyatos Matas, 2015; Ordóñez de Pablos, 2004). This information is passed on to new hires through onboarding, orientation and induction processes.

Schools conduct new teacher induction programs as their way to develop structural capital. Pennsylvania schools are required to implement a teacher induction program for all newly hired teachers. This induction program provides an overview of curriculum, instruction, assessments, and processes, procedures, and organizational policies unique to the school and the teacher's classroom.

Working conditions, workload, processes, administrative tasks, levels of accountability, and organizational technologies all factor into the performance of an organization and the ability of its members to achieve its objectives (Mason & Poyatos Matas, 2015; Ordóñez de Pablos, 2004). While structural capital is considered to be crucial to increasing the performance of an organization in the knowledge-based industry, research has shown that the association between them is not consistent. This indicates that there are other factors that could affect the relationship between structural capital and members of an organization's success (Ahmad et al., 2019).

Social Capital

Social capital refers to collaborative social relations and the benefits of membership in social networks (Akdere, 2005). According to Flap (2002), social structures affect the members of the network and their actions. As with social capital, teacher mentorship programs foster collaborative social networks among members within the school, including personal peer and professional teacher relationships (Podsen & Denmark, 2000).

Social capital is generated through the network of relationships and its member's resources (Lin et al., 2017). These resources and support are established in school social structures such as teacher mentorship programs (Akdere, 2005). When schools provide valuable interrelationships and strong social capital through network structures such as mentorship programs, it increases positive student outcomes and teacher efficacy and retention (Leana, 2010).

Research has shown that the capacity to learn in school social network structures is the leading form of social capital (McElroy et al., 2006). Lack of resources and support from school social networks can lead to feelings of isolation and low self-efficacy and retention (Mason & Poyatos Matas, 2015). Social capital theory has definitional and operational ambiguities, suggesting, along with the other capital theories mentioned previously, there could be additional factors affecting teacher efficacy and retention such as unsupportive administrators, student discipline, the work itself, achievement, and career advancement (Isham et al., 2002; Taylor, 1997).

Summary of Theoretical Framework

The four capital tenants based on Mason & Poyatos Matas's (2015) theoretical framework for teacher retention holistically contribute to the factors that affect a teacher's decision to leave the profession. According to Mason and Poyatos Matas (2015), teacher retention is an experience created by the interaction of these four capitals. While further research is recommended to test the validity of this theoretical framework, it was applied to this study to help build on the understanding of teacher efficacy and retention.

Pennsylvania Teacher Retention

Education is viewed as a way for countries to be successful socially and economically in today's global economy. It can improve people's understanding of society and the world around them. This leads to increased productivity and creativity which has a social and economic impact (Ozturk, 2008). Ever since the 1983 report "A Nation at Risk" by the National Commission on Excellence, having quality and capable teachers has been at the forefront when discussing educational policies (Saeger, 2019). Holding teachers to standards of quality is not unique to core academic subjects. This standard is also held for CTE teachers.

Even though CTE programs are sometimes seen as one entity within a school due to the allocation and sources of school funds, each CTE program requires different licensure requirements, professional organizations, and at times teacher preparation and certification pathways (Bowling & Ball, 2018). In 2008 the U.S. had over 102,800 students graduate with four-year degrees in education. As of 2018, only a little over 82,500 students graduated with a four-year degree in education (Flaherty, 2020). As teacher preparation programs and certification pathways are slowly dwindling, states are trying to find ways to increase the CTE teacher pipeline.

As a result, alternative certification routes are the options states are turning to, but they do not come without their own challenges. Retaining CTE teachers who meet the standards of quality the states have laid out for them has been more difficult than retaining core academic teachers. The majority of CTE teachers go through an alternative certification route to secure a teaching position, but these same alternatively certified teachers are less likely to stay in the profession after their first year of teaching (Bowling & Ball, 2018). Research showed that 86%

of CTE State Directors reported a moderate or severe CTE teacher shortage (Career Technical Education States' Perkins v Priorities, 2020).

Dissatisfaction from the teachers is the main cause for them to leave the profession. Studies have shown that the lack of professional learning opportunities, instructional leadership, and time for collaboration and planning have caused teachers to feel unsupported and ineffective (Kutsyuruba & Walker, 2015; Sutcher et al., 2016). Darling-Hammond and Berry (1999) reported that, throughout the U.S., state-funded teacher induction programs had a 100% participation rate, but locally funded teacher induction programs, such as the ones in Pennsylvania, have less than 15% participation rate.

Teacher preparation, induction, and mentorship programs are a means to meet the needs of CTE teachers. In the highest-performing educational systems worldwide, overall teacher retention rates are 97%, but in Pennsylvania, overall teacher retention rates are lower at 94% (Boyce & Morton, 2023). With almost half of the newly hired teachers leaving within their first five years of teaching, due to a lack of preparation programs, the quality of support for teachers beyond their first year is consequential (Ingersoll, 2003).

Pennsylvania Alternative Certification Routes

Over the past decade, colleges have been closing their Bachelor of Education programs causing students to seek other ways to enter the teaching profession (Flaherty, 2020). In addition, according to a survey conducted by Advance CTE, CTE State Directors specified that alternative certification routes are the most successful strategy in filling teacher vacancies (Advance CTE, 2020). As a result, offerings of alternative certification routes have increased significantly.

These alternative certification routes are provided by companies, such as Teach For America, and institutions of higher education. Enrollment in alternative certification routes that are unaffiliated with institutions of higher education has increased by over 40% from 2010-2018 (Cellini & Turner, 2016; Partelow, 2019). It has been estimated that the percentage of teachers entering the field through an alternative certification route is between 18% and 33% (Feistritzer, 2007; Flaherty, 2020). This accounts for over 35,000 alternatively certified teachers each year (Feistritzer, 2005).

Pennsylvania has also seen a decrease in traditionally certified teachers who graduated with a four-year degree in education and an increase in alternatively certified teachers (Boyce & Morton, 2023). The number of all teachers in Pennsylvania receiving an “Educational Obligation to Pursue Certification” emergency permit, as part of an alternative certification route, rose from 962 in 2015 to 3, 253 in 2021 (Pennsylvania Department of Education, n.d.b). This upward trend has set the amount of alternatively certified teachers to outnumber the traditionally certified teachers. These alternately certified teachers can be successful as long as they are well-prepared and mentored (Fenzel et al., 2014).

Teachers who completed ten or more teaching preparation classes, received recognition and support from a supervisor, or had the availability of a mentoring program were likely to feel well-prepared, have a sense of accomplishment, and remain in the profession (Bottoms et al., 2013; Saeger, 2019). The highest-performing educational systems from around the world have a limited number of teacher preparation programs and demonstrate quality and consistency across all routes of certification (Boyce & Morton, 2023). There is a plethora of teacher certification routes in the U.S. with inconsistent competencies and practices among them. States with numerous certification pathways and varying competencies throughout the alternative certification routes create issues for schools, individuals entering the teaching profession, and student outcomes (Bowling & Ball, 2018).

Currently, there are 126 approved teacher certification route providers in Pennsylvania. Thirty-five of them are alternative certification route providers. The varying teacher certification routes and lack of standardization among the certification routes cause many new teachers in Pennsylvania to not receive the proper support, or experiences needed, and feel unprepared to successfully continue in the profession (Boyce & Morton, 2023). Without quality preparation, induction, and mentorship programs, a large amount of alternately certified teachers will leave the profession (Guthery & Bailes, 2019).

Lack of Preparation

Teachers of CTE programs possess an abundance of technical skills and content knowledge within their industry. This makes them very effective in training students for careers, supporting the school's mission, and creating skilled employees for local business and industry. Schools have a difficult time filling teaching positions that require such specific technical skills for CTE programs. When hiring CTE teachers, the candidate's work history and technical knowledge are favored over their pedagogical skills and teaching experience.

Traditionally certified teachers must complete a full preparation and training program before entering the classroom. The increased requirements for traditionally certified teachers affect the supply of teachers and the pathways chosen for certification (Gray & Herr, 1998). Twice as many CTE teachers go through alternative certification routes and enter the profession with little or no training in instruction compared to traditional certification route teachers (Feistritzer, 2011). In most cases, alternatively certified CTE teachers are hired into full-time teaching positions, receiving their training while on the job (Devier, 2019). Because of this, CTE teachers might need more skills and self-efficacy to teach reading, writing, and mathematics content that their students will need to succeed in school and the workplace (Bottoms et al., 2013).

Fully qualified teachers are twice as likely to stay in education as those who lack more educational training. When entering the educational field, CTE teachers who follow an alternative certification route lead students in a classroom without any prior experience or preparation. In doing so, alternatively certified CTE teachers lack the basic pedagogical skills to conduct a well-structured classroom and learning environment (Bowling & Ball, 2018). Studies have shown that teachers who have taken the alternative certification route for teaching are missing some qualifications and need support with curriculum, lesson plans, CTE student organizations, students with disabilities, and student behavior (Bottoms et al., 2013; Judie Ahn, Rose Li and Associates, Inc, 2017; Morris, 2006).

The Elementary and Secondary Education Act of 1965 (ESEA) mandates that states must ensure not to have high rates of children being taught by inexperienced or unqualified teachers (Pennsylvania Department of Education, n.d.c). States who require teacher preparation coursework as a way to increase pedagogical skills and qualifications force alternatively certified CTE teachers to invest time and money towards college courses. In addition, a teacher who takes additional coursework while teaching has lower self-efficacy (Gordon, 2014). This can set up barriers to recruitment and retention. Policymakers can create alternative certification routes with a balance of competencies and required preparation coursework. Incorporating work experience, participation in induction and mentorship programs, and providing curriculum resources are additional ways alternatively certified CTE teachers can be prepared for success in the classroom (Bottoms et al., 2013; Jacques & Potemski, 2014).

Traditionally certified teachers enroll in coursework that incorporates student teacher field-based experiences under the guidance of a supervising teacher. They receive significantly more support and training and have a more refined knowledge of pedagogy, classroom management, and the overall school environment compared to alternatively certified teachers. Traditionally certified teachers are better prepared and have higher self-efficacy and retention rates (Bowling & Ball, 2018; Redding & Smith, 2016).

Alternative certification routes are criticized for their low retention rates due to their inconsistency in competencies and no formal student teacher field-based experience (Bottoms et al., 2013). There is a high need for professional development of alternatively certified CTE teachers prior to entering the classroom. A deciding factor in a teacher leaving the profession was whether the teacher received proper preparation and support (Kang & Berliner, 2012; Morris, 2006). Pedagogical skills including rubrics, assessments, alignment of curriculum and academic standards, engaging and motivating students, and developing classroom rules need to be addressed (Bowling & Ball, 2018). These types of competencies can increase the retention of alternatively certified CTE teachers.

Teacher Efficacy

Teacher motivation, effort, confidence, perseverance, and positive attitudes toward their influence over student learning are critical to student outcomes and job satisfaction. Teachers with low self-efficacy are ineffective and can impede up to six months' worth of student learning per school year (Jacob, et al., 2012).

According to Bandura (1997), a teacher's self-efficacy is most vulnerable in the first few years of their teaching career. Entering a new profession as an untrained novice teacher can be stressful and increase negative thoughts toward the career path and hinder career advancement

(Lent et al., 1994). There are many aspects to teaching that a newly hired teacher has to learn which can put doubt in a new teacher when entering the classroom. Vulnerable teachers have a greater likelihood of reaching the point of quitting the profession because of a lack of teacher efficacy (Bandura & Cervone, 1986; Steffy & Wolfe, 1998).

To help increase teacher retention and teacher efficacy, interventions should focus on strengthening teachers' sense of preparedness (Darling-Hammond et al., 2002; Ware & Kitsantas, 2007). Teachers who are properly prepared for the demands and challenges of being a teacher have the confidence and perseverance to be effective and influence student outcomes. Traditionally certified teachers who have a student teacher field-based experience are better prepared in classroom management, lesson planning, and student motivation and participation than alternatively certified teachers and have higher self-efficacy (Kurt et al., 2014). High levels of self-efficacy in student engagement, instructional strategies, classroom environment, and implementation of school guidelines are all associated with quality teaching and better student outcomes (Kurt et al., 2014; Ross, 1994; Tschannen-Moran et al., 1998).

Teachers who experience positive student outcomes result in higher job satisfaction. Newly hired, alternatively certified CTE teachers who participate in quality preparation, induction, and mentorship programs that include professional development, and coaching within their first two years have high teacher efficacy and become effective teachers (Bandura, 2000; Krasnoff, 2014). To support newly hired, alternatively certified CTE teachers, teacher preparation, induction, and mentorship programs should meet the quality of professional teaching. Increasing the quality of teacher preparation, induction, and mentorship programs for alternatively certified CTE teachers will have a positive impact on teacher efficacy, increase student outcomes, and improve job satisfaction and retention rates (Chen & Ney, 2020; Kutsyuruba & Walker, 2015).

Teacher Preparation

Teacher preparation programs are the cornerstone for teacher efficacy and professional growth (National Commission on Teaching and America‘s Future, 1996). The quality of teacher preparation programs is found to be associated with the effectiveness and retention of newly hired teachers. Teachers who experience quality teacher preparation programs and obtain the necessary knowledge, and skills to be a teacher are more likely to remain in their current school and the profession (Saeger, 2019). The content of the coursework, and student teacher field-based experiences all contribute to the quality of the teacher preparation program. To aid in increasing teacher efficacy and retention, some educational organizations have researched and recommended standards for the development and implementation of teacher preparation programs.

The Southern Regional Educational Board created a model of standards for CTE teacher preparation programs which include learning classroom assessment, classroom management, instructional planning, instructional strategies, and professional relationships (Bottoms et al. 2013). The National Board for Professional Teaching Standards also developed standards for CTE teacher preparation programs. Their standards focus on the knowledge of students, responding to diversity, knowledge of content, learning environments and instructional practices, assessment, postsecondary readiness, program design and management, partnerships and collaborations, leadership in the profession, and reflective practices (National Board for Professional Teaching Standards, 2014). Other organizations have developed some national standards as well: the National Council for the Social Studies created the National Standards for the Preparation of Social Studies Teachers; the National Council for Teachers of English made the Standards for the Initial Preparation of Teachers of English Language Arts 7–12; the National Science Teacher Association produced the Standards for Science Teacher Preparation; and the National Council of Teachers of Mathematics designed the Standards for Secondary (Initial Preparation). While some identified standards are related, none of the organizations have fully agreed upon what exact national competencies there should be for teacher preparation programs.

Postsecondary institutions develop curricula with specific state standards, student teacher field-based experiences, and resources to support and train the next generation of teachers. Identifying what specific competencies will best prepare teachers for classroom expectations and create high teacher efficacy has been difficult for states to do. The competencies learned in U.S. postsecondary educational coursework do not always fulfill the needs of newly hired teachers and at times, have very little value to them when they first enter the classroom (Tucker, 2011).

Each of Pennsylvania's three postsecondary institutions' alternative CTE teacher certification programs have their curriculum approved by the state to ensure compliance with specific standards. Under the Pennsylvania state code, postsecondary institutions are required to instruct participants of teacher preparation programs in the following areas: to understand how to provide classroom instruction relating to academic standards and instructional strategies; providing learning opportunities in skill development for all students in all settings; knowledge of assessment strategies; field observation experiences; integration of technology; culturally relevant and sustaining education; professional ethics; an understanding of motivations and behaviors; communication techniques with all stakeholders, and how to collaborate to grow professionally (Pennsylvania Code and Bulletin, 2022). These standards are delivered by different methods depending on the postsecondary institution and the resources available.

Additional standards, which are not required by Pennsylvania and are unregulated, may vary between postsecondary institutions.

In 2010, Pennsylvania's Department of Education (PDE) published a document titled "The Framework for Secondary Grades 7-12 Program Guidelines," outlining the framework for program design, delivery, and competencies for traditional teacher preparation programs. This document listed 54 competencies on organizational structure, adolescent development, pedagogy, assessment, and professionalism (Pennsylvania Department of Education, 2010). Another published document from 2012, titled "The Framework for a Teacher Intern Certification Program: Specific Program Guidelines" does not list one specific competency. The document published by PDE only states that the "preparing institution shall ensure that candidates complete a well-planned sequence of professional educator courses and field experiences to develop an understanding of the structure, skills, and core concepts" and that the "program focuses on professional and pedagogical areas to supplement the candidate's content area" (Pennsylvania Department of Education, 2012, p. 6).

These unstandardized guidelines create a discrepancy between the two teacher preparation programs in Pennsylvania. The guidelines for traditional teacher preparation program competencies are more explicit than the guidelines for alternatively certified teacher preparation program competencies. The lack of rigor among the competencies within the alternative certification teacher preparation program produces less prepared alternatively certified CTE teachers than traditionally certified teachers and lowers alternatively certified CTE teacher efficacy and retention rates (Cramer, 2004).

According to Darling-Hammond (2000), for teacher preparation programs to be effective, they should be created and implemented based on regulated standards and specific competencies throughout the nation. In the U.S., unstandardized teacher preparation programs, various alternative certification routes, and the independent state requirements to become a certified teacher allow teacher candidates to enter the classroom lacking certain skills and knowledge, affecting CTE teacher efficacy and retention rates (Bottoms, et al., 2013). Global educational assessments and data provide the U.S. an opportunity to reflect on its and other countries' educational policies and identify standards and specific competencies for states to use in their teacher preparation programs. Based on research and data collected from the Programme for International Student Assessment (PISA), it was concluded that teacher quality depends on setting high standards for candidates to enter and complete the teacher preparation programs (Organisation for Economic Co-operation and Development, 2018a).

The countries with the highest-performing educational systems based on the PISA do not allow alternative certification routes. For these countries, a bachelor's degree, or a bachelor's degree with an additional education certification, an assessment, or further subject qualifications is required to become a certified teacher (National Center on Education and the Economy, n.d.; Tucker, 2011). Canada, China, and Finland, three of the high-performing countries in education, have a teacher retention rate of around 97%. (Carver-Thomas & Darling-Hammond, 2017). The required educational degrees by these countries ensure that newly hired teachers are fully prepared to enter the classroom and educate students with high teacher efficacy and are being retained.

The coursework needed to earn educational degrees introduces teacher candidates to instructional practices, classroom management, and the use of data and assessments to prepare them to be effective in the classroom and have positive student outcomes (Jacques & Potemski, 2014). This is the period of time when teacher candidates can expand their knowledge of the profession and put their learning into practice through field-based experiences. Canada, China, and Finland make it a priority to implement specific competencies for coursework in teacher preparation programs, support teacher candidates, and increase teacher efficacy and retention. These high-performing countries allot a multitude of resources to the development of specific competencies, and implementation of coursework and field-based experiences for teacher candidates (Tucker, 2011).

