

Running Head: DEVELOPING A PRE-APPRENTICESHIP PROGRAM

**IMPROVING STUDENT EMPLOYABILITY THROUGH A PRE-
APPRENTICESHIP PROGRAM IN CAREER AND TECHNICAL EDUCATION:
DEVELOPING A PRE-APPRENTICESHIP PROGRAM**

A Doctoral Capstone Project

Submitted to the School of Graduate Studies and Research

Department of Secondary Education and Administrative Leadership

In Partial Fulfillment of the
Requirements for the Degree of
Doctor of Education

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Dedication

My wife Jennifer has played such a big role in my pursuit of higher education. Jenn has been a teacher at the Grier School for over 22 years. We actually pursued and received our Masters in Education together from Saint Francis University. Since becoming an educator in 2003 and choosing a career in education, Jenn has been there to support me. Two weeks into my first teaching position I stood in my kitchen in tears and did not know if I could continue, she put her hand on my shoulder and said “We can do this.” From that day on, she has been by my side and helped me in countless ways. For this reason and many more not listed I dedicate this Doctorate to my wife of 26 years and counting, Jennifer Payne.

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Abstract

According to a report published by ed.gov (2019) there are currently 7,136,00 unfilled jobs in the United States. The gap in available jobs and individuals to fill those jobs has never been greater. A large portion of these unfilled jobs are in the area of skilled trades. Apprenticeships and pre-apprenticeships are avenues many times used to fill these positions. Apprenticeships and pre-apprenticeships, according to Dr. Lee Burket in her opening remarks at the 2020 Education and Workforce Development Symposium, are the oldest instructional models in education. As the Director of the Huntingdon County Career and Technology Center (HCCTC) I am looking to create a pre-apprenticeship in one or more of the programs offered at HCCTC for the 2020-21 school year. Creating a pre-apprenticeship program will help connect companies and businesses looking for skilled employees with students from HCCTC. The Huntingdon County Career and Technology Center will work hand-in-hand with these employers to create a meaningful curriculum as well as the required hands on instruction needed.

Finding employer sponsors, developing a curriculum, and implementing a pre-apprenticeship program was the basis for this action research project. A mixed-method research approach was used for this project, using both qualitative and quantitative research methods. Instructors at the HCCTC were interviewed using a semi-structured interview process to gather qualitative information. Employers in Huntingdon, Mifflin and Juniata counties were given an online survey to complete. These surveys generated quantitative data and those outcomes were triangulated with the semi-structured interview results to measure the overall attitudes and knowledge about pre-apprenticeships. The results were used to create a pre-apprenticeship program for the 2020-21 school year.

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CHAPTER I

Introduction

Rationale

Pre-apprenticeships and apprenticeships are an important part of some business's process in hiring skilled employees. I feel it is important to be able to offer quality pre-apprenticeships at the secondary level. The creation of a quality pre-apprenticeship program is the focus of this paper. This action research project will address two research questions, both of which are two-part questions. They are:

- From a business's perspective, what makes a pre-apprenticeship program successful or not, and what can we change in either instance to encourage participation?
- What do instructors feel is necessary for successful implementation of a pre-apprenticeship program and how do they envision the program progressing?

Apprenticeships and pre-apprenticeships have been an integral part of many industries and have been around for centuries. The first national apprenticeship system of training was introduced in 1563 by the Statute of Artificers, which included conditions that could be likened to apprenticeship minimum standards today (Mizra-Davies, 2015). They have been used in a variety of ways, but one main use has been to help solve the shortage of skilled labor facing the Commonwealth and across the country. I have seen first-hand the need for a 21st-century skilled workforce and the lack of students available as the director of the 300 student Huntingdon County Career and Technology Center. The students who attend HCCTC come from four different sending school districts in the County. Those districts are the Huntingdon Area School District, Juniata Valley School District, Mount Union Area School District, and Southern

Huntingdon Area School District. We offer approved programs of study in fourteen Pennsylvania Department of Education programs including but not limited to Computer Systems Networking and Telecommunications, Cosmetology, Culinary Arts, Construction Trades, Electrical and Power Transmission, Welding Technology, and Health/Medical Assisting Services.