In 2015, Ontario, Canada, increased the length of its teacher preparation program by a full year and extended its student teacher field-based experience requirement to 80 days (National Center on Education and the Economy, n.d.). Novice teachers who have a student teacher field-based experience in their teacher preparation program before they begin teaching are more prepared in terms of connecting their coursework to their classroom experiences (Darling-Hammond & Bransford, 2005). In Pennsylvania, alternatively certified CTE teachers do not have the opportunity for a pre-service student teacher field-based experience. Instead, teachers complete their coursework for their student teacher field-based experience after they already began their professional teaching career, leaving them vulnerable to quitting the profession.

The lack of specific competencies, meaningful educational courses, and student teacher field-based experiences in teacher preparation programs in the U.S. put many of the newly hired alternatively certified CTE teachers at a disadvantage. Alternatively certified CTE teachers require the learning of new educational content and experiences through authentic tasks and to be able to reflect on their learning (Bottoms et al., 2013). Teacher preparation programs are the initial step in sufficiently preparing teacher candidates in the knowledge, and pedagogical skills to be an effective educator. Newly hired teachers who did not receive quality teacher preparation programs or student teacher field-based experiences do not produce positive student outcomes and have low teacher efficacy, leading to them leaving the profession (Jacques & Potemski, 2014). Teacher preparation programs should be comprised of specific competencies that meet the needs, demands, and expectations of newly hired, alternatively certified CTE teachers to increase teacher efficacy and retention.

Teacher Induction

In addition to teacher preparation programs, teacher induction programs can support newly hired alternatively certified CTE teachers in developing the skills they need to be effective teachers (Jacques & Potemski, 2014). As with many other professions, onboarding and training new hires consists of the new employee shadowing another employee or being trained by a supervisor for a period of time. This is not always possible in the educational field as newly hired teachers are often given their own classrooms to lead in their first days of employment. The amount of independence given to newly hired teachers makes their induction programs and the support they receive all that more critical to their success.

Realizing how critical teacher induction programs are to a teacher's success, the Association for Career Technical Education's Teacher Quality Task Force lists developing quality induction programs among its top priorities (Bottoms et al., 2013). Not every newly hired teacher has the opportunity to participate in a teacher induction program though. According to recent data, only 61% of teachers in the U.S. reported having participated in a teacher induction program (Organisation for Economic Co-operation and Development, 2018b). This leaves many newly hired teachers with little to no training or support in transitioning to the classroom.

After several years of employment in the workforce, alternatively certified CTE teachers are hired directly from industry. Teachers who enter through an alternative certification route have no previous educational coursework and require a system of training and support. Alternatively certified CTE teachers need quality teacher induction programs to help train and support them through the transition from the workforce into the educational field to be effective educators and continue teaching. Providing quality teacher induction programs that include specific competencies and resources prepares newly hired CTE teachers for the classroom, increases their self-efficacy, and can also influence them to remain in the profession (Morris, 2006).

Specific competencies and resources are not the only factors in providing quality teacher induction programs. Participating in a second year of induction adds to the quality of the program by helping newly hired teachers better prepare for the classroom and refine their practice (Goldrick et al., 2012). A study by the Institute of Education Sciences discovered that student outcomes were not affected by teachers who participated in a teacher induction program for a length of one year, but teachers who participated in a teacher induction program for a length of two years demonstrated a significant impact on student outcomes (Glazerman et al., 2010). Several countries that scored higher than the U.S. in the PISA rankings require teacher induction programs longer than two years. Currently, in the U.S., only Arkansas, Colorado, Delaware, Hawaii, Michigan, Minnesota, North Carolina, South Carolina, and Utah require more than two years of a teacher induction program (Goldrick et al., 2012; Organisation for Economic Co-operation and Development, 2018a).

Having specific competencies and resources and the length of a teacher induction program are seen as a way to positively influence student outcomes. These factors also affect the efficacy, and retention of newly hired teachers (Goldrick et al., 2012; Ingersoll & Kralik, 2004; Ingersoll & Perda, 2010). Due to low teacher retention, some states have been revising the requirements of their teacher induction programs to better support their teachers. Recently, Pennsylvania implemented required content topics including The Danielson Framework for Teaching, the state's academic standards alignment system, culturally responsive teaching, and professional ethics, and increased the length of the required teacher induction program from one year to two years, but still do not address specific competencies within the required content topics (Boyce & Morton, 2023). Pennsylvania schools have their teacher induction programs approved by the state but there are no set requirements for specific competencies or practices throughout the program.

Teacher induction programs with specific competencies and resources, and ones that provide a system of support have many benefits for newly hired teachers. When funded and implemented well, quality teacher induction programs can increase teacher efficacy, student outcomes, and teacher retention (Strong, 2006). Not all states provide funding for teacher induction programs though. In 2010, only seven states funded their mandated teacher induction programs (Goldrick et al., 2012). Teacher induction programs, including some state-funded programs, are more compliance-driven than quality-driven and are not seen as a best practice to fully prepare teachers or increase teacher effectiveness and retention (Boyce & Morton, 2023).

To be fully prepared in the first few years of teaching, newly hired alternatively certified teachers require educational experiences and professional development activities that are designed to give the support and resources needed to meet the challenges of the classroom. For this purpose, quality induction programs are created to fully prepare newly hired alternatively certified teachers for the profession, enhance teacher efficacy and pedagogical skills, and increase student outcomes (Goldrick et al., 2012). Schools that develop quality multi-year induction programs provide teachers with an overall better sense of preparedness and are more likely to remain in the education field (Woods, 2016).

According to Morris (2006), newly hired teachers can be fully prepared by receiving an extensive orientation that includes a firm understanding of their school's policies, procedures, teacher duties, and responsibilities. For schools to implement a quality teacher induction program and have strong teacher retention, the program must include a wide variety of content including continuous professional development for personalized learning, teacher autonomy, and discussions that are relevant to teaching and the learning behavior of students (Watkins, 2005). Additionally, school administrators should create an environment where newly hired teachers feel welcomed and supported to bring new and unique ideas to the school.

In any school, you will find newly hired teachers placed into various teaching roles with diverse educational backgrounds and work experiences, and who have followed different certification routes, all participating in the same teacher induction program. Newly hired, alternatively certified CTE teachers are less experienced in areas like classroom management, instructional strategies, and assessments than traditionally certified teachers and have additional obligations as well. A teacher in a CTE program is also required to keep abreast of specific occupational developments and update the program's curriculum, be an advisor to student organizations, and coordinate work-based learning programs (Morris, 2006). Administrators who supervise CTE teachers recognize the diverse backgrounds of newly hired teachers and have identified that to have positive student outcomes CTE teachers need more support in the depth of knowledge in pedagogical approaches and alignment of lesson plans and academic content with the program's industry standards and competency-based curriculum (Chen & Ney, 2020).

School leaders must act on this acknowledgment and develop specific competencies and a support system within teacher induction programs to cover the depth of knowledge needed for effective teaching and provide time and resources for newly hired CTE teachers to complete their myriad of curriculum duties. To fully support newly hired CTE teachers in developing lesson plans and curriculum materials, quality induction programs should include release time and a reduced workload (American Federation of Teachers, 2001; Berry et al. 2002). In the highest-performing educational systems, newly hired teachers are provided with the extra time needed to seek support and resources for planning and completing their additional curriculum duties (National Center on Education and the Economy, n.d.). Providing time and resources to newly hired teachers is as equally consequential to teacher efficacy as implementing specific competencies in a teacher induction program.

Newly hired alternatively certified teachers bring extensive knowledge of the demands and skills needed in the industry. As beneficial as this knowledge and skills are to teaching the curriculum, these teachers still require assistance in transferring this knowledge and skills to their students, developing assessments, and perfecting their pedagogy (Watkins, 2005). Teachers rely on induction programs as an opportunity for them to learn and receive ongoing support through their early years of teaching. Quality teacher induction programs must meet the individual and diverse needs of newly hired teachers. For teacher induction programs to be effective for CTE teachers, they must consist of diverse pedagogical and curriculum-based professional development and a comprehensive support system through multiple resources that align with state and school policies and procedures (Jacques & Potemski, 2014).

Teacher Mentorship

A third component in supporting newly hired alternatively certified CTE teachers in Pennsylvania is teacher mentorship programs. While Pennsylvania provides guidelines on teacher mentorship, the Pennsylvania state code does not define a teacher mentor and only goes as far as requiring a mentor relationship with the induction team for the duration of the induction program (Pennsylvania Department of Education, 2023). Quality teacher mentorship programs throughout the U.S. prepare both traditionally and alternatively certified teachers for a successful career in education (Reese, 2010).

Encountering unexpected challenges and demands in the classroom necessitates teachers to adapt and apply learned techniques and methods to maintain an effective learning environment. Mentorship programs provide new teachers with resources, a network of support, and encouragement to overcome these challenges and demands when they arise (Greiman, 2007). Teacher mentors are essential to coaching and assisting newly hired teachers in their first years of teaching. To create high teacher efficacy and positive student outcomes, newly hired teachers need to have access to a mentor from their very first day in the classroom (Hallam et al., 2012; Uriegas et al., 2014).

When beginning to learn the trade of educating students, newly hired teachers are often left to their own devices and try to figure things out themselves as the sole teacher in the classroom. Alternatively certified teachers struggle most in navigating the classroom independently and being effective teachers with the lack of preparation for the classroom. Teacher mentorship programs create a collaborative environment of reflective learning within the school and are meant to guide teachers through orientation and induction and offer advice on instructional improvement by fostering personal and professional relationships of trust and modeling lessons (Hallam et al., 2012). As Bottoms et al. (2013) and Pomerance and Walsh (2020) noted, support and guidance from teacher mentors can have a large positive influence on CTE teacher success and professional growth.

Participation in mentorship programs offers newly hired teachers the chance to develop professionally and increase teacher efficacy. Mentor support and guidance help newly hired teachers feel more prepared, secure, and confident with their responsibilities. (Bottoms et al., 2013; Morris, 2006). Mentors who take an interest in the prior experiences of the newly hired teachers, introduce them to their peers, and acquaint them with the school culture are a valuable component of high retention (Padua & Fujii, 2021). Research has shown that alternatively certified teachers who participated in mentorship programs and felt part of a team have a greater level of quality of instruction and higher retention rates (Latham & Vogt, 2007; Morris, 2006; Sorensen & Ladd, 2020; Woods, 2016).

Since alternatively certified teachers enter the educational field directly from industry with no prior training or experience as a teacher, resources and coaching from a seasoned professional are integral to their quality of instruction and success. Mentorship programs support newly hired teachers through the transition from one stage of teacher development to another and help to quickly familiarize themselves with their new position (DeBolt, 1992; Vierstraete, 2005). Teachers receive help from mentors during their transition with self-care, social and emotional issues, and curriculum matters such as instructional strategies and pedagogical content knowledge (Joiner & Edwards, 2008). Teacher mentors help connect the content from preparation and induction programs to real work experiences and are supplemental to a teacher’s transition and growth as a professional educator.

Identifying effective teacher mentors to help make the transition into the classroom is central to a newly hired alternatively certified teacher's success. The highest priority of a quality mentorship is ensuring a good match between the mentor and the newly hired teacher (Eby et al., 2000). Time, distance, and lack of trust are three key factors in identifying the ideal mentor (Bryan, 2006). Mentors and newly hired teachers should be matched according to subject areas, planning time, distance, and educational philosophy (Bottoms et al., 2013; Jonson, 2008; Morris, 2006). The connections between the mentor and the newly hired teacher help develop a strong professional relationship and increase teacher efficacy. The more aligned the mentor and newly hired teacher are the higher quality mentorship program the newly hired teacher will experience (Morris, 2006).

Quality mentoring programs should also have clearly defined goals, expectations, roles and responsibilities for the mentor and newly hired teacher where each of them gains from participating in the program (Brock, 1999). One important factor in having a quality mentorship program is time for the mentors and newly hired teachers to meet regularly (Bottoms et al., 2013; National Education Association, 1999). During regular meetings, specific competencies that support newly hired teachers in transitioning into the classroom should be discussed. Competencies including lesson planning, time management, assessments, classroom management, school climates, and self-care are some of the top priorities for newly hired teachers (Bottoms et al., 2013). Newly hired teachers need to have support from, and time with, a mentor to be effective, create positive student outcomes, and stay in the profession.

Newly hired alternatively certified teachers are not always guaranteed a mentor. In the U.S. only 31 states require a mentorship program amounting to about 39% of newly hired teachers having mentors (Barrientos, 2022; Organisation for Economic Co-operation and

Development, 2018b). In addition, not every state has specific standards for teachers to serve as mentors or competencies for a mentorship program (Barrientos, 2022). This leaves over half of newly hired teachers in the U.S. without a mentor, an inappropriate mentor match, or a low-quality mentorship program.

Pennsylvania schools are required to provide a mentor for first-year teachers, one where the mentor may vary and can change throughout the year. The state does not have specific competencies or required topics for the mentorship program. Instead, Pennsylvania provides schools with recommendations on criteria and types of support for mentorship programs. These recommendations include mentors who have previous mentor training, a similar certification and assignment, knowledge of district/school policies, procedures, and resources, willingness, and time to meet regularly, and knowledge of inquiry-based learning and various educational best practices and teaching methods (Pennsylvania Department of Education, 2023). The state also recommends that the program incorporate the following competencies: instructional planning and assessment strategies; differentiated instruction; data-informed decision-making; information about school policies, procedures, and professional educator responsibilities; and peer relationships. Due to the lack of specific required competencies, content, and support, alternatively certified CTE teachers are subject to unregulated local school plans that could lead to mentorship programs that are of poor quality, not long enough, irrelevant to their needs, or assigned a mentor that is not qualified to support them (Tucker & National Center On Education And The Economy, 2011).

Mentorship programs in the U.S. are not developed or implemented to the same standards as other higher-performing educational systems around the world. In countries such as Canada, China, and Finland, newly hired teachers spend their first year as a teacher under the intense supervision of a mentor. These mentors and newly hired teachers are relieved of other duties and observe each other's taught lessons throughout the year (Tucker, 2011). This provides a quality mentorship program consisting of peer-to-peer guidance in matters of developing teaching plans and assessments, classroom management, implementation of the new curriculum, and pedagogy (Jensen et al., 2016; National Center on Education and the Economy, n.d). Mentorship programs that are administered properly with regular peer meetings, and developed appropriately with specific competencies increase teacher efficacy and retention (Brown 2003; DePaul 2000; Raue & Gray, 2015; See et al., 2020; Van Zandt Allen, 2013).

Previous Meta-analysis Research

There have been numerous studies on teacher preparation, induction, and mentorship programs and how these affect teacher efficacy and retention. Borman and Dowling's (2008) meta-analysis of over 34 studies suggested that teacher efficacy and retention can be influenced by various personal and professional factors. Some of the factors determined to be influential were teachers' educational backgrounds and abilities to perform their jobs; school mentorship programs and administrative support; school expenditures for materials and support per teacher; and a student body's and teacher's gender, race, and age. The meta-analysis did establish, though, that state and school programs, policies, and initiatives can address and regulate these influential factors to positively impact teacher efficacy and retention (Borman & Dowling, 2008).

Another meta-analysis by Serpell and Bozeman (1999), analyzed the effectiveness of teacher preparation, induction, and mentorship programs. The researchers referenced one study by Eberhard et al. (2000), where they found that 95% of graduates from Texas A&M's teacher preparation program were still in the profession five years later. Serpell and Bozeman also cited data from a study by Bartell (1995), in which 95% of teachers who completed California's teacher induction program were still teaching three years later; and a third study by Spuhler and Zetler (1995), communicating that 91% of the participants from Montana's teacher mentorship program were still working in the classroom two years later. This meta-analysis concluded that characteristics of a successful teacher preparation, induction, and mentorship program consist of having a reduced teaching load with structured learning experiences focusing on support in curriculum, effective teaching practice, and behavior management (Serpell & Bozeman, 1999).

In a similar meta-analysis by Ingersoll and Kralik (2004), the researchers reviewed ten studies to determine the value of teacher preparation, induction, and mentorship programs and provided policymakers and educators with a reliable conclusion to the outcomes these programs have on newly hired teachers. The report expressed that there is likely value to these programs in increasing teacher efficacy and retention. While having perceived value, the programs studied varied greatly in terms of delivery, structure, and content, leaving the researchers with a myriad of possible causes.

While each meta-analysis concluded that teacher preparation, induction, and mentorship programs affect teacher efficacy and retention, they were not consistent on the exact reasons that caused the effect. Due to such variances, policymakers and educators are confronted with difficult choices on how to implement and support these programs. Ingersoll and Kralik (2004) specified that there is a need for more empirical research on teacher preparation, induction, and mentoring programs in order to determine specific competencies that can increase teacher efficacy and retention.

Summary

Based on the PISA results, compared to other countries, we can determine that the efforts and support of Canada, Finland, and China given to their respective new teachers in relation to the quality of their classroom experiences and support, demonstrate that teacher preparation, induction, and mentorship programs have a positive effect on student outcomes, and in turn improving teacher efficacy and retention. Quality teacher preparation, induction, and mentorship programs are the best solutions in giving ongoing support for alternatively certified CTE teachers by meeting their diverse professional development needs and helping them thrive in the teaching profession. (Bowling & Ball, 2018; Ingersoll & Strong, 2011). As a method to increase teacher efficacy and retention, programs should be developed to have relevant coursework, incorporate participation in impactful field-based experiences, include reduced teaching duties, support from a mentor, and a professional growth plan that meets the diverse needs of newly hired alternatively certified CTE teachers (Bottoms et al., 2013; Carver-Thomas & Darling-Hammond, 2017).

Current alternative teacher certification routes fail to meet the diverse needs of newly hired alternatively certified CTE teachers causing low teacher retention (Szuminski, 2003). States and school districts should ensure that their alternatively certified CTE teachers are supported in meeting the daily and long-term challenges of teaching CTE programs. In doing so, states and schools play an important role in developing and implementing quality preparation, induction, and mentorship programs (Schultz et al., 2023).

While Pennsylvania requires teacher preparation, induction, and mentorship programs to be approved by the state, they do not require specific competencies and practices. The literature suggests that states must go beyond publishing recommendations and policies for standards.

These programs should require specific competencies that provide diverse instruction in classroom and teacher effectiveness, including extensive time for peer observation and feedback; development of instruction and assessment strategies; activities to increase pedagogical knowledge, and time to complete additional curriculum duties to lessen the struggles of alternatively certified CTE teachers transitioning into education and increase teacher efficacy and retention. (Bottoms et al., 2013; Carver-Thomas & Darling-Hammond, 2017; Wong, 2004).

Chapter III: Method and Procedures

This research study provides a description of the experiences of alternatively certified CTE teachers who participated in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs. Also, this study identifies Pennsylvania alternatively certified CTE teachers' and CTC Directors' perceptions of which specific competencies and practices within their CTE teacher preparation, induction, and mentorship programs of alternative certification routes affect CTE teacher efficacy and retention. This chapter describes the research design and methodology used by the researcher, which includes cross-sectional mixed method surveys from a purposive sampling of alternatively certified CTE teachers and CTC Directors in Pennsylvania. This study sought to answer the following research questions:

1. How do Pennsylvania CTC Directors describe teacher efficacy and retention of alternatively certified teachers within their schools?
2. What are the experiences of alternatively certified CTE teachers in Pennsylvania who participated in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs?
3. What are the competencies in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs that are perceived by Pennsylvania CTC Directors and alternatively certified CTE teachers to affect alternatively certified CTE teacher efficacy and retention in Pennsylvania?
4. What are the current practices in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs that are perceived by Pennsylvania CTC Directors and alternatively certified CTE teachers to affect alternatively certified CTE teacher efficacy and retention in Pennsylvania?

Research Design and Methodology

For this study, the researcher utilized a descriptive, non-experimental mixed methods approach. According to Dulock (1993), descriptive research helps provide an accurate portrayal of a particular experience and describes what exists and the categorizing of the experience. To accomplish a descriptive study, descriptive mixed method surveys are used to collect quantitative and qualitative information from a portion of a target population to attempt to describe characteristics, commonalities, or differences (Dulock, 1993).

Mixed methods research is a research approach where the researcher collects and analyzes quantitative data and qualitative data within the same study, combining them, and integrating the results (Tasseff et al., 2018). Quantitative data about Pennsylvania alternative CTE teacher preparation, induction and mentorship programs was collected from various Directors of CTCs and CTE teachers throughout Pennsylvania using cross-sectional surveys. Qualitative research was also conducted using cross-sectional surveys. The data was collected from various current Directors of CTCs and alternatively certified CTE teachers throughout Pennsylvania.

Mixed Methods Research

The researcher chose a mixed method research process because even though qualitative data is holistic and rich in detail, quantitative data is a valuable source to see the overall picture of the data (Mertler, 2016). The researcher took the data from the quantitative and qualitative research to help formulate and synthesize the collected information (Bryman, 2006; Creswell & Plano Clark, 2017). The timing, sequence, and process the researcher uses in combining the results from quantitative and qualitative methods is an important factor in maximizing the strengths and quality of each part of the study. Integrating the data from the quantitative and qualitative research helps to corroborate and expand the findings of the research.

Using both quantitative and qualitative research enables the researcher to apply a broad and flexible approach to solving complex social experiences (Borbasi et al., 2019). As Johnson (2016), stated, being dialectical and seeing both perspectives, and learning from each method of research to find a workable solution is important to the research. Quantitative methodology helps measure the extent of the impact of an experience, while qualitative methodology measures the meaning of the experiences (Coolican, 2018).

The researcher used the overarching framework for mixed methods research and incorporated cross-sectional surveys to promote the improvement of a human situation and increase the scientific knowledge of a subject at the same time. Acquiring information from both forms of research can create balanced analytical research. This method also helps to validate the information and help reduce biases (Creswell & Creswell, 2018).

Qualitative Research

For this descriptive study, the researcher conducted qualitative research on the perceived experiences of alternatively certified CTE teachers and CTC Directors. Qualitative research allows the researcher to gather data, collected primarily through surveys on the participants' learning perspectives and attitudes toward an experience (Fraenkel et al., 2012; Patton, 2002). Biases do appear in qualitative research along with issues about ethics of care, misuse of data, and misconduct of the participants (Lichtman, 2013). This does not mean that qualitative research is not a valid method. Researchers using the qualitative method can apply reflexivity to their study. When researchers demonstrate reflexivity, their self-awareness, and critical reflection of their own biases validate their honesty in the production of the data (Tufford & Newman, 2010). Researchers who are transparent about their possible biases and are authentic about the accounts of the participants' voices establish credibility and display internal validity (Coffey, 1999; Gunawan, 2015).

Quantitative Research

When quantitative data is used in descriptive mixed method research it helps to balance out the biases of qualitative data. Quantitative research records an experience in a statistical way to determine what caused the experience and what effects, if any, it had on the participants. The quantitative data is also used to verify the perceptions of the participants (Mcleod, 2023).

According to Cohen et al. (2018), quantitative research is seen as research using precise measurements and structured and validated data collection instruments that demonstrate consistency and replicability over time with an objective approach that includes predictable behavior, and general laws that apply to whole populations and help analyze statistical relationships. The structured methodological approach requires the research process to be finalized before data collection can begin (Kumar, 2019). For this study, the research process was finalized, and it was determined that quantitative data from each career and technical center (CTC) will be gathered and analyzed utilizing descriptive statistics.

The researcher developed mixed method cross-sectional surveys to distribute to all 84 CTCs within Pennsylvania. The data collected from the surveys are statistical facts about their school's teacher preparation, induction, and mentorship programs and are the viewpoints of the participant's perspectives and realities from experiences in their teacher preparation, induction, and mentorship programs. This information set the framework for analyzing and comparing additional research gathered to answer the research questions.

Instrumentation

When creating the cross-sectional surveys for the study, it was important to understand the level of knowledge of the participants and construct questions that the participants understand and ones that do not lead the participants toward a specific answer, as this can affect the study's outcome (Iarossi, 2006). A good cross-sectional survey provides participants with a coherent experience and maximizes their ability to respond with quality answers (Ornstein, 2013). The survey questions for this study were kept short, written in sequential order and in terms that would maximize comprehension of the questions being asked, and included rating scales that have neutral mid-points for a point of reference to keep the responses more accurate (Office for Coastal Management, 2015).

The researcher designed mixed method cross-sectional surveys for a descriptive non-experimental study by determining the type of research and the collection method to be used (Saris & Gallhofer, 2014). The researcher thoroughly explained the purpose behind the surveys, the time requirement to complete the surveys, and also ensured the confidentiality of the participants. The surveys' designs were based on gathering descriptive statistics on the length, frequency, and competencies of teacher preparation, induction, and mentorship programs for alternatively certified CTE teachers and of alternatively certified CTE teacher efficacy and retention in Pennsylvania.

As a means to help identify the competencies that should be included in teacher preparation, induction, and mentorship programs to increase teacher efficacy and retention for alternatively certified CTE teachers in Pennsylvania, information must be collected from those who experienced them. The goal of the cross-sectional surveys was to determine how well the alternative certification route prepared CTE teachers for their teaching careers. These cross-sectional surveys helped detail the participants' perceived experiences to determine what was beneficial in the programs in terms of length, frequency, and specific competencies and what could have been improved.

The cross-sectional survey for alternatively certified CTE teachers (see Appendix B) focused on the experience of a teacher who went through Pennsylvania's alternative certification route for CTE teachers. The participant's responses detail the experiences and perceptions of their teacher preparation, induction, and mentorship programs. The information gathered from the cross-sectional surveys can help identify specific competencies and practices that are needed for alternatively certified CTE teachers to have a positive effect on teacher efficacy and retention.

Directors of CTCs provided information on their school's teacher induction and mentorship program and teacher retention through a cross-sectional survey (see Appendix C). This quantitative data and qualitative data were synthesized to provide details of what support the schools are currently providing their teachers and how it is affecting teacher efficacy and retention. Responses from both cross-sectional surveys will be integrated to validate and expand the findings to the research questions.

The cross-sectional surveys used clear and concise questions with instructions on how to complete each answer and were delivered and collected using Qualtrics through UW-Stout. This allowed the participants to complete the survey at their convenience and their responses were automatically compiled (Office for Coastal Management, 2015). Additionally, consent and non-consent allowed the research participant to step out of the study at any time. The responses from the anonymous surveys were collected, analyzed, and presented in this dissertation.

Cross-Sectional Surveys

Survey research design, which involves the collection of data from a determined sample population, was used in developing the research methods for this study (Reis & Judd, 2014). Surveys are beneficial because they can generate numerical data and provide descriptive and explanatory information. They are also useful for gathering data on feelings, beliefs, and positions on a topic (Cohen et al., 2018).

The researcher used cross-sectional surveys to collect data on the behaviors, attitudes, perspectives, and opinions of the participants at a specific point in time (Connelly, 2016). Cross-sectional surveys help limit the control effects and increase the likelihood of completion as participants only fill out the survey once. Cross-sectional surveys also enable descriptive statistics to be used and compare sub-groups within the sample. Some disadvantages to using cross-sectional surveys that the researcher acknowledges are an omission of a single factor can undermine the results significantly and the researcher is unable to identify changes over time (Cohen et al., 2018).

Validity and Reliability

A survey's validity and reliability are very important to the study. The reliability of the survey used is based on whether participants complete the survey honestly and correctly. As discussed as part of the assumptions of the study, the participants might not fully comprehend the question, accurately remember their answer, or want to disclose specific information. The validity of the study can be affected by the sample of participants, the types of responses submitted and even by those who did not fill out the survey as they could influence the distribution of answers received (Cohen et al., 2018). The cross-sectional survey used was designed after a thorough literature review to prove that the cross-sectional survey's research sample comprehensively covers and fairly represents the information on the wider issue under investigation and was also reviewed by the dissertation committee (Cohen et al., 2018).

Both cross-sectional surveys were self-administered to address the internal validity and social desirability bias of the study and account for the accuracy of the participants' perceived experiences the study intended to describe (Newhart & Patten, 2023). Social desirability bias occurs when the participants might choose responses they believe are more socially acceptable rather than responses that are reflective of their true feelings and perspectives. The self-administered cross-sectional surveys prevent social desirability bias and possible influence within the study which can lead to a misrepresentation of the true participants' perspectives (Grimm, 2010).

To improve the validity and reliability of the survey, the researcher consulted with a project manager in planning, assessment, and research at UW-Stout for expert advice on survey design to align survey questions with the research questions. In addition, the researcher performed a pilot test with local alternatively certified CTE teachers. Feedback from the participants of the cross-sectional survey pilot test and the review from other experts after the administration of the cross-sectional survey pilot test were gathered. This allowed the researcher to review the appropriateness, meaningfulness, usefulness, and effectiveness of the questions being asked (Christodoulou et al., 2015). Edits to the cross-sectional survey that were done are reflective of the feedback. Participants of the cross-sectional survey pilot test were excluded from the study because they were aware of the questions being asked, which could have affected the results of the study.

Subject Selection and Description

The researcher used two distinct populations for separate cross-sectional surveys, utilizing purposive sampling for both cross-sectional surveys. Purposive sampling requires clear criteria and rationale for inclusion so the participants meet the specific qualifications for the study (Obilor, 2023). The purposive sample used was intended to provide a wide range of responses about teacher preparation, induction, and mentorship program competencies and practices an alternately certified CTE teacher will encounter. The responses of the descriptive study are to help describe and reflect the wide range of participants' perceived experiences to understand and reveal the reality of the social event (Lichtman, 2013). When a researcher uses a purposive sampling to complete a study's survey, the validity and random bias of the participants cannot be fully controlled because the process depends on the researcher's judgment (Obilor, 2023).

CTC Director Survey Population and Sample

The researcher distributed the cross-sectional surveys to all 84 CTCs in Pennsylvania, providing every CTC Director the same probability of becoming part of the study's sample to help reduce sample bias and prevent any overrepresentation or underrepresentation of a specific subgroup (Cohen et al., 2018).

Alternatively Certified CTE Teacher Survey Population and Sample

The researcher chose to survey alternatively certified CTE teachers throughout the state of Pennsylvania to gather their perceptions on the alternative certification routes for teacher preparation, induction, and mentorship programs provided to them as they transitioned from the workforce into education. The total number of responses is to fairly represent a portion of alternatively certified CTE teacher population in Pennsylvania, but data cannot be generalized beyond the sample (Obilor, 2023).

Analyzing the perceived experiences of both CTC Directors and alternatively certified CTE teachers provided insight into the gap in the knowledge on Pennsylvania alternative certification routes for CTE teacher preparation, induction, and mentorship programs and helped to identify specific competencies and practices for improvements to state and district programs, and positively affect education policies that could help increase CTE teacher efficacy and retention in Pennsylvania.

Data Collection Procedures

For this study, the researcher used cross-sectional surveys to gather quantitative data and qualitative data. All personal identifiers, names, locations, and organizations that might have been included in the participants' responses were redacted in both data and survey documents that were used as the source of data.

The first step in collecting data was to connect with the Directors of the CTCs in Pennsylvania to gather information on their teacher induction and mentorship programs and the teacher efficacy and retention of their teachers through a cross-sectional survey. The researcher utilized the assistance of the Executive Director of The Pennsylvania Association of Career and Technical Administrators (PACTA) to distribute the survey to the 84 CTC Directors in Pennsylvania. The Executive director of PACTA sent a group email, and a follow-up email, that included a pre-written message and instructions with the survey. The cross-sectional survey was open for two weeks for the participants to respond. The researcher used Qualtrics for the cross-sectional surveys and the CTC Directors completed the survey to the best of their ability.

The second step to collecting data was to distribute the cross-sectional survey to alternatively certified CTE teachers and record their educational background information to determine the type of certification route taken, the level of teacher certification they have, and the number of years they have been teaching. The researcher coordinated communication through the executive Director of PACTA to obtain the email addresses of the CTC Directors. The CTC Directors were then asked by the researcher for permission and assistance in distributing the cross-sectional survey to their CTE teachers. The CTC Directors emailed their CTE teachers the pre-written message and instructions along with the cross-sectional survey. Additional data was collected about their perceived experiences of their teacher preparation, induction, and mentorship programs and the competencies learned from each program. The cross-sectional survey for the CTE teachers was open for two weeks for the participants to respond. The researcher used Qualtrics for the cross-sectional surveys and the CTE teachers completed the survey to the best of their ability.

Data Analysis

While quantitative data is given, and can be counted or measured in numerical values, qualitative data is actively taken and able to be recorded or observed (Drucker, 2011). When conducting a descriptive study on an event, a researcher identifies connections between experiences and consciousness and provides a description of the participant's perspective. Qualitative data is the data of the conscious experience (Beverly, 2017). This type of information represents what is seen, thought, and felt by the person who had the experience.

In this descriptive study, quantitative data and qualitative data from mixed method research were used to help reach conclusions about the participants’ perceived experiences of an event (Conner & Johnson, 2017). The quantitative data and qualitative data collected through the cross-sectional surveys were gathered using Qualtrics. This provided easy use and configuration of the data to fit the researcher's needs of analysis and synthesizing. The following sections will describe the data analysis procedures for each type of data collected.

Quantitative Analysis

A quantitative research study helps understand relationships within the data (Albers, 2017). The quantitative data collected was reduced to descriptive statistics, the facts, and the perspectives of the participants (Fisher & Marshall, 2009). These descriptive statistics were presented and analyzed to find patterns and understand the details of the data. The quantitative data helps connect relationships to the research context and formulate the study's conclusions (Albers, 2017).

Qualitative Analysis

Mixed method research requires useful qualitative data from the participants' perspectives to be interpreted into meaningful descriptive statistics (Fossey et al., 2002). Thematic analyses of the participants' responses to the survey questions are conducted by researchers to determine appropriate coding and the formation of themes (Braun & Clarke, 2006; Pope & Mays, 1995). A general approach for thematic analysis will be borrowed from a grounded theory approach. Only aspects of grounded theory approach were applied to this research, as the researcher took an empirical event and systematically gathered, analyzed, and turned the experiences of the event into scientific data (Lichtman, 2013). Grounded theory focuses on what happened to individuals, why they thought it happened, and what the experience means to them (McMillan, 2012).

Grounded theory approach requires the researcher to follow a three-part coding approach known as the constant-comparative method (Lichtman, 2013). This approach requires open coding, which is where the researcher identifies distinct concepts and themes for categorization; axial coding, which entails identifying emergent themes, as the themes are refined; and selective coding, which requires selecting and organizing themes into a cohesive and meaning-filled expression (Williams & Moser, 2019). This type of thematic analysis can be used to categorize the data for synthesizing and comparison to other data. The researcher realizes the benefits of grounded theory but understands the repetitive and time-intensive process required for this approach.

The researcher only used grounded theory approach to help guide the data analysis and did not fully implement the entire formal application of the methodology. As with other qualitative methods, grounded theory is not without flaws. Researchers must acknowledge their beliefs and biases in the research process to the readers and suspend those biases during the research (Creswell & Miller, 2000).

The researcher must also consider the simultaneity and dependence of the research components, and balance the importance given to each quantitative and qualitative collection and the analysis of each collection (Schoonenboom & Johnson, 2017). After reviewing the surveys, the researcher sorted the collected data by meaning. Once organized by meaning, the data was then analyzed for similar concepts and placed into categories. These categories were then summarized and turned into themes that represented the participants' perceptions and consciousness of the experience (see Appendix D and Appendix E). The researcher merged different collections of data to identify areas of convergence and quantified the relationships between the data to provide a more extensive understanding of the key themes to help develop a conclusion to the research questions (Greer & Abel, 2022; Harman, 1968).

Assumptions

The researcher acknowledges various assumptions about the cross-sectional survey used for this study. One assumption is that the purposive sample used for this study is a reflection of a true representation of CTE teachers throughout Pennsylvania. A second assumption is that the purposive sample used for this cross-sectional survey had limited biases from the researcher's judgment. Another assumption is that the participants completed each question on the survey truthfully and comprehended what each question was asking of them reducing potential biases from their responses. A fourth assumption is the validity of the cross-sectional survey and the expectation that the cross-sectional survey actually accomplishes what it is meant to.

Limitations

This study had participants from various CTCs in Pennsylvania. The participants were teachers who chose to continue in the educational field and stayed in their profession. The study depended on participants to be truthful and honest in their responses. Personal time to complete the survey was also required. In addition, the experiences that the participants had, the time of year the survey was distributed, and their feelings towards a professor, mentor, school, or program could have influenced the participation rate (Delva et al., 2002).