According to the Pennsylvania State System's Gap Analysis, a recent report published by the Pennsylvania State System of Higher Education (2020), there will be 963,000 skilled job openings in Pennsylvania to 2024. The report also stated there will be over 2000, 1300, and a 1500 annual job opening gap in healthcare occupations, computer occupations, and middle skills occupations respectively. This translates into approximately 4800 jobs in those three areas which may go unfilled if something is not done to help close this gap. In my opinion, a pre-apprenticeship program tied to full time apprenticeship upon completion could help close this gap.

Experience and Outcome

My background as an architectural engineer and technology education teacher fuels my passion for career and technical education. This combination has ultimately led me to my role as an executive director of a career and technology center in Central Pennsylvania. As a business owner in the early 2000's, I experienced first-hand the difficulties in finding skilled labor in an area where jobs outnumbered the available workforce. Over the last several years, Pennsylvania has been proactive in career and technical education and has placed an even greater emphasis on offering/developing pre-apprenticeship programs at the secondary level. While the federal Carl D. Perkins Act authorizes funding and program criteria to support CTE programs, Pennsylvania provides

a critical state investment of \$62 million in funding (Office of Career and Technical Education, Pennsylvania Department of Education, 2018). I have chosen to complete an action research project on the process and challenges of developing a pre-apprenticeship program for the Huntingdon County Career and Technology Center with hopes of implementation in the 2020-21 school year. The emphasis at the state level and my appetite for career and technical education is what has driven me to this action research project.

My plan is to have an operational pre-apprenticeship program in one of our programs at the start of next year with future plans to implement additional programs moving forward. One key component to a successful pre-apprenticeship program is a business to act as a sponsor for the process. This business will then become the fulltime employer once the student(s) finish the pre-apprenticeship program at HCCTC. After some initial research, the two programs which look to have the most potential for business sponsorships are welding technology and construction trades.

This action research project will use existing data collected from various sources including the Pennsylvania Department of Education / Career and Technical Education Department as well as potential employer interviews / surveys and HCCTC instructor interviews.

Financial Impact

The financial impact on the HCCTC will be minimal-approximately \$15 to \$20,000-with the bulk of the student cost being paid by the business sponsor or a grant provided to the business from an agency such as the Pennsylvania Workforce Development Board or the Office of Vocational Rehabilitation. There will also be a

need for additional or supplemental curriculum development or implementation to the chosen program. The driving force behind such decisions will be the business sponsor of the program. The initial interview/surveys given to potential business sponsors will be paramount, and this data will also determine which direction and which program we will use to implement a pre-apprenticeship program.

It is my hope this project will serve as a template moving forward for not only additional programs at my school, but also other schools across the commonwealth as they start and maintain quality pre-apprenticeship programs. The results of this project will hopefully help others navigate muddy waters experienced when starting a pre-apprenticeship program in a secondary setting as they have traditionally only been offered to post-secondary students. There is a large pool of potentially skilled labor in 69 career and technical centers across the state, and it is my hope businesses realize this group of individuals, when given the right training and opportunities, can become valued employees in their companies. The cost associated with this training when offered at the secondary level is far less than hiring the same individual once they have graduated from a post-secondary institution. This action research project should assist companies in realizing this untapped source of skilled labor.