The sampling of this study was used to access as many alternatively certified CTE teachers as possible from multiple regions in the state of Pennsylvania. This does not include alternately certified teachers who left the profession. The data from former alternately certified teachers, which would have been beneficial in identifying the improvements needed in the teacher preparation, induction, and mentorship programs, was found to be difficult to obtain and excluded from the study.

When the researcher generalized the responses from the participants this could have presented biases in the study. Biases also could have happened as some questions required the researcher to take an entire scale of possible values and narrow them down to only a few values. This forces the participant to choose an answer that might not fully represent their opinion (Hasson & Arnetz, 2005).

The study also required CTC Directors from various parts of the state to complete the survey on their personal time. Not every school is obligated to respond as some might avoid participating due to not wanting to admit flaws within their school or reveal information that they might perceive as being negative. CTC Directors new to the position or those who have planned initiatives might not respond due to changes that might be happening in the near future to their programs that could alter their responses at the current time of the survey.

The participants in the teacher survey could also have had different external factors influencing their responses. Any additional support outside of the participant's professional network, and additional obligations or social and economic factors are all uncontrollable factors that could distort or manipulate the results of the research (Ewert & Sibthorp, 2009).

Summary

When developing this study, the researcher had to take into consideration many factors. This chapter explained the thought process of the study and the reasoning for the research methods and data analyses that was followed. The choices of survey questions, what theoretical framework to follow, which research method would be a best fit and how to choose participants for the study could all influence the results and create limitations of the study (Simon & Goes, 2018). Using cross-sectional surveys to conduct mixed methods research and the process of purposive sampling and thematic analyses has the potential to create generalizations of the results and expose the study to biases.

Relying on literature, professional researchers and the dissertation committee, the researcher took strategic measures to attempt to offset any limitations and possible bias. The research methods and data analysis procedures followed by the researcher sought to strengthen the validity and reliability of the study. The following chapters will present the data collected, explain the meaning behind the findings and make recommendations based on the conclusion of the results.

Chapter IV: Presentation of the Findings

This mixed methods study aimed to describe the experiences of alternatively certified CTE teachers in Pennsylvania who participated in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs. The findings identify specific competencies and practices within CTE teacher preparation, induction, and mentorship programs of alternative certification routes that are perceived as having an impact on CTE teacher efficacy and retention in Pennsylvania.

This study was guided by the following research questions:

1. How do Pennsylvania CTC Directors describe teacher efficacy and retention of alternatively certified teachers within their schools?
2. What are the experiences of alternatively certified CTE teachers in Pennsylvania who participated in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs?
3. What are the competencies in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs that are perceived by Pennsylvania CTC Directors and alternatively certified CTE teachers to affect alternatively certified CTE teacher efficacy and retention in Pennsylvania?
4. What are the current practices in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs that are perceived by Pennsylvania CTC Directors and alternatively certified CTE teachers to affect alternatively certified CTE teacher efficacy and retention in Pennsylvania?

This chapter presents the results of the data from the cross-sectional surveys. Responses from each question of both cross-sectional surveys will be aligned to the research questions and the results of data will be described. Descriptive statistics will be utilized for survey questions of a quantitative nature and thematic analysis will be utilized for survey questions of a qualitative nature.

Demographics

The distributed surveys yielded responses from 50 alternatively certified CTE teachers and 14 CTC Directors in Pennsylvania. There were 14 responses out of 84 CTC Directors, with a response rate of 30%. The researcher could not confirm a response rate for alternatively certified CTE teachers because there is no real-time data on the number of alternatively certified CTE teachers currently teaching at a CTC in Pennsylvania to be compared to the 50 participants.

Alternatively certified CTE teachers identified the number of years they have been teaching (see Table 1), the postsecondary teacher preparation program they attended (see Table 2) and the CTE program they are certified to teach (see Table 3). Thirty-four percent of the teacher participants are three years or newer in the field of education, 30% have between four and eight years of teaching experience, and 36% of the teacher participants have nine years or more in the field of education. This is very close to being evenly distributed among newly hired alternatively certified CTE teachers who are on an intern teaching certificate (1-3 years), CTE teachers who are on a level 1 certificate (4-8 years), and CTE teachers who possess a permanent level II certificate (9+ years).

Table 1

Alternatively Certified CTE Teachers by Year

Years teaching	Percentage %	Number of teachers
1 year	16	8
2 years	12	6
3 years	6	3
4 years	8	4
5 years	4	2
6 years	8	4
7 years	6	3
8 years	4	2
9 years	6	3
10 years	8	4
11 years	0	0
12 years	2	1
13 years	0	0
14 years	2	1
15+ years	18	9
Total number of respondents:	100	50

As shown in Table 2, there were no participants from teachers who attended Penn State University for their teacher preparation program. This area includes alternatively certified CTE teachers from central Pennsylvania. The number of respondents of alternatively certified CTE teachers from Indiana University of Pennsylvania and Temple University were equally close to 50% each.

Table 2

Alternatively Certified CTE Teachers by Postsecondary Teacher Preparation Program

Postsecondary teacher preparation program	Percentage %	Number of teachers
Indiana University of Pennsylvania	44	22
Penn State University	0	0
Temple University	56	28
Total number of respondents:	100	50

Table 3 displays the breakdown of the alternatively certified CTE teacher participants and the CTE programs they are certified to teach. Of the 50 alternatively certified CTE teachers who responded to the cross-sectional survey, 40% of those were teachers of Institutional Food Worker (n=6), Cosmetology (n=5), Automotive Technology (n=3), Machine Tool Technology (n=3), and Welding Technology (n=3).

Table 3

Alternatively Certified CTE Teachers by Program Certified to Teach

Program name	CIP code	Number of teachers
Graphic communications	0.0399	1
Computer systems networking	1.0901	1
Baking & pastry arts	2.0501	1
Institutional food worker	2.0508	6
Cosmetology	2.0401	5
Drafting & design	5.0301	1
Electronic communications & engineering	5.0303	2
Electromechanical engineering	5.0403	1
Job seeking/changing skills	2.0105	1
Criminal justice police science	3.0107	1
Homeland security & protective services	3.9999	2
Carpentry	6.0201	1
Electrical power & transmission	6.0399	2
Building property maintenance	6.0401	1
HVAC technician	7.0201	3
Auto collision & repair	7.0603	1
Automotive technology	7.0604	3
Machine tool technology	8.0501	3
Welding technology	8.0508	3
Commercial & advertising art	0.0402	2
Dental assisting	1.0601	1
Health/Medical assisting services	1.0899	2
Rehabilitation aide	1.2604	2
Health professions & related services	1.9999	2
Logistics & supply chain management	2.0203	1
Management information system	2.1201	1

Total number of respondents: 50

Data Analysis and Results

The following will detail the findings of each research question. Both qualitative and quantitative results are presented within the context of each research question.

Research Question 1

Research question 1 asked, "How do Pennsylvania CTC Directors describe teacher efficacy and retention of alternatively certified teachers within their schools*"*. CTC Directors answered questions based on their perceptions of teacher efficacy and retention among their own alternatively certified teachers within their school. CTE Directions were asked how would they describe the teacher efficacy among their newly hired alternatively certified CTE teachers within their school and asked to rate from no confidence (1) n=0, *low confidence* (2) n=1, *moderately confident* (3) n=6, *confident* (4) n=6, and *highly confident* (5) n=0. Eighty-two percent of CTC Directors replied that teacher efficacy among their newly hired alternatively certified CTE teachers was moderately confident and confident, resulting in a mean of 3.38, and a standard deviation of 0.62. No CTC Director said their teachers were highly confident.

When asked the open-ended question about what evidence helped them come to this conclusion, all of the CTC Directors who responded, except one, relayed that their induction and mentorship program was the reason. Teacher induction and mentorship programs implemented by the school assign a peer to act as a resource and coach for transitioning newly hired teachers into the classroom. A CTC Director cited that having "staff who are willing to share their expertise" was their way of developing confident new teachers.

When asked the open-ended question to identify specific school practices that positively affect the teacher retention of newly hired alternatively certified CTE teachers, the two major themes that emerged from the analyzed data were strong mentorship and coaching, and positive relationships with students, stakeholders, and peers. Strong mentorship and coaching relate to peers and administration acting as a resource of information about policies, procedures, and best practices for newly hired teachers. While one CTC Director simply put strong mentorship and coaching are ways to “provide guidance and support” and make sure the “new teachers' needs are met”. An additional CTC Director stated that schools need to have “supportive administrators and staff who are willing to share their expertise”.

Along with that, the theme of having positive relationships with students, stakeholders, and peers means cultivating good communication, and shared values with those who you serve and work with. An individual CTC Director described positive relationships with stakeholders as newly hired teachers having a “sense of belonging at our school and everyone in our school is there for students”. As another CTC Director emphasized that “being part of a team” positively affects teacher retention.

The CTC Directors also provided data for the past five years on the number of newly hired alternatively certified CTE teachers who left their school within their first three years of teaching. This data showed that over the past five years, 72% of CTC Directors acknowledged that they had two or more newly hired alternatively certified CTE teachers leave their school within their first three years of teaching. Their responses are shown in Table 4.

Table 4

CTE Teachers Leaving Their School Within Three Years of Hire (2020-2024)

Number of teachers who left	Number of CTCs who had that amount leave
0	3
1	0
2	1
3	3
4	1
5	0
6	2
7	0
8	0
9	0
10+	1
Total number of respondents: 11	

When the CTC Directors were asked the open-ended question about their perceived reasons for teachers leaving their school, the two themes present were the realities of the number of responsibilities and requirements and a lack of support. The theme for a number of respondents revealed that their teachers were unprepared for the realities of the number of responsibilities and requirements for newly hired alternatively certified CTE teachers. Unprepared for the realities of teaching was clarified nicely by two CTC Directors when they wrote teachers were being "overburdened with college courses" and some teachers have an "unwillingness to commit to the demands of teaching including conducting work outside the school day".

Furthermore, the theme that was evident in their responses was a lack of support. A lack of support translates to not having the resources, relationships, and professional development required to meet the challenges of being a teacher. A CTC Director indicated that the newly hired alternatively certified CTE teachers who left needed consistent "support from administration and fellow teachers and counselors". A different CTC Director made it clear that alternatively certified CTE teachers often find that “teaching is harder than they believed it would be”.

Research Question 2

Research question 2 asked, “What are the experiences of alternatively certified CTE teachers in Pennsylvania who participated in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs”. The data collected for this research question was from alternatively certified CTE teachers only. When asked the open-ended question, based on the areas/competencies, strategies, information, and resources their postsecondary teacher preparation, school-based teacher induction, and school-assigned teacher mentorship program provided them, what level of confidence do they have in their ability to successfully fulfill their duties as a teacher, alternatively certified CTE teachers demonstrated their self-efficacy with an overwhelmingly 94% of them feeling moderately confident to highly confident with a mean of 3.94 and a standard deviation of 1.01. The responses are included with the scale as follows: no confidence (1) n=1, *low confidence* (2) n=1, *moderately confident* (3) n=10, *confident* (4) n=10, and *highly confident* (5) n=13.

When asked the open-ended question to explain why they feel this way about the level of confidence they have in their ability to successfully fulfill their duties as a teacher, the three major themes that were revealed were having significant support from peers, mentors, and administration, having previous experience with working and managing people, and the quality and relevance of the courses in their postsecondary teacher preparation programs. The first major theme of having significant support from peers, mentors, and administration comes in the form of ongoing peer relationships and strong teacher induction and mentorship programs. As an alternatively certified CTE teacher conveyed, “I feel both my school and my mentor teacher are doing really well in preparing us for this year and years to come”.

The second theme of having previous experience with working and managing people. This includes previous work or life experience with youth and teaching at the postsecondary level. While one alternatively certified CTE teacher explained, “I was a high school coach for many years prior to teaching CTE and I was ahead of the curve”. A separate respondent expressed that their teacher efficacy “stems from work/ life experience and colleague collaboration”.

The third theme of the quality and relevance of the courses in their postsecondary teacher preparation programs have a large amount of influence on their self-efficacy in whether they are successful in the classroom or not. The teacher preparation program for alternatively certified CTE teachers, which instructs newly hired teachers on the essential foundational knowledge of teaching should align with the needs of newly hired teachers to make the program meaningful to the newly hired teachers. One participant noted that “the content presented in most of these classes did not relate to career and technical education”. While another alternatively certified CTE teacher divulged that their “teacher prep could have been much better in every area”.

Research Question 3

Research question 3 sought to answer, “What are the competencies in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs that are perceived by Pennsylvania CTC Directors and alternatively certified CTE teachers to affect alternatively certified CTE teacher efficacy and retention in Pennsylvania”. Both alternatively certified CTE teachers and CTC Directors contributed to this question by providing data on their perceptions about their respective alternative CTE teacher preparation, induction, and mentorship programs.

Alternative CTE Teacher Preparation Programs. Alternatively certified CTE teachers were asked which areas/competencies within their postsecondary teacher preparation program were beneficial to them in helping successfully fulfill their duties as a teacher, and explain why they feel this way. When analyzing their responses, the themes that emerged were knowing how to establish a good learning environment with effective classroom management, having a strong understanding of school law and special education requirements, and learning pedagogy skills such as lesson planning, differentiated instruction, and assessments.

The first theme of knowing how to establish a good learning environment with effective classroom management relates to creating fair, consistent, and equitable rules and procedures in their classroom will establish a strong rapport with students and promote a safe, welcoming, and structured learning environment where students can take risks and be successful. One alternatively certified CTE teacher confirmed that “these items are essential to the management of a classroom”.

In addition to that, the theme of having a strong understanding of school law and special education requirements focuses on the fact that teachers should have a full understanding of the school and state policies and procedures so they can confidently complete required tasks and fulfill their professional duties. As an alternatively certified CTE teacher declared that “knowing the legalities and how to deal with the special populations in today's school setting helped me tremendously."

The other theme that was evident, which alternatively certified CTE teachers felt helped fulfill their duties as a teacher, was learning pedagogy skills such as lesson planning, differentiated instruction, and assessments. Understanding effective pedagogy and correctly implementing instructional strategies and techniques can increase student success. This student success could contribute to higher teacher efficacy and retention. One alternatively certified CTE teacher emphasized that, for them, the “most useful information covered methods of student assessment”.

Alternatively certified CTE teachers were also asked which areas/competencies within their postsecondary teacher preparation program, were not covered that they need/needed more support and guidance with to help successfully fulfill their duties as a teacher, and explain why they feel this way. Two themes that were identified were the lack of training in instructional technology and classroom management and strategies on how to handle student behaviors. The lack of training in instructional technology is important with technology changing rapidly and new educational software and hardware being pushed out every year. Teachers in preparation programs need to comprehend the usefulness and situational applications of the technology to promote student engagement and student success. Due to the lack of experience with educational technology, several alternatively certified CTE teachers mentioned seeking guidance on these topics from mentors and peers.

The theme of classroom management and strategies on how to handle student behaviors also emerged which includes concerns about situations with special education students and how to deal with students on a daily basis. Handling students with special needs and behavior plans is foreign to new teachers. There are specific supports and strategies for situational awareness of the classroom and other students that a teacher must follow to maintain effective classroom management. As one respondent acknowledged that they “did not get enough training on dealing with emotional support students in the classroom".

When CTC Directors were asked what areas/competencies within their local postsecondary teacher preparation program they feel are important in increasing teacher efficacy of their newly hired alternatively certified CTE teachers, and explain why they feel this way the two themes that became apparent were knowing about good pedagogy and learning how to establish a good learning environment where students feel safe and welcomed. The identical theme to the responses of the alternatively certified CTE teacher of knowing about good pedagogy reinforces the idea that implementing effective instructional strategies and learning assessments helps classroom engagement and learning. A CTC Director supported this theme by writing “high-quality instructional strategies will help students reach the intended learning outcomes”.

Another theme that was present in over half of the CTC Directors’ responses to the survey questions and agreed with the alternatively certified CTE teachers, is that learning how to establish a good learning environment where students feel safe and welcomed is a competency that is important to supporting alternatively certified CTE teachers fulfill their duties as a teacher and should be taught in teacher preparation programs. One CTC Director elaborated that “establishing a classroom, climate, and culture that focuses on respect, learning, and inclusion will build a sense of belonging and team within the classroom”. This will elevate the effectiveness of classroom management and reduce student behavior issues.

Teacher Induction Programs. When asked which areas/competencies within their school-based teacher induction program were beneficial to them in helping successfully fulfill their duties as a teacher and explain why they feel this way, the alternatively certified CTE teachers’ responses produced three prominent themes. The themes were discussions on various just-in-time topics with peers and mentors, implementing effective curriculum, instructional strategies, and pedagogy, and learning the school policies and procedures to help fulfill the daily duties of a teacher. Because newly hired teachers are unsure of what they need to know, discussions on just-in-time topics are relevant information that teachers need to implement a lesson, complete a school-required task, or fulfill a professional duty such as conducting back-school-nights, filling out interim reports or teaching a lesson aligned with a school-wide initiative. An individual from the alternatively certified CTE teacher survey described times when they “basically had to figure things out as I go”.

The theme of implementing effective curriculum, instructional strategies, and pedagogy was repeated in questions about new teacher induction as well. This is an indicator that pedagogy and teaching strategies are very important to learn. Newly hired teachers rely on their lessons to be engaging so that both student behavior and student outcomes are positive within the classroom. An alternatively certified CTE teacher expressed that the competencies that were beneficial to them were “pedagogical training, content knowledge, cultural competence, technology integration, work-based learning, and reflective practice”.

A third theme of learning the school policies and procedures was also present.
were seen as essential information for newly hired alternatively certified CTE teachers. Each school has its own board policies and procedures. These can only be taught at the local level prohibiting the school policies and procedures to be taught during the teacher’s preparation program. These policies and procedures are fundamental in having the teacher meet compliance and duties outlined in their contract and job description. One alternatively certified CTE teacher communicated that “the most essential information” received was about teacher responsibilities and other important schoolwide policies.

When asked to describe what competencies were not covered that they need/needed more support and guidance with to help successfully fulfill their duties as a teacher, and explain why they feel this way, alternatively certified CTE teachers’ responses included the top two recurring themes of working with and observing peers and mentor teachers, and creating effective and engaging lesson plans. Newly hired teachers' self-efficacy can benefit from observing their peers' teaching strategies being modeled for them and how classroom management and difficult situations should be addressed. An alternatively certified CTE teacher suggested that "having someone sit in and help you for the first week or two would make the experience a lot less frightening". Another emphasized that "I find more valuable ideas watching other teachers in action than I ever did in any induction meeting".

Creating effective and engaging lesson plans, the additional theme from the responses, was the general consensus. As discussed previously, having effective and engaging lesson plans can resolve a lot of newly hired teacher concerns with positive student outcomes and classroom behavior. A participant from the alternatively certified CTE teacher cross-sectional survey straightforwardly answered, "I would focus more on lesson preparation and teaching strategies".

When asked to rate the degree to which each area/competency within their teacher induction program is important in increasing the teacher efficacy of their newly hired alternatively certified CTE teachers, the responses from the CTC Director survey aligned with what the alternatively certified CTE teachers reported. As seen in Table 5, school policies and procedures were the highest responses for "important" competencies with a mean of 2.36 and a standard deviation of 0.76. In addition, 81% of CTC Directors surveyed indicated that classroom management was a "very important" competency to cover during a teacher induction program, with a mean of 1.27 and a standard deviation of 0.59 and over 90% thought safety was a "very important" competency in teacher induction programs with a mean of 1.18 and a standard deviation of 0.36.

Table 5

The Level of Importance in Teacher Induction Programs

Competency	(1)Very important %	(2)Important %	(3)Moderately important %	(4)Slightly important %	(5)Not important %
Classroom management	(9) 81.81	(1) 9.09	(1) 9.09	(0) 0.00	(0) 0.00
Curriculum development	(2) 18.18	(3) 27.27	(5) 45.45	(1) 9.09	(0) 0.00
Instruction and assessment	(4) 36.36	(3) 27.27	(3) 27.27	(1) 9.09	(0) 0.00
Professional code of ethics	(5) 45.45	(3) 27.27	(1) 9.09	(1) 9.09	(1) 9.09
Safety	(10) 90.90	(0) 0.00	(1) 9.09	(0) 0.00	(0) 0.00
School procedures and policies	(2) 18.18	(5) 45.45	(3) 27.27	(0) 0.00	(1) 9.09
Student support	(4) 36.36	(4) 36.36	(1) 9.09	(0) 0.00	(1) 9.09
Total number of respondents: 11					

Teacher Mentorship Programs. Throughout the alternatively certified CTE teachers' survey results, mentors and peer collaboration are mentioned numerous times. This is evidence that mentors and peers directly influence teacher efficacy and a newly hired teacher's preparation and induction programs. When asked specifically about which areas/competencies within their school-assigned mentorship program, were beneficial to them in helping successfully fulfill their duties as a teacher, and explain why they feel this way the two themes were that mentors are integral in their success with learning the proper steps and following all of the school's policies and procedures and the most effective way for learning to happen was through frequent and meaningful conversations about specific topics, issues, or concerns as they arise throughout the year.

The first theme of mentors being integral in their success with learning the proper steps and following all of the school's policies and procedures highlights that mentors can provide specific details and clarify any misunderstandings to ensure compliance with the organizational processes. One individual alternatively certified CTE teacher acknowledged that “my mentor teacher has helped clear up any confusion in a lot of those areas”.

The other theme found in the data was that the most effective way for learning to happen was through frequent and meaningful conversations about specific topics, issues, or concerns as they arise throughout the year. One alternatively certified CTE teacher stated that “having casual conversations about what I was experiencing in the classroom and what my mentor had encountered just like it in their years of teaching” was beneficial in transitioning to the classroom.

Alternatively certified CTE teachers’ responses to the question of which areas/competencies within their school-assigned mentorship program were not covered that they need/needed more support and guidance with to help successfully fulfill their duties as a teacher, and explain why they feel this way, had themes of a higher need from their mentors for an in-depth understanding of all school policies and procedures, and assisting with establishing effective teacher routines and creating curriculum and good classroom management.

The first theme of a higher need from their mentors for an in-depth understanding of all school policies and procedures depicts that when teachers are unaware of school policies and working for a public entity, it creates difficult situations for them in terms of professionalism and responsibilities. A participant admitted that “how to successfully add occupational advisory committee (OAC) members and following school policy was difficult to understand at first”. The second theme of assisting with establishing effective teacher routines and creating curriculum and good classroom management sets forth that any newly hired teacher needs support in establishing effective teacher routines and creating curriculum and good classroom management. These three areas are what teachers are held responsible for by their administration, which is why it is repeatedly mentioned by alternatively certified CTE teachers and CTC Directors during this study. An alternatively certified CTE teacher replied that they needed more "classroom management for first year and curriculum mapping".

Interestingly, when CTC Directors were asked to rate the degree to which each area/competency within their teacher mentorship program, is important in increasing teacher efficacy of their newly hired alternatively certified CTE teachers, CTC Directors surveyed also believed classroom management is of the utmost importance. As shown in Table 6, 90% of the CTC Directors surveyed believed classroom management is one of the most important competencies for mentors to help newly hired teachers with a mean of 1.20 and a standard deviation of 0.60. The data showed that both CTC Directors and alternatively certified CTE teachers view classroom management as an integral skill to learn for teacher success.

Table 6

The Level of Importance in Teacher Mentorship Programs

Competency	(1)Very important %	(2)Important %	(3)Moderately important %	(4)Slightly important %	(5)Not important %
Classroom management	(9) 90.00	(0) 0.00	(1) 10.00	(0) 0.00	(0) 0.00
Curriculum development	(1) 10.00	(3) 30.00	(5) 50.00	(1) 10.00	(0) 0.00
Instruction and assessment	(4) 40.00	(3) 30.00	(2) 20.00	(1) 10.00	(0) 0.00
Professional code of ethics	(5) 50.00	(3) 30.00	(1) 10.00	(1) 10.00	(0) 0.00
Safety	(5) 50.00	(4) 40.00	(1) 10.00	(0) 0.00	(0) 0.00
School procedures and policies	(2) 20.00	(4) 40.00	(3) 30.00	(0) 0.00	(1) 10.00
Student support	(4) 40.00	(4) 40.00	(1) 10.00	(0) 0.00	(1) 10.00
Total number of respondents: 10					

Contrary to what alternatively certified CTE teachers believe though, Table 6 shows only 20% of CTC Directors view school policies and procedures as very important and ten percent of CTC Directors believe this is not an important competency for newly hired teachers to seek support from mentors with a mean of 2.40 and a standard deviation of 1.11. This demonstrates a disconnect between CTC Directors and alternatively certified CTE teachers about school policies and procedures. The alternatively certified CTE teachers are asking for more support on school policies and procedures while CTC Directors are not too concerned with this competency for increasing teacher efficacy and retention.

Research Question 4

Research question 4 examined the alternatively certified CTE teachers about the current practices in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs that are perceived by Pennsylvania CTC Directors and alternatively certified CTE teachers to affect alternatively certified CTE teacher efficacy and retention in Pennsylvania. The collected data about the number of years alternatively certified CTE teachers participated in alternative CTE teacher preparation (number of years needed to complete and receive a permanent Career and Technical Instructional II Certificate), teacher induction, and teacher mentorship programs are shown in Table 7, Table 8, and Table 9, respectively.

Table 7

Number of Years in an Alternative CTE Teacher Preparation Program

Years in program	Percentage %	Number of teachers
1 year	0.00	0
2 years	5.41	2
3 years	0.00	0
4 years	10.81	4
5 years	8.11	3
6 years	18.92	7
7 years	16.22	6
8 years	40.54	15
Total number of respondents:	100	37

Over 80% of alternatively certified CTE teachers are enrolled in an alternative CTE teacher preparation program for five years or more. For the entire length of their program, they are also a full-time CTE teacher. This equates to newly hired alternatively certified CTE teachers learning foundational teaching skills and knowledge while working on the job for over half a decade. While traditionally certified teachers obtain these teaching skills and knowledge within the four years prior to them beginning their professional teaching career.

Table 8

Number of Years in a Teacher Induction Program

Years in Program	Percentage %	Number of teachers
Less than 1 year	10.81	4
1 year	51.35	19
2 years	18.91	7
3 years	18.91	7
4+ years	0.00	0
Total number of respondents:	100	37

Regarding the length of teacher induction programs, almost 80% of alternatively certified CTE teachers participate for two years or less. Only 45% of respondents indicated that their teacher induction program met with the frequency of at least once per week.

Table 9

Number of Years in a Teacher Mentorship Program

Years in Program	Percentage %	Number of teachers
Less than 1 year	8.10	3
1 year	54.05	20
2 years	21.62	8
3 years	13.51	5
4+ years	2.70	1
Total number of respondents:	100	37

Only 18% of alternatively certified CTE teachers surveyed had a mentor for longer than two years. In addition, only 38% of respondents communicated that their teacher mentorship program met with the frequency of at least once per week. When comparing the alternative CTE teacher preparation, induction, and mentorship programs, the length and frequency of support in teacher induction and mentorship programs, being much shorter and less frequent, is almost the complete opposite of the length and frequency of support alternative CTE teacher preparation programs offer.

While alternatively certified CTE teachers have been in their teacher preparation program for over five years, several of their teacher induction and mentorship programs end after the first two years. This misalignment demonstrates a high probability that alternatively certified CTE teachers have not learned everything the teaching profession requires of them after the first two years of teaching and that the teacher induction and mentorship programs could still benefit the teachers while they continue in their teacher preparation program.

When CTC Directors were asked what criteria are used to assign teacher mentors, the themes that appeared after reviewing the data from the cross-sectional surveys were identifying a model teacher who is similar in personality, in close proximity to the new teacher, work ethic, classroom procedures, and subject content. Personality and proximity are important as communication needs to be efficient and effective between the teacher and the mentor. This also applies to work ethic and classroom procedures. How one runs their classroom and the perceived effort can vary greatly between teachers. While these are the goals of the CTC Directors, it does not always work that way as an alternatively certified CTE cosmetology teacher pointed out the differing subject content between them and their mentor “there are a lot of little details that only a cosmetology teacher can help with, it was not my mentor’s fault they could not help me”.

When asked if they plan to continue in their current teaching position 88% of alternatively certified CTE teachers surveyed showed that they plan to continue in their current teaching position. The responses were: *yes* (n=34) and *no* (n=4). An alternatively certified CTE teacher declared “I really enjoy working with the students and teaching the next generation of tradesmen and tradeswomen”.

Suggested Changes to Programs. When asked what changes could be made to alternative CTE teacher preparation programs the common themes that surfaced among alternatively certified CTE teachers were restructuring the scope and sequence of the postsecondary institution's certification courses to make the job-embedded assignments and course content more relevant to the highest needs of new teachers as they encounter them in the classroom, and for the postsecondary institutions to create an alternative CTE teacher certification route that is more accessible, and less time-consuming, and can be done in a shorter amount of time.

The one theme from the alternatively certified CTE teacher responses of restructuring the scope and sequence of the postsecondary institution's certification courses to make the job-embedded assignments and course content more relevant to the highest needs of new teachers as they encounter them in the classroom was prevalent. This would help reduce the burden of the classes while making them more useful and meaningful to the alternatively certified CTE teachers so they can apply their new knowledge in their classroom and build confidence when encountering situations they have not experienced yet. One alternatively certified CTE teacher explained that "the most frequently dealt with issues is students with special needs. However, that topic was not even spoken about in my teacher preparation program until my third year of teaching". Another alternatively certified CTE teacher wrote "some of the classes that I took that were offered to traditional college students were not a good fit for CTE as far as content and workload expectations".

The second theme of the postsecondary institutions to create an alternative CTE teacher certification route that is more accessible, less time-consuming, and can be done in a shorter amount of time was also widespread. The teacher preparation program generally lasts five years, some as long as eight years (see Appendix F). This drawn-out sequence of courses limits the timeliness of alternatively certified CTE teachers' learning of essential skills and knowledge and affects student outcomes and teacher efficacy. One alternatively certified CTE teacher suggested to "streamline the whole teacher prep program. The CTE courses are good, the extra classes are not necessary."

When asked about changes to their teacher induction programs alternatively certified CTE teachers provided responses and ideas which they thought would have been helpful for them. Two themes that appeared in the data were developing preservice training and mentor support for teachers before the school year begins and finding ways to streamline requirements and provide more support in completing teacher tasks to allow teachers additional preparation time to plan and organize their classrooms efficiently.

By developing preservice training and mentor support for teachers before the school year begins will allow additional set-up and orientation days for newly hired alternatively certified CTE teachers and would provide the time and space needed for them to get more acclimated to the school's policies, procedures, and classroom environment. An alternatively certified CTE teacher replied, "more support prior to the first day of school would help new teachers with the transition".

The other theme of finding ways to streamline requirements and provide more support in completing teacher tasks to allow teachers additional preparation time to plan and organize their classrooms efficiently will lessen the stress and anxiety when transitioning into the classroom, as the first few days, weeks, and months for a newly hired alternatively certified CTE teacher can be very difficult to learn everything they need to do while teaching a full course load. As one respondent cited “it is very overwhelming in the beginning”, and another alternatively certified CTE teacher simply put “there is not much prep time at all”.

When asked about changes to teacher mentorship programs, the main theme was for mentors to have similar backgrounds to the newly hired alternatively certified CTE teachers. This helps the mentor understand the newly hired alternatively certified CTE teacher’s perspective on their thinking, questioning, and implementation of teaching strategies, program compliance, and curriculum. One alternatively certified CTE teacher reflected, "I would have requested a teacher that taught the same CIP code because it would be easier to understand the tasks on the induction plan.” While one more revealed that “the mentor match is important. I was assigned a mentor who had not taught formal classes for years.”

When CTC Directors were asked what current school practices they feel positively affect teacher retention of newly hired alternatively certified CTE teachers, the prominent theme was having a strong support system consisting of mentors, administrators, and peers. Support systems in all different aspects of assisting newly hired alternatively certified CTE teachers with pedagogy, policies, procedures, and student behaviors are what teachers need to have positive student outcomes, and high teacher efficacy and retention. One CTC Director confirmed that to positively affect teacher efficacy and the retention of newly hired alternatively certified CTE teachers you need “strong mentor support and monthly meetings with instructional coaches and administration to listen and provide guidance”.

Summary

For this mixed method research, two cross-sectional surveys were used that included quantitative and qualitative data to help answer each research question. The researcher organized the data from the qualitative questions on the cross-sectional surveys by meaning, and then analyzed and placed the data into categories. These categories were then turned into themes that represented the participants' perceptions of the experience. The data collected by the researcher from the quantitative questions on the cross-sectional surveys was reduced to descriptive statistics, the facts, and the perspectives of the participants. In Chapter 5 the researcher will discuss the findings and make recommendations based on the discoveries from the results of the study.

Chapter V: Discussion, Conclusion and Recommendation

This mixed methods cross-sectional research study sought to describe the experiences of alternatively certified CTE teachers in Pennsylvania who participated in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs and the competencies and practices within those programs that are perceived as having an impact on CTE teacher efficacy and retention in Pennsylvania. Teacher preparation, induction, and mentorship programs help ease the transition from industry to the classroom and strengthen a teacher's commitment to being an educator (Bottoms et al., 2013). This study aimed to close the gap in the knowledge on the effects that CTE teacher preparation, induction, and mentorship programs of alternative certification routes, and specific competencies and practices within these programs have on CTE teacher efficacy and retention in Pennsylvania.

For this study alternatively certified CTE teachers and CTC Directors in Pennsylvania participated by sharing their perceptions on the competencies and practices in their teacher preparation, induction, and mentorship programs; and the effects each one has on teacher efficacy and retention. The following research questions helped guide this study:

1. How do Pennsylvania CTC Directors describe teacher efficacy and retention of alternatively certified teachers within their schools?
2. What are the experiences of alternatively certified CTE teachers in Pennsylvania who participated in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs?
3. What are the competencies in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs that are perceived by Pennsylvania CTC

Directors and alternatively certified CTE teachers to affect alternatively certified CTE teacher efficacy and retention in Pennsylvania?

4. What are the current practices in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs that are perceived by Pennsylvania CTC Directors and alternatively certified CTE teachers to affect alternatively certified CTE teacher efficacy and retention in Pennsylvania?

This chapter discusses the research findings and conclusions for each research question. Through mixed methods research the findings will provide support in identifying specific competencies of Pennsylvania's alternative teacher preparation programs for CTE teachers and CTCs' induction and mentorship programs, that meet the needs of newly hired, alternatively certified CTE teachers. This chapter will also provide recommendations for further research.

Discussion

Regarding teacher preparation, induction, and mentorship programs for CTE teachers, most of the literature states that CTE teachers need pedagogical practice and training to have a high sense of self-efficacy and to continue in the education field (Bottoms et al., 2013; Carver-Thomas & Darling-Hammond, 2017; Chen & Ney, 2020; Goldrick et al., 2012; Haynes, 2014; Jacques & Potemski, 2014; Lucksnat et al., 2022; Wong, 2004). Newly hired, alternatively certified CTE teachers need more preparation, support, and training than what is being offered due to their varying career and education backgrounds and routes taken to obtain teacher certification (Bottoms et al., 2013; Bowling & Ball, 2018; Chen & Ney, 2020; Redding & Smith, 2016). The following discussion about the findings will add to the discussion of the research in hopes of identifying specific competencies and practices for alternatively certified teachers in Pennsylvania.

Research Question 1

In answering the research question of “How Pennsylvania CTC Directors describe teacher efficacy and retention of alternatively certified teachers within their schools,” the majority of CTC Directors explained that teacher efficacy among their newly hired alternatively certified CTE teachers equated to a confident staff. The CTC Directors identified strong teacher induction and mentorship programs that create positive relationships with students, and stakeholders and the use peers as a resource in school practices that positively affect teacher retention. Even though they perceived their teacher efficacy to be confident, almost three-quarters of CTC Directors noted that over the past five years, they had two or more newly hired alternatively certified CTE teachers leave their school within their first three years of teaching.

The perception of the CTC Directors’ teacher efficacy in their own schools does not fully align with the realities of CTE teachers. As one CTE teacher responded “my nine-year career has been beyond difficult and the stress of doing things backward with no support has taken a toll on me. I can see why CTE teachers don't always last long and go back to industry.” This aligns with the research of Ingersoll (2003), where he stated that newly hired teachers leave within their first few years of teaching, due to a lack of preparation and support beyond their first year (Ingersoll, 2003).

Research Question 2

For the research question of “What are the experiences of alternatively certified CTE teachers in Pennsylvania who participated in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs,” CTE teachers empathetically stated that their level of self-efficacy was high and that they had moderately high confidence. One must remember though that this study did not survey teachers who left the profession. Those teachers who did leave their teaching positions could have had a lower teacher efficacy.