CHAPTER II

Literature Review

History of Apprenticeship

Historically registered apprenticeships were contractual agreements between an apprentice or laborer and an employer, labor union, or other establishment (Cantor, 1997). Pre-Apprenticeship included structured workplace education and training coupled with an employer, union, or other organization and a secondary school or career-technical school (Cantor, 1997). Apprenticeships, a form of work-based learning, date back to the start of human civilization with early examples occurring in agriculture, medicine, and craftsmanship (Jacobson, 2015). The early form of apprenticeship in Colonial America were referred to as indentured servitude. Initially there was little interest in education and its relationship to the indentured servant. According to Snyder (2007) when native born children began entering the system as apprentices the master became the primary instructor for basic education. As time progressed and schools were developed, the master's role as an educator was reduced to its current responsibility in vocational education. The transition between indentured servants and apprentices developed as migrant domestics evolved into native-born apprentices. Became. Below is an early agreement between Thomas Millard and Henry Wolcott.

“Know all men that I, Thomas Millard, with the Consent of Henry Wolcott of Windsor unto whose custody and care at whose charge I was brought over out of England into New England, doe bynd myself as an apprentice for eight yeeres to serve William Pynchon of Springfield, his heirs and assigns in all manner of lawful employmt unto the full ext of eight yeeres beginning the 29 day of Sept

1640. And the said William doth condition to find the said Thomas meat drinke & clothing fitting such an apprentice & at the end of this tyme one new sute of apparel and forty shillings in mony: subscribed this 28 October 1640.”

The following statement is made at the foot of the indenture:

“Tho Millard by his owne consent is released & discharged of Mr. Pinchons service this 22. Of May 1648 being 4 months before his tyme comes out, in Consideration whereof he looses the 40s in mony wch should have bin pd him, but Mr. Pynchon givith him on New sute of Apparell he hath at present.

-by Thomas Millard 22nd of May 1648

The history of apprenticeships is well documented. With the use of training and skills acquisition, ancient Egypt and Babylon maintained an adequate number of craftsman (Lerman, Eyster, & Chambers, 2009). Apprenticeships have always involved a master craftsperson and an individual willing to learn according to Keller (1948). What started out as an indentured servant attending a master and learning a skill has grown into today what is considered the most efficient way to train or teach individuals a skill, craft, or trade. Early days saw apprentices working for the basic items needed to live, e.g. clothes, food, and shelter. With the onset of the Industrial Revolution, graduated compensation became part of the apprenticeship. Even considering inflation, the early wages paid to the apprentice were substantially less than those paid to their “master.” The term “master” (although derogatory in most areas) is still used in many trades to this day, “master machinist” and “master plumber” are two such example uses. As an example, in 1865 the Pennsylvania Railroad used the below listed graduated wage rates:

First 620 days - \$0.50 per 10-hour day

Next 310 days - \$0.60 per 10-hour day

Balance of apprenticeship - \$0.80 per 10-hour day

The individual was paid a \$124.00 bonus once training was complete. Compare this to the hourly rate of \$2.54/hour for their non-apprentice equal. It goes without saying companies were taking advantage of apprentices, because they could. Fast forward almost 50 years: in 1911 the first legislation was passed by the United States in Wisconsin to help organize and promote the use of apprenticeships. Immigration slowed following World War I and many of the skilled labor force in the United States were from other countries, so the need for skilled labor rose to an all-time high (Washington State Department of Labor & Industries, 2019).

Today's apprenticeship programs molded into their current form after the passing of The Fitzgerald Act of 1937. This act ushered in equal representation from both employers and laborers when previously the control fell mainly in the hands of the employer.

Currently in the United States, all apprenticeship programs must be registered with the Bureau of Apprenticeship and Training (BAT). The bureau has compiled a minimum number of requirements. Listed below are the basic standards for all modern day apprenticeship programs.

- The starting age of an apprentice is not less than 16.
- There is full and fair opportunity to apply for apprenticeship.
- There is a schedule of work processes in which an apprentice is to receive training and experience on the job.