When alternatively certified CTE teachers were asked about the reasons that drove them to such a high level of teacher efficacy, they mentioned that they had significant support from their mentors and administration, and had previous career-related experience. As one participant noted “although it was very inconvenient and at times overwhelming, I truly think that the programs helped give me the necessary information and education needed to understand the importance of content presentation, data collection, and steps needed to prepare my students for the workforce in my field”. This contributes to the theoretical framework of Mason and Poyatos Matas (2015), in that having positive psychological capital (teacher’s self-efficacy), human capital (teacher preparation programs), structural capital (teacher induction programs) and social capital (teacher mentorship programs) in place for alternatively certified CTE teachers helps increase teacher efficacy and retention.

Research Question 3

When attempting to answer the research question of “What are the competencies in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs that are perceived by Pennsylvania CTC Directors and alternatively certified CTE teachers to affect alternatively certified CTE teacher efficacy and retention in Pennsylvania,” there were several components that factored into the solution.

Alternative CTE Teacher Preparation Programs. Alternative certification routes are an experience that is not equal for all participants. Newly hired alternatively certified CTE teachers throughout Pennsylvania will go through a different alternative certification route for teacher preparation programs for entering the classroom. The participants will vary in the level of teaching certificate each one has. Depending on the number of years taught, the participants might either have an emergency teaching certificate, an intern teaching certificate, or a Level 1 Career and Technical Instructional teaching certificate.

Alternatively certified CTE teachers receive their teacher preparation courses after they begin their teaching career in the classroom making the preparation program that much more important to their success. They obtain teaching certifications while having diverse backgrounds of education and work experiences and need more support and resources than traditionally certified teachers (Bottoms et al., 2013). Not surprisingly then, the participants had more feedback about their teacher preparation program than their teacher induction and mentorship programs.

The three postsecondary institutions in Pennsylvania that offer alternative certification routes for CTE teachers and have their teacher preparation competencies approved by the state still provide differing educational experiences. Because of this, each teacher who goes through the alternative certification route will experience a different level of support and resources. Much of the information is hard to comprehend without experiencing the situation and the teachers need clarification as to the reasons for what they are learning.

It was shown that the alternatively certified CTE teachers want their coursework and competencies to be more relevant and timely to their needs. The topics should include learning pedagogy skills, such as lesson planning, differentiated instruction, and assessments, and a strong understanding of school law and special education requirements. Teacher preparation programs also need to be more purposeful in terms of managing student behavior and developing effective learning environments.

The CTC Directors agreed with the alternatively certified CTE teachers, that establishing a good classroom environment is a competency that is important in increasing teacher efficacy and retention and should be taught in teacher preparation programs. Many alternatively certified CTE teachers are missing qualifications to create a well-structured classroom and learning environment and need support with curriculum and student behavior (Bottoms et al., 2013; Bowling & Ball, 2018; Morris, 2006). These competencies should be addressed in their coursework as some of the teacher preparation program's usefulness is currently lacking. As noted in the responses, not all of the teacher preparation programs in Pennsylvania provide courses or instruction about incorporating instructional technology for engaging pedagogy and strategies to help with student behaviors and classroom management.

A theme that was present throughout the alternatively certified CTE teacher cross-sectional survey was the opportunity for teachers to select their preferred postsecondary teacher certification program, as many of them are unhappy with their current postsecondary institution. The certification process for alternatively certified CTE teachers takes too long and at times lacks essential content to be a new teacher or is irrelevant to their current situation. One respondent revealed that "every person I tell that I have 10 years to complete these classes. Yet I can teach the whole time, literally laughs!"

Teacher Induction Programs. Even though alternatively certified CTE teachers must complete the teacher induction program to meet the school's requirements and expectations, each school's differs in terms of content, competencies and delivery methods causing each participant's teacher induction program to also differ greatly. Directors of CTCs are tasked with developing and implementing teacher induction and mentorship programs, providing professional development for teachers to meet their staff's personal goals, and working closely with the three post-secondary institutions in filling teacher vacancies and preparing teachers for the classroom. The CTC Directors of this study have institutional knowledge of what their school has done in the past and have a direct influence on helping teacher efficacy and retention.

An overarching theme that arose from the quantitative and qualitative data of both cross-sectional surveys is to develop a system that has additional preservice training with mentors and applicable teacher induction sessions for newly hired alternatively certified CTE teachers on classroom management, effective instructional strategies, and school policies and procedures. Having newly hired alternatively certified CTE teachers learn everything, some information not being relevant at the time, on the days leading up to and even on the days students are in session, process this information and implement teaching and classroom management techniques, and follow school policies, all without peer assistance, is neither enough time nor support and causes added stress to an already confusing period for newly hired alternatively certified CTE teachers. As one alternatively certified CTE teacher stated, “all the new instructors need more time before the school year starts to have more of an understanding on what is expected of them”. This overarching theme supports Woods’s (2016), notion that implementing a quality multi-year induction program will better prepare teachers and increase teacher efficacy and retention.

Alternatively certified CTE teachers also emphasized that observing peers and mentor teachers greatly increased their teacher efficacy. When observing peers and mentors, alternatively certified CTE teachers are able to see good classroom management in action, and ideas for creating safe, effective and engaging lesson plans. Alternatively certified CTE teachers need to have the immediate opportunity to discuss topics and concerns with peers and mentors as they happen.

Teacher Mentorship Programs. The mentor's participation in the program and their relationship to and engagement with the mentee can also vary from school to school and teacher to teacher. Alternatively certified CTE teachers who enter the educational field with no classroom experience or pedagogical knowledge rely on their mentor for support and guidance. The willingness and level of participation and commitment of the mentor assigned to the mentorship program also determines the level of preparedness of newly hired alternatively certified CTE teachers.

Alternatively certified CTE teachers and CTC Directors, alike, believe that mentors are a great resource for learning classroom management. They disagreed, though, on competencies in school policies and procedures as an important topic for mentors to teach their mentees. Alternatively certified CTE teachers seek out their mentors for support with school policies and procedures along with establishing effective teacher routines and creating curriculum. While CTC Directors felt school policies and procedures are not a competency that mentors should focus on with their mentees.

One consistent theme in both cross-sectional surveys to help increase CTE teachers' ability to fulfill their duties as a teacher was that schools should establish a positive school climate and culture. As Hallam et al. (2012), recommended, mentors are needed for newly hired teachers to improve teacher efficacy and student outcomes. This includes having strong mentor relationships and ongoing collaboration with peers, providing additional common planning time, and allocating resources for mentors to support newly hired alternatively certified CTE teachers.

Frequent and meaningful conversations with mentors are essential to the success of newly hired alternatively certified CTE teachers. Without a mentor, newly hired alternatively certified CTE teachers have to identify other resources to help them be successful and develop teacher efficacy. As one alternatively certified CTE teacher exclaimed, “mentors are needed! Orientation is a must!” and a CTC Director expressed that teachers need a place “where people feel comfortable asking for help” from mentors and peers.

Research Question 4

When reviewing the responses to the research question of “What are the current practices in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs that are perceived by Pennsylvania CTC Directors and alternatively certified CTE teachers to affect alternatively certified CTE teacher efficacy and retention in Pennsylvania,” the data supported the literature review. Arnett-Hartwick & Cannon (2020), determined that alternatively certified CTE teachers have insufficient preparation time, lack classroom management and discipline skills, and an inability to properly motivate students when they first enter the classroom hindering their teacher efficacy and retention. This is because alternative teacher preparation programs are over twice as long in the length of years compared to teacher induction and mentorship programs, leaving newly hired alternatively certified CTE teachers without all of the required knowledge and skills for meeting success in the classroom. When schools implement strong teacher induction and mentorship programs consisting of mentor, administrator, and peer support that extends beyond a teacher’s first year and throughout their full transition into the classroom teacher efficacy and retention will increase.

Conclusions

The responses from the cross-sectional surveys ranged from the teacher preparation, induction, and mentorship programs being able to develop teacher efficacy in alternatively certified CTE teachers, to these programs needing improvements in several areas. A significant amount of the responses focused on the relevance of the information and support provided to the newly hired alternatively certified CTE teachers; and the timeliness, and access to the information and resources when needed. Ongoing, meaningful, and accessible peer support embedded in all aspects of their professional learning is paramount for alternatively certified CTE teachers.

Alternative CTE Teacher Preparation Programs

Teacher preparation programs were described by alternatively certified CTE teachers as being irrelevant and overwhelming. Proper preparation and support are circumstances as to whether a teacher decides to leave the profession (Kang & Berliner, 2012; Morris, 2006). When the sequence of courses and the workload of the preparation programs are aligned with specific competencies and the level of need, newly hired alternatively certified CTE teachers have the capacity to take on such obligations and requirements. An alternatively certified CTE recounted that “all CTE instructors are trying to reorganize their classrooms, develop programs, and actively figure out how to be a teacher in real-time, while taking these courses. It was a real strain as a new teacher to manage the workload of being a new teacher and the workload of these classes”.

Teacher Induction Programs

Extending teacher induction workshops prior to newly hired alternatively certified CTE teachers beginning in the classroom and beyond their first year will help prevent them from being overwhelmed with a flood of information in such a short time period. This allows the newly hired alternatively certified CTE teachers time to process the necessary competencies such as classroom management, effective instructional strategies; and school policies and procedures and develop clarifying questions to ask the presenters. Glazerman et al. (2010), Jacques and Potemski (2014), and Woods (2016), asserted that schools that have quality multi-year induction programs with a comprehensive support system significantly impact student outcomes and increase teacher efficacy and retention.

Teacher Mentorship Programs

Teacher mentorship programs with frequent meetings between the mentor and the newly hired teacher that focus on competencies pertaining to school policies and procedures and classroom management establish a positive school climate and culture and are beneficial to a newly hired teacher's self-efficacy. When the mentor is trained in a closely related subject matter, how to be a mentor, and understands the methods of coaching and supporting newly hired alternatively certified CTE teachers, they provide the needed guidance and support newly hired alternatively certified CTE teachers need during the transition into the classroom. With a mentorship program and a network of support and resources in place alternatively certified CTE teachers will be encouraged and capable of overcoming challenges (Greiman, 2007).

Retention and Efficacy

When newly hired alternatively certified CTE teachers were asked if they plan to continue in their current teaching position 88% of alternatively certified CTE teachers surveyed said they plan to stay. This shows that despite the suggestions and feedback from the cross-sectional surveys, the current programs mostly meet the needs of the participants to stay in the profession. Understanding that data on the perceptions of the teachers who left the profession were not collected and the feedback provided by the study's participants, teacher induction, preparation, and mentorship programs could still benefit from several changes. As Chen and Ney (2020) proclaimed the quality of these programs affects student outcomes, job satisfaction, and consequently teacher efficacy and retention.

Recommendations

This study identified several opportunities for establishing policies, improvements to implementation, and further research related to improvement in Pennsylvania's alternative CTE teacher preparation, teacher induction, and teacher mentorship programs.

Establishing Policies

The U.S. Department of Education stated that newly hired teacher retention is currently the biggest challenge, but it is also a challenge where the government can make the biggest difference (Advance CTE, 2020). Most states lack policies that establish specific competencies for their teacher preparation, induction, and mentorship programs (Haynes, 2014). Pennsylvania only provides guidelines and vague recommendations for its teacher induction, and mentorship programs.

When submitting a school's teacher induction and mentorship plan to the state of Pennsylvania, there are no specific requirements or competencies that the school has to meet. Stronger policies that support alternatively certified CTE teacher candidates in Pennsylvania can provide access to meaningful and relevant teacher preparation, induction, and mentorship programs for alternatively certified CTE teacher candidates. As demonstrated in the study, and other research, retention is highly correlated to the quality and level of support and training provided to newly hired teachers during their first years of teaching.

Improvements to Practices

For those entering the teaching profession through an alternative certification route, Pennsylvania has to improve the systems and practices in place that schools and postsecondary institutions use to deliver their alternative CTE teacher preparation, induction, and mentorship programs.

Alternative CTE Teacher Preparation Programs. Many individuals are entering their classrooms learning differing competencies and having disparate experiences among their teacher preparation programs can cause low teacher efficacy and retention. To support the preparation and sustainability of alternatively certified CTE teachers, Pennsylvania needs to have alternative teacher certification routes with relevant, timely, and specific competencies.

Canada, China, and Finland, who have much higher teacher retention rates than the U.S., have established robust teacher preparation programs. These countries have developed specific competencies for coursework such as instructional practices, classroom management, and the use of data and assessments in their teacher preparation programs and field-based experiences for teacher candidates (Tucker, 2011). Having a meaningful and deliberate scope and sequence of the postsecondary institution's certification courses, which include learning opportunities for pedagogical skills, school law, and special education is integral to the success of Pennsylvania's alternatively certified CTE teachers.

Teacher Induction Programs. The improvements suggested for Pennsylvania's teacher induction programs were more about the logistics and practices of the programs and not so much improvement in the quality of content. Even though Pennsylvania requires teacher induction programs for newly hired teachers, there needs to be consistency among them, following research-based best practices on the overall delivery and content of these programs to include competencies of classroom management, effective instructional strategies, and school policies and procedures. Currently, these programs vary greatly with the content, duration, intensity, and frequency of the programs (Haynes, 2014).

These leading countries in teacher retention, Canada, China, and Finland, have teacher induction programs that equal the length of their teacher preparation programs. Their teacher induction programs cover the competencies of teaching plans and assessments, classroom management, implementation of the new curriculum, and effective pedagogy. Pennsylvania CTC Directors should support further research, collaborate, and share best practices about the length and frequency of their teacher induction programs for alternatively certified CTE teachers.

Teacher Mentorship Programs. Teacher mentorship was also a program in which the participants of the cross-sectional surveys provided significant feedback. Successful teacher mentorship programs include regular collaboration, embedded coaching, and feedback and support from peer teachers (Haynes, 2014; U.S. Department of Education, 2023). Canada, China, and Finland have mentoring for all newly hired teachers with a reduced teaching load, and shared planning and collaboration time with mentors to increase teacher efficacy and retention (Carver-Thomas & Darling-Hammond, 2017).

To help improve teacher efficacy and retention in Pennsylvania, CTC Directors should identify ways to promote the facilitation of positive, ongoing collaboration and peer support from mentors. For alternatively certified CTE teachers in Pennsylvania to learn the competencies of, and successfully implement, school policies and procedures and effective classroom management there has to be a system for ongoing peer support, collaboration, and coaching. Schools in Pennsylvania should also have a positive school climate and culture, as many administrators cite the lack of well-supervised student teacher field-based experiences and mentor support during the initial years of teaching and beyond that contribute to low teacher efficacy and retention (Haynes, 2014).

Future Research

According to Haynes (2014), there needs to be teacher development that is grounded in research-based competencies and practices for preparation, induction, and mentorship programs. Additional research is necessary for a larger-scale study to expand the conversation about newly hired alternatively certified CTE teachers in Pennsylvania and to gather more data on their lived experiences. The study should include the discourse, corroboration, and dissent on solutions to the issues and establishing best practices in improving teacher efficacy and retention of alternatively certified CTE teachers in Pennsylvania.

Additional quantitative research on alternatively certified CTE teacher retention within Pennsylvania CTCs is needed to accurately and comparably determine the significance of the retention rate in Pennsylvania. Further qualitative research of current alternatively certified CTE teachers and former alternatively certified CTE teachers who left the educational field should be conducted to clarify which competencies should be taught when, and prioritize the learning for newly hired alternatively certified CTE teachers. More in-depth research about Pennsylvania’s three postsecondary institutions’ course offerings and curriculum will also support establishing specific competencies and practices in these programs. Establishing specific competencies and practices will provide insight into the factors and influences of teacher efficacy and their decision to leave the profession and allow the state of Pennsylvania to provide guidance on teacher preparation, induction, and mentorship programs and create a collaborative alternative CTE teacher certification system (Bowling & Ball, 2018). Teacher preparation, induction, and mentorship programs with specific, fully agreed-upon research-based competencies and practices would increase pedagogical skills, positive student outcomes, and teacher efficacy and positively change retention rates (Carver-Thomas & Darling-Hammond, 2017; Haynes, 2014; Lucksnat et al., 2022).

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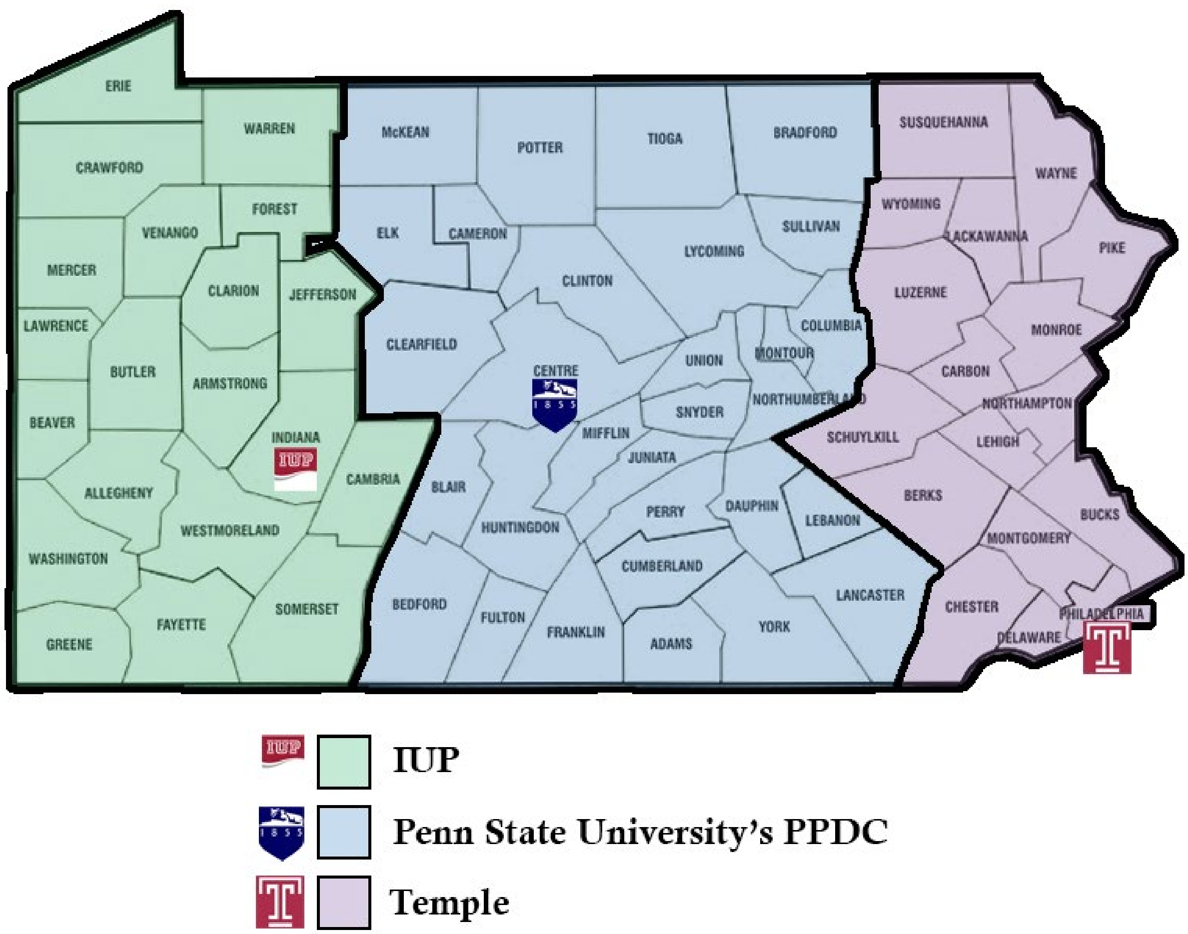
Appendix A

Postsecondary Territory Map



Source: https://ed.psu.edu/academics/departments/department-learning-and-performance-systems/career-technical-education-certifications

Appendix B

CTC Director Introduction Email and Survey

University of Wisconsin-Stout
Wisconsin's Polytechnic University

INSTITUTIONAL REVIEW BOARD

Office of Research and
Sponsored Programs Robert
S. Swanson Learning Center
#201 715-232-4042
irb@uwstout.edu

Date: March 19, 2024

PI: Stephen Monastra

Department: TEACHING LEARNING & LEADERSHIP, GRADUATE STUDENT

Re: Initial - IRB-FY2024-275

Alternative Certification Routes for Career and Technical Education Teachers Matter: A Descriptive Study on CTE Teacher Efficacy and Retention in Pennsylvania

Dear Stephen Monastra,

In accordance with Federal regulations, your project, *Alternative Certification Routes for Career and Technical Education Teachers Matter: A Descriptive Study on CTE Teacher Efficacy and Retention in Pennsylvania*, was reviewed by a member of the University of Wisconsin - Stout Institutional Review Board and was determined to be Exempt from full review under the below Categories in accordance with Federal Policy for the Protection of Human Subjects (45 CFR 46).

Category: Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:

The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects;

You project is hereby approved and deemed exempt from further IRB review for 5 years from March 19, 2024. If a renewal of this approval is needed, it is to be submitted at least 10 working days prior to the expiration date.

Responsibilities for Principal Investigators of UW-Stout IRB-approved research:

1. No subjects may be involved in any study procedure prior to the IRB approval date or after the expiration date.
2. All unanticipated or serious adverse events must be reported to the IRB.
3. All protocol modifications must be approved prior to implementation unless they are intended to reduce risk.
4. All protocol deviations must be reported to the IRB.
5. All recruitment materials and methods must be approved by the IRB prior to being used.
6. Research which involves financial compensation to participants must follow appropriate UW-Stout payment procedures.
7. Consent forms must adhere to UW-Stout IRB standards and indicate that the research has been approved by the UW- Stout IRB as required by federal regulations (see UW-Stout IRB consent form templates for more details).
8. Researchers conducting human subjects' research under an approved exempt category are still ethically bound to follow the basic ethical principles of the Belmont Report, as reflected in the practice of obtaining informed consent from participants and adherence to IRB approved methods.
9. Any modifications to the approved study must be submitted for review through Cayuse IRB. All approval letters and study documents are located within the Study Details in Cayuse IRB.

Thank you for your cooperation with the IRB and best wishes with your project. If you have questions, please contact the IRB office at irb@uwstout.edu or by phone 715-232-4042, and your question will be directed to the appropriate person.

Sincerely,

Michael Mensink, Ph.D.; IRB Chair

University of Wisconsin-Stout Institutional Review Board

Hi CTC Directors,

My name is Stephen Monastra, principal at North Montco Technical Career Center. I am enrolled in a doctoral program through the University of Wisconsin and am currently working on my dissertation for a doctorate in Career and Technical Education Leadership (Ed.D.). The topic of the dissertation is CTE teacher efficacy (the belief someone holds about their ability to be a successful teacher) and retention (CTE teachers returning the following year to the same position at their school). The research includes analyzing alternative certification teacher preparation, induction, and mentorship programs throughout Pennsylvania.

I am hoping that you could support me by completing a 5-10 minute survey. Please fill out all required questions to the best of your ability. This survey is anonymous as no personal identifiers are being collected. If you have any questions or concerns please feel free to contact me at smonastra@nmtcc.org.

Here is the link to the survey: https://uwstout.qualtrics.com/jfe/form/SV_6YIK8hvtXQI0d2C

Another step in conducting the research on teacher efficacy and retention is to solicit responses from current CTE teachers and gather data about their experiences going through alternative certification teacher preparation, induction, and mentorship programs. If you are willing to distribute this anonymous survey to your CTE teaching staff, to assist in gathering this data, please forward the attached PDF (greeting letter and embedded link) to your CTE teachers.

Thank you for your time and participation!

Stephen Monastra

Principal: North Montco Technical Career Center

Study Title: Alternative Certification Routes for Career and Technical Education Teachers Matter for Directors

Thank you for taking the time to complete this survey and supporting me in completing my dissertation research.

Implied Consent Informed Consent for Research Participation

Study Title: Alternative Certification Routes for Career and Technical Education Teachers Matter: A Descriptive Study on CTE Teacher Efficacy and Retention in Pennsylvania

Researcher Names - Stephen Monastra

Department - CTE EdD

Contact Information - monastras8242@my.uwstout.edu

Faculty Advisor - Debbie Stanislawski, Ph.D. Department - Professor & Program Director, Marketing and Business Education, Teaching, Learning, and Leadership Department

Contact Information - stanislawskid@uwstout.edu

Overview of the Research Study:

Participation invitation:

You are invited to participate in the research study described below. Your participation is entirely voluntary, and you may stop your participation or withdraw from the study at any time and for any reason. If you choose to not participate or to stop your participation, there will be no negative consequences to you. Your decision to participate or not in this study will not change your relationship with the researchers or the University of Wisconsin-Stout.

Who can participate in this study:

Current CTC Directors in the state of Pennsylvania.

Study description:

This research seeks to gather information on CTC Directors' perspectives on alternative certification CTE teacher routes in Pennsylvania. Specifically, the study seeks to describe alternative CTE teacher preparation, induction, and mentorship programs and the effects they had on teacher self-efficacy and retention through a cross-sectional survey. Questions of the survey will be focused on the participants' experiences and perspectives on the supports provided and the level of preparation for the classroom they were afforded.

What you will be asked to do:

Participants will be asked to complete a survey with questions about their perspectives on alternative certification CTE teacher routes in Pennsylvania, including teacher preparation, induction, and mentorship programs.

Time commitment:

5-10 minutes

Participation risks:

The researcher(s) do not believe this study will cause you any discomfort or other risk beyond what you would normally experience in your daily life.

What will be done to minimize your participation risks:

All personal identifiers, names, locations, and organizations that might have been included in the participants' responses were redacted in both data and survey documents that were used as the source of data.

Participation benefits:

This study will further research on alternative certification routes for CTE teachers in Pennsylvania and the experiences of alternatively certified CTE teachers in Pennsylvania who participated in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs. This study is of practical significance to various stakeholders on the local, secondary, postsecondary, and state levels, informing them about the importance of compliance and oversight of teacher preparation, induction, and mentorship programs and how to improve state and district programs for alternatively certified CTE teachers.

The results of this study could also further education policies and ensure that each newly hired teacher, regardless of certification route, previous industry experience, or educational background, receives quality education, training, and support that is consequential to teacher efficacy and retention.

In addition, this research could further the practice of teacher preparation program Directors and school administrators in evaluating their preparation, induction, and mentorship program competencies to improve the outcomes of newly hired, alternatively certified CTE teachers entering the classroom and, in turn, improve student learning.

Confidentiality and Data Protection:

Who will have access to your data:

Only the researcher and the research advisor will have access to raw data.

Data protection and future use:

Any survey data will be stored on password-protected computers.

Protection of Human Research Subjects:

If you have questions about this study, please contact: Stephen Monastra monastras8242@my.uwstout.edu

If you have concerns about this study or your rights as a participant, please contact:

Institutional Review Board Chair University of Wisconsin-Stout Robert S. Swanson Learning Center #207 715-232-4042 irb@uwstout.edu

Your right to withdraw:

Your participation in this study is entirely voluntary. You may choose not to participate or to stop the study or survey without any adverse consequences to you. However, should you choose to participate and later wish to withdraw from the study, there may be no way to identify your data after it has been submitted. If you are participatig in an anonymous survey, once you submit your responses, the data cannot be linked to you and cannot be withdrawn.

UW-Stout IRB approval statement:

Survey:

This study has been reviewed and approved by the University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations for human subjects research as required By federal law and UW-Stout policies.

Implied Consent Statement:

By completing the following survey, I am indicating that I agree to participate in this study and understand that I may stop my participation or withdraw my consent at any time during active participation.

Instructions: Please choose the appropriate choice for each question. Your answers should best align with your current school's practices.

Within your local postsecondary teacher preparation program, what areas/competencies do you feel are important in increasing teacher efficacy of your newly hired alternatively certified CTE teachers, and explain why you feel this way?

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Within your teacher induction program, rate the degree to which each area/competency is important in increasing teacher efficacy of your newly hired alternatively certified CTE teachers.

	Very Important (1)	Important (2)	Moderately Important (3)	Slightly Important (4)	Not Important (5)
Classroom management (1)	O	O	O	O	O
Curriculum development (2)	O	O	O	O	O
Instruction and assessment (3)	O	O	O	O	O
Professional Code of Ethics (4)	O	O	O	O	O
Safety (5)	O	O	O	O	O
School procedures and policies (6)	O	O	O	O	O
Student Support (7)	O	O	O	O	O

Within your teacher mentorship program, rate the degree to which each area/competency is important in increasing teacher efficacy of your newly hired alternatively certified CTE teachers.

	Very Important (1)	Important (2)	Moderately Important (3)	Slightly Important (4)	Not Important (5)
Classroom management (1)	O	O	O	O	O
Curriculum development (2)	O	O	O	O	O
Instruction and assessment (3)	O	O	O	O	O
Professional Code of Ethics (4)	O	O	O	O	O
Safety (5)	O	O	O	O	O
School procedures and policies (6)	O	O	O	O	O
Student Support (7)	O	O	O	O	O

What criteria do you use when choosing a teacher mentor for your newly hired alternatively certified CTE teachers?

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How would you describe the teacher efficacy among your newly hired alternatively certified CTE teachers within your school?

- O No Confidence (1)
- O Low Confidence (2)
- O Moderately Confident (3)
- O Confident (4)
- O Highly Confident (5)

What current school practices do you feel positively affect teacher efficacy of newly hired alternatively certified CTE teachers in your school, and what evidence helped you come to this conclusion?

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Over the past five years, what number of newly hired alternatively certified CTE teachers left your school within their first three years of teaching?

▼ 0 (1) ... 10+ (11)

What are your perceived reasons for teachers leaving your school?

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What current school practices do you feel positively affect teacher retention of newly hired alternatively certified CTE teachers in your school, and what evidence helped you come to this conclusion?

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What other details would you like to share with the researcher about teacher efficacy and retention within your school?

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Appendix C

CTE Teacher Introduction Email and Survey

INSTITUTIONAL REVIEW BOARD

Office of Research and
Sponsored Programs Robert
S. Swanson Learning Center
#201 715-232-4042
irb@uwstout.edu

Date: March 19, 2024

PI: Stephen Monastra

Department: TEACHING LEARNING & LEADERSHIP, GRADUATE STUDENT

Re: Initial - IRB-FY2024-275

Alternative Certification Routes for Career and Technical Education Teachers Matter: A Descriptive Study on CTE Teacher Efficacy and Retention in Pennsylvania

Dear Stephen Monastra,

In accordance with Federal regulations, your project, *Alternative Certification Routes for Career and Technical Education Teachers Matter: A Descriptive Study on CTE Teacher Efficacy and Retention in Pennsylvania*, was reviewed by a member of the University of Wisconsin - Stout Institutional Review Board and was determined to be Exempt from full review under the below Categories in accordance with Federal Policy for the Protection of Human Subjects (45 CFR 46).

Category: Category 2.(i). Research that only includes interactions involving educational tests (cognitive,

diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects;

You project is hereby approved and deemed exempt from further IRB review for 5 years from March 19, 2024. If a renewal of this approval is needed, it is to be submitted at least 10 working days prior to the expiration date.

Responsibilities for Principal Investigators of UW-Stout IRB-approved research:

1. No subjects may be involved in any study procedure prior to the IRB approval date or after the expiration date.
2. All unanticipated or serious adverse events must be reported to the IRB.
3. All protocol modifications must be approved prior to implementation unless they are intended to reduce risk.
4. All protocol deviations must be reported to the IRB.
5. All recruitment materials and methods must be approved by the IRB prior to being used.
6. Research which involves financial compensation to participants must follow appropriate UW-Stout payment procedures.
7. Consent forms must adhere to UW-Stout IRB standards and indicate that the research has been approved by the UW- Stout IRB as required by federal regulations (see UW-Stout IRB consent form templates for more details).
8. Researchers conducting human subjects' research under an approved exempt category are still ethically bound to follow the basic ethical principles of the Belmont Report, as reflected in the practice of obtaining informed consent from participants and adherence to IRB approved methods.
9. Any modifications to the approved study must be submitted for review through Cayuse IRB. All approval letters and study documents are located within the Study Details in Cayuse IRB.

Thank you for your cooperation with the IRB and best wishes with your project. If you have questions, please contact the IRB office at irb@uwstout.edu or by phone 715-232-4042, and your question will be directed to the appropriate person.

Sincerely,

Michael Mensink, Ph.D.; IRB Chair

University of Wisconsin-Stout Institutional Review Board

Hi CTE Teachers,

My name is Stephen Monastra, principal at North Montco Technical Career Center. I am enrolled in a doctoral program through the University of Wisconsin and am currently working on my dissertation for a doctorate in Career and Technical Education Leadership (Ed.D.). The topic of the dissertation is CTE teacher efficacy (the belief someone holds about their ability to be a successful teacher) and retention (CTE teachers returning the following year to the same position at your school). The research includes analyzing alternative certification teacher preparation, induction, and mentorship programs throughout Pennsylvania.

I am hoping that you could support me by completing a 10-15 minute survey. Please fill out all required questions to the best of your ability. This survey is anonymous as no personal identifiers are being collected. If you have any questions or concerns please feel free to contact me at smonastra@nmtcc.org.

Here is the link to the survey: https://uwstout.qualtrics.com/jfe/form/SV_6L13dvhn0QYStAq

Thank you for your time and participation!

Stephen Monastra

Principal: North Montco Technical Career Center

Study Title: Alternative Certification Routes for Career and Technical Education Teachers Matter for Directors

Thank you for taking the time to complete this survey and supporting me in completing my dissertation research.

Implied Consent Informed Consent for Research Participation

Study Title: Alternative Certification Routes for Career and Technical Education Teachers Matter: A Descriptive Study on CTE Teacher Efficacy and Retention in Pennsylvania

Researcher Names - Stephen Monastra

Department - CTE EdD

Contact Information - monastras8242@my.uwstout.edu

Faculty Advisor - Debbie Stanislawski, Ph.D. Department - Professor & Program Director, Marketing and Business Education, Teaching, Learning, and Leadership Department Contact Information - stanislawskid@uwstout.edu

Overview of the Research Study Participation invitation:

You are invited to participate in the research study described below. Your participation is entirely voluntary, and you may stop your participation or withdraw from the study at any time and for any reason. If you choose to not participate or to stop your participation, there will be no negative consequences to you. Your decision to participate or not in this study will not change your relationship with the researchers or the University of Wisconsin-Stout.

Who can participate in this study:

Current Alternatively Certified CTE Teachers in the state of Pennsylvania.

Study description:

This research seeks to gather information on the experiences of alternatively certified teachers in Pennsylvania. Specifically, the study seeks to describe their teacher preparation, induction and mentorship programs and the effects they had on their self-efficacy and retention through a cross-sectional survey. Questions of the survey will be focused on the participants' experiences and perspectives on the supports provided and the level of preparation for the classroom they were afforded.

What will Participants be asked to do:

Participants will be asked to complete a survey with questions about their experiences as an alternatively certified CTE teacher in Pennsylvania, including teacher preparation, induction, and mentorship programs.

Time commitment: 10-15 minutes

Participation risks:

The researcher(s) do not believe this study will cause you any discomfort or other risk beyond what you would normally experience in your daily life.

What will be done to minimize your participation risks:

All personal identifiers, names, locations, and organizations that might have been included in the participants' responses will be redacted in both data and survey documents.

Participation benefits:

This study will further research on alternative certification routes for CTE teachers in Pennsylvania and the experiences of alternatively certified CTE teachers in Pennsylvania who participated in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs.

Benefits of the Study:

This study is of practical significance to various stakeholders on the local, secondary, postsecondary, and state levels, informing them about the importance of compliance and oversight of teacher preparation, induction, and mentorship programs and how to improve state and district programs for alternatively certified CTE teachers. The results of this study could also further education policies and ensure that each newly hired teacher, regardless of certification route, previous industry experience, or educational background, receives quality education, training, and support that is consequential to teacher efficacy and retention. In addition, this research could further the practice of teacher preparation program Directors and school administrators in evaluating their preparation, induction, and mentorship program competencies to improve the outcomes of newly hired, alternatively certified CTE teachers entering the classroom and, in turn, improve student learning.

Confidentiality and Data Protection:

Who will have access to your data: the researcher and the research advisor will have access to raw data.

Data protection and future use: Any survey data will be stored on password-protected computers.

Protection of Human Research Subjects:

If you have questions about this study, please contact: Stephen Monastra monastras8242@my.uwstout.edu. If you have concerns about this study or your rights as a participant, please contact: Institutional Review Board Chair University of Wisconsin-Stout Robert S. Swanson Learning Center #207 715-232-4042 irb@uwstout.edu.

Your right to withdraw:

Your participation in this study is entirely voluntary. You may choose not to participate or to stop the study or survey without any adverse consequences to you. However, should you choose to participate and later wish to withdraw from the study, there may be no way to identify your data after it has been submitted. If you are participating in an anonymous survey, once you submit your responses, the data cannot be linked to you and cannot be withdrawn.

UW-Stout IRB approval statement:

Survey:

This study has been reviewed and approved by the University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations for human subjects research as required by federal law and UW-Stout policies.

Implied Consent Statement:

By completing the following survey, I am indicating that I agree to participate in this study and understand that I may stop my participation or withdraw my consent at any time during active participation.

Did you enter teaching through a traditional postsecondary four-year teacher certification route or an alternative certification route?

O Traditional teacher certification route (1)

O Alternative certification route (2)

Demographics

What CTE program do you teach at your school? Please enter CIP Code.

____

How many years have you been teaching?

▼ 1 year (1) ... 15+ years (15)

What school are/were you enrolled in for your postsecondary teacher preparation program?

O Indiana University of Pennsylvania (1)

O Penn State University (2)

O Temple University (3)

O Other - Please enter name of postsecondary teacher preparation program below: (4)
____

How many years is/was your postsecondary teacher preparation program? (number of years needed to complete and receive a permanent Career and Technical Instructional II Certificate)

▼ 1 year (1) ... 8 years (8)

Within your postsecondary teacher preparation program, which areas/competencies were beneficial to you in helping successfully fulfill your duties as a teacher, and explain why you feel this way?

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Within your postsecondary teacher preparation program, which areas/competencies were not covered that you need/needed more support and guidance with to help successfully fulfill your duties as a teacher, and explain why you feel this way?

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Within your postsecondary teacher preparation program, what would you change or improve upon to help you better successfully fulfill your duties as a teacher, and explain why you feel this way?

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How many years is/was your school-based new teacher induction program?

▼ Less than 1 year (1) ... 4+ years (5)

How often do/did you meet for your school-based new teacher induction program?

O Once per week (1)

O Once per month (2)

O Multiple times per week (3)

O Less than five times per year (4)

O Other - Please type answer below: (5) ____

Within your school-based teacher induction program, which areas/competencies were beneficial to you in helping successfully fulfill your duties as a teacher, and explain why you feel this way?

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Within your school-based teacher induction program, which areas/competencies were not covered that you need/needed more support and guidance with to help successfully fulfill your duties as a teacher, and explain why you feel this way?

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Within your school-based teacher induction program, what would you change or improve upon to help you better successfully fulfill your duties as a teacher, and explain why you feel this way?

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Were you a participant in a school-assigned mentorship program?

O Yes (1)

O No (2)

How many years do/did you have a school-assigned mentor for?

▼ Less than 1 year (1) ... 4+ years (5)

How often do/did you meet with your school-assigned mentor?

O Once per week (1)

O Once per month (2)

O Multiple times per week (3)

O Less than five times per year (4)

O Other - Please type answer below: (5) ____

Within your school-assigned mentorship program, which areas/competencies were beneficial to you in helping successfully fulfill your duties as a teacher, and explain why you feel this way?

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Within your school-assigned mentorship program, which areas/competencies were not covered that you need/needed more support and guidance with to help successfully fulfill your duties as a teacher, and explain why you feel this way?

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Within your school-assigned mentorship program, what would you change or improve upon to help you better successfully fulfill your duties as a teacher, and explain why you feel this way?

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Based on the areas/competencies, strategies, information, and resources your postsecondary teacher preparation, school-based teacher induction, and school-assigned teacher mentorship program are providing/provided you, what level of confidence do you have in your ability to successfully fulfill your duties as a teacher?

O No Confidence (1)

O Low Confidence (2)

O Moderately Confident (3)

O Confident (5)

O Highly Confident (6)

Explain why you feel this way.

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Do you plan to continue in your current teaching position?

O Yes (1)

O No (2)

What other details would you like to share with the researcher about the experiences you had in your postsecondary teacher preparation, school-based teacher induction, and school-assigned teacher mentorship programs?

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Appendix D

Thematic Qualitative Analysis

Research Question:	How do Pennsylvania CTC Directors describe teacher efficacy and retention of alternatively certified teachers within their schools?			
CTC Director Question:	What current school practices do you feel positively affect teacher efficacy of newly hired alternatively certified CTE teachers in your school, and what evidence helped you come to this conclusion?			
Response Number	Data	Meaning	Categories	Themes
1	administrative and instructional coach support on an ongoing basis	Coaching	Coaching	Strong Mentorship and Coaching
2	We have a positive school climate where people feel comfortable asking for help. We also feel like we have done a pretty good job of matching new hires up with mentors so that they get together more often because their personalities are similar. For instance, and one of our new	Positive School Climate	Positive Engagement with Stakeholders and Peers	Positive Relationships with Students, Stakeholders and Peers

	teachers eats lunch with his mentor every day because they have so much in common.			
		Good Mentor Match	Mentors	Strong Mentorship and Coaching
3	Support with classroom management	Support With Classroom Management	Coaching	Strong Mentorship and Coaching
4	Our teacher mentors are always available and reach out to our new teachers daily.	Good Mentor Availability	Mentors	Strong Mentorship and Coaching
5	Engagement. Teachers have to be engaged with other staff, students and parents	Numerous Engagement with Stakeholders	Positive Engagement with Stakeholders and Peers	Positive Relationships with Students, Stakeholders and Peers
6	admin and mentors spending time with them during instructional and after instruction hours	Good Mentor Availability	Mentors	Strong Mentorship and Coaching

	- it just takes time and demonstrating positive behaviors of an effective teacher.			
7	The mentoring/induction program that was developed by the teachers for teachers is very effective. Evidence includes both the qualitative data of teacher input on the program as well as quantitative data on attrition rates since its implementation.	Effective Mentorship	Mentors	Strong Mentorship and Coaching
8	I do not believe we are positively affecting new hires, this is causing a major issue with retention and we have struggled to fill positions and as a result have had to eliminate important programs.	No Positive Influences	No Positive Influences	No Positive Influences
9	Mentoring program - new hires normally go to their mentor for help first.	Good Mentoring	Mentors	Strong Mentorship and Coaching
10	We have a good induction program , supportive administrators and staff who are willing to share their expertise.	Supportive Mentors	Mentors	Strong Mentorship and Coaching

Appendix E

Thematic Qualitative Analysis 2

Research Question:	What are the competencies in Pennsylvania alternative CTE teacher preparation, induction, and mentorship programs that are perceived by Pennsylvania CTC Directors and alternatively certified CTE teachers to affect alternatively certified CTE teacher efficacy and retention in Pennsylvania?			
CTE Teacher Question:	Within your postsecondary teacher preparation program, what would you change or improve upon to help you better successfully fulfill your duties as a teacher, and explain why you feel this way?			
Response Number	Data	Meaning	Categories	Themes
1	I am unable to answer this question with the little experience I have had with my temple program.	N/A	N/A	N/A

2	I would rather have less in person classes and more virtual classes. Or just assignments to complete and meet say 2x/semester instead of multiple times a week. As a working, single mom of young kids it is very difficult for me to manage the stress of it all with so many added commitments.	More Asynchronous college classes.	More Asynchronous college classes.	Create a teacher certification pathway that is more accessible, less time-consuming and can be done in a shorter amount of time.
3	More specialized classes, workshops on specific topics, ect	More course-specific college classes.	Ensure the courses are applicable to their CTE program	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher

4	It needs to have a Fastrack or a more streamlined program for obtaining your CTE I & II certifications.	Quicker teacher certification program.	Condense the courses so teachers can finish quicker and reduce their workload.	Create a teacher certification pathway that is more accessible, less time-consuming and can be done in a shorter amount of time.
5	The use of the Temple lesson plan is the worst part of being a new teacher because no one uses that format at all. I transferred to Penn State to finish my degree, and they have you use the format of your school as long as it has certain criteria. This is much more affective.	Change college class assignments.	Make job-embedded assignments more relevant.	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher
6	The issue that I and several of my colleagues have brought up is not was is lacking, but the	Change the order of the college courses.	Restructure the scope and sequence of the college courses to	Restructure the scope and sequence of the college courses to make the job-embedded

	order in which competencies are presented. One of the most frequently dealt with issues is student with special needs. However, that topic was not even spoken about in my teacher preparation program until my third year of teaching.		allow the most important topics to be taught first.	assignments and course content relevant to the highest needs of a new teacher
7	I had a great experience but I would have enrolled in a more special education course to fully understand how to make adaptations as a new teacher.	More special ed college classes.	Ensure the courses are applicable to their CTE program	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher
8	"Start the training earlier. I was hired in the summer and did not have any form of training until 4	More preservice training.	More preservice training.	More preservice training.

	days before the school year started. In those 4 days the new teachers including myself were force fed way to much information to retain."			
9	In the Temple program currently, CTE teachers are put into classes with regular post-secondary students and are treated as such. CTE teachers should not be considered as a regular college student: they are working in the field, most have families of their own already, they have immediate needs in learning the educational part of their job, etc.	Have CTE specific college courses.	Make job-embedded assignments more relevant.	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher

10	I would streamline the whole teacher prep program. The CTE courses are good, the extra classes are not necessary.	Quicker teacher certification program.	Condense the courses so teachers can finish quicker and reduce their workload.	Create a teacher certification pathway that is more accessible, less time-consuming and can be done in a shorter amount of time.
11	"Shorten program No electives should be required The program should be in the summer when we are not teaching. It should take 2 to 3 years at most. Obviously if you can take 10 years to complete the program while teaching. It can't be that important or helpful. You literally have done the job for 10 years. This program is nothing but checking boxes and making	Quicker teacher certification program.	Condense the courses so teachers can finish quicker and reduce their workload.	Create a teacher certification pathway that is more accessible, less time-consuming and can be done in a shorter amount of time.

	PA look good because there teachers are ""highly"" qualified. Industry specific certifications and experience should be taken into consideration. For example I could literally become a master chef (there are currently 60 in the whole country) be considered at the top of my profession but it doesn't help me be qualified to teach high school kids. Conversely the requirement of only four-year industry experience is too little. More high level experience should			

	count for more twordd our education. "			
12	New teachers need more time to prepare. It takes substantial time to plan and implement classroom management strategies and lab activities.	Provide less workload for new teachers.	Provide less workload for new teachers.	Create a teacher certification pathway that is more accessible, less time-consuming and can be done in a shorter amount of time.
13	I have been a teacher in Wisconsin for 25 years before taking classes to acquire my Cooperative Education Certification here in PA. The special education class was not waived for me even though I know it inside and out. I am also disappointed with the law class.	Quicker teacher certification program.	Condense the courses so teachers can finish quicker and reduce their workload.	Create a teacher certification pathway that is more accessible, less time-consuming and can be done in a shorter amount of time.

14	"Honestly, these programs feel more like a money grab than true interest to prepare teachers for the long haul of CTE. My 9-year career has been beyond difficult and the stress of doing things backwards with no support has taken a toll on me. I can see why CTE teachers don't always last long and go back to industry. Temple will transfer little to no college credits for me. I am a college educated, PA licensed veterinary medical professional and not one of my credits counts for a gen ed in the program. We	Quicker teacher certification program.	Condense the courses so teachers can finish quicker and reduce their workload.	Create a teacher certification pathway that is more accessible, less time-consuming and can be done in a shorter amount of time.

	are all industry professionals many with alternative college degrees coming from Technical Colleges, yet Temple refuses to acknowledge our credits and require us to spend more money & time instead. Additionally, my program is an agricultural education program, meaning I must include the FFA CTSO within my classroom. I have been given zero prep or knowledge in FFA as it is typically covered in a traditional college ag ed degree program. I've talked with Penn State about			

	it and they cannot do anything to help me. Temple does nothing to help me with my CTSO. I'm not the only Vet Assisting teacher in PA who is going through the same struggle and I know there are agriculture teachers who are alternatively educated who face the same issues. I feel as though the college based on your location is part of the issue. I am not with Penn State's boundaries so they will not help me, I'm in Temple's boundaries but they have nothing to do with Ag Education so they won't help me			

	either. It is a super frustrating position to be in."			
15	In the state of PA as a cosmetology instructor you are required to obtain a teachers license. A large amount of the information covered in the post-secondary track is already covered through the courses I previously have had to take. If an individual in trade already has a teachers license that should equate to some additional classes.	Quicker teacher certification program.	Condense the courses so teachers can finish quicker and reduce their workload.	Create a teacher certification pathway that is more accessible, less time-consuming and can be done in a shorter amount of time.
16	Have not begun yet	N/A	N/A	N/A

17	I would keep the classes to CTE instructors only as much as possible. Some of the classes that I took that were offered to traditional college students were not a good fit for CTE as far as content and workload expectations. All CTE instructors are trying to develop, reorganize their classrooms and programs and actively "figure out" how to be a teacher in real time while taking these courses. It was a real strain as a new teacher to manage the workload	Quicker teacher certification program.	Condense the courses so teachers can finish quicker and reduce their workload.	Create a teacher certification pathway that is more accessible, less time-consuming and can be done in a shorter amount of time.

	of being a new teacher and the workload of these classes.			
18	"I believe the program would be substantially improved by adjusting the amount and coverage of instructional content presented in years 1 and 2 while revisiting portions of this content in greater depth during years 3 to 5. There are many elements of CTE instruction that I use regularly which I did not get adequate instruction for in a direct manner. Most likely, this happened because I was not ready to use the information	Change the order of the college courses.	Restructure the scope and sequence of the college courses to allow the most important topics to be taught first.	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher

	provided by the VOED courses, or I was overwhelmed with challenges of a more immediate nature. Either way, when I eventually needed to work in these areas, at best a long time had passed since the material was covered. Of course, no one wants to add more courses to the already lengthy agenda, so my idea for implementing this possible training sequence is to develop a suite of mini courses, some of which could be combined into ""full"" courses, others of which may be			

	standalone offerings like the recent Curriculum Mapping and Classroom Management seminar series. In the Robotics Engineering Technology program that I teach, I revisit fundamental content several times during a student's 2-3 years in the program. Each time, the students gain greater mastery of the material. I believe teacher prep could benefit from a similar approach. "			
19	Any type of class that would be geared toward updating and preparing the class that you are	Change college class assignments.	Make job-embedded assignments more relevant.	Restructure the scope and sequence of the college courses to make the job-embedded

	teaching. It is difficult to teach full time, complete the unnecessary class work that Temple gives, and keep your curriculum up to date.			assignments and course content relevant to the highest needs of a new teacher
20	N/A	N/A	N/A	N/A
21	So much of what we do comes from our industry experience, and I understand that making sure that we can teach that experience appropriately is a concern, but I think a lot of the schoolwork was busy work and that through several evaluations, we could be judged accurately in our ability to teach.	Change college class assignments.	Make job-embedded assignments more relevant.	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher

22	More specified content directly related to my CIP, and more interaction with Culinary Instructors. Additionally, an option for 100% remote learning at IUP would be an incredible time saver.	More course-specific college classes.	Ensure the courses are applicable to their CTE program	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher
23	I covered a lot of this in the prior question but I would also add in sessions where the class meets and just vents about what is going on in their school / classroom. Too many times, new teachers have no idea that others are in the same boat and they feel they are the only one going	More course-specific college classes.	Ensure the courses are applicable to their CTE program	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher

	through the "new teacher blues" so to speak			
24	Less liberal study requirements.	More course-specific college classes.	Ensure the courses are applicable to their CTE program	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher
25	Not sure due to being so early in the program.	N/A	N/A	N/A
26	I know this is not probaly practical and I am preaching to the choir, but the daily lesson plans that are 5 pages are ridiculous. I understand in learning how to create them, this is sometimes a necessary thing to do, I just felt it was not practical.	Change college class assignments.	Make job-embedded assignments more relevant.	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher

	We have turned to such a digital era of learning. There needs to be more emphasis on AI in the classroom, how to deal with problematic behaviors in the classroom, how to locate resources that are beneficial to your content area, how to create step by step checklists and grading rubrics, the importance of documentation, just to name a few.			
27	More practical guidance in full curriculum development, not just lesson plan writing	Change college class assignments.	Make job-embedded assignments more relevant.	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher

28	I felt like having less core subjects and more teaching subjects would have been more beneficial.	More course-specific college classes.	Ensure the courses are applicable to their CTE program	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher
29	n/a	N/A	N/A	N/A
30	Tailor the math to fit the program or CIP code. I am certain this requirement has stopped some teachers from completing their certification process.	More course-specific college classes.	Ensure the courses are applicable to their CTE program	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher
31	More training on how to handle special education population students in the classroom. I don't feel there is enough time dedicated to that.	More course-specific college classes.	Ensure the courses are applicable to their CTE program	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher

32	I would have covered Classroom management 1st then POS in developing curriculum/ lessons. Learn how to create a basic simple lesson plan for the week. Like the one I am required to use in my current job.	Change the order of the college courses.	Restructure the scope and sequence of the college courses to allow the most important topics to be taught first.	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher
33	I feel more emphasis should have been placed on developing a set regiment of classes so I knew what I was taking from semester to semester. I realize there are scheduling conflicts and students might not take classes every time and need to pick up where they left off, but	Change the order of the college courses.	Restructure the scope and sequence of the college courses to allow the most important topics to be taught first.	Restructure the scope and sequence of the college courses to make the job-embedded assignments and course content relevant to the highest needs of a new teacher

	to do so is very difficult and one can become lost easily.			

Appendix F

Sample Course Offerings from Penn State University for Fall 2024

WFED Courses and Dates for CTE Teacher Certifications*							
CTE teacher and Cooperative Education Certification							
Location	School	Semester Course Offerings					
		Spring 2026, 2028, 2030	May-June 2026, 2028 2030	Fall 2024, 2026, 2028	Spring 2025, 2027, 2029	Fall 2025, 2027, 20229	May-June 2025, 2027 2029
Penn State	*University Park*	100 101 105 197 207w 310 413 414 442 445 450 495A 495C 595C	411 450 808	001 100 105 413 414 441 450 495A 495C 560 595C	100 101 105 197 413 414 442 445 450 495A 495A 495C	001 100 105 106 413 414 441 450 495A 495C 595C	411 413 450 546 806
*NOTE: This list reflects only WFED courses taught by the WFED Professional Personnel Developn Additional non-WFED courses are required for the certification or degree.							

Source: https://ed.psu.edu/academics/departments/department-learning-and-performance-systems/career-technical-education-certifications