- The program includes organized instruction designed to provide apprentices with knowledge and technical subjects related to their trade (a minimum of 144 hours per year is normally considered necessary).
- There is a progressively increasing schedule of wages.
- Proper supervision of on-the-job training with adequate facilities to train apprentices is insured.
- The apprentice's progress, both in job performance and related instruction, is evaluated periodically and appropriate records are maintained.
- There is employee-employer cooperation.
- Successful completions are recognized.
- There is no discrimination in any phase of selection, employment, or training.

Currently, there are four types of workforce preparation programs or systems in the United States:

- Registered apprenticeships, which started officially with the National Apprenticeship Act of 1937.
- On-the-job training (OJT) incorporates learning the job, skill or trade while you work.
- Career and Technical schools associated typically with a public sending school. There are however, many comprehensive career and technical schools that incorporate academics into the career training curriculum.
- Public or private sector post-secondary schools.

This review will explore apprenticeships and pre-apprenticeships, and their collaboration/partnership with secondary schools and career and technology centers with an emphasis on the career and technology centers.

History of Pre-Apprenticeship

Pre Apprenticeships were originally designed in the early 1970s for the construction industry to increase employment and integration of women and people of color (Nichols & Sofer, 2019). Fewer than three percent of the workers in the construction field were the above-mentioned minorities and the creation of pre-apprenticeship helped to increase this percentage. Since then apprenticeships have blossomed beyond the construction field into other industries in need of skilled labor, pre-apprenticeships have followed. Businesses such as health care, manufacturing, hospitality, retail, information technology, and others have taken advantage of both pre-apprenticeship and apprenticeship programs to recruit and maintain a skilled labor force (Fischback, 2016).

Apprenticeships and pre-apprenticeships are not confined to the United States. They exist to one degree or another all over the world. Germany has and continues to have a robust pre-apprenticeship program. Germany's system is what is referred to as a "dual system" (Theuerkauf & Putnam, 1996). This dual system is comprised of hands-on-training offered by a business or commercial enterprise and theoretical training offered at the vocational institution. This style or system of pre-apprenticeship training is experienced by 60-70 percent of Germany's youth (Theuerkauf & Putnam, 1996). German apprenticeships are an integral part of the educational system which is based on

explicit tracking of students into specific career paths (Bailey & Merritt, 1993). This type of tracking is not as common in the United States.

Unlike the German dual model, the United States' approach, according to Tiff (1992), is akin to an auto manufacturer dedicating 90 percent of its production cost to perfecting a sophisticated computer in the engine and only 10 percent to finalizing the wheels, brakes, seats, and gears. There are few who would purchase such a car, and yet, recently this has been America's way of solving the skilled labor shortage.

There are many benefits to both employer and employee with a well-designed pre-apprenticeship program. Lerman, Eyster, and Chambers (2009) found 86 percent of pre-apprenticeship sponsors would "strongly" recommend it, and 11 percent would endorse with reservations, primarily due to problems accessing related instruction. The most beneficial aspect of a pre-apprenticeship program for employers was helping to meet the demand for skilled workers (Lerman, Eyster, & Chambers, 2009).

Lerman, Eyster, and Chambers (2009) concluded there were four major drawbacks sponsors expressed:

- Competitor firms "poaching" away trained apprentices upon completion of the apprenticeship program.
- Companies felt apprentices' failure to complete the program was a problem.
- Companies felt instructional costs were too high.
- A small number of companies felt there were significant problems in other aspects of the registered apprenticeship.

Characteristics of a Quality Pre-Apprenticeship Program

Program aspects. According to Browning & Sofer (2017), pre-apprenticeship programs across the United States have four common components in one form or another which determine their success. The components are as follows – student participation, educational content, location of instruction, and credentialing (Bailey & Merritt, 1993).

According to Bailey and Merritt (1993) the framework used from their analysis was based on the four components defined below:

Student participation. Youth apprenticeship is designed to be an integral part of the basic education of a broad cross-section of youth. It should not be limited to narrowly defined target groups such as “at-risk” youth. The term at-risk is used to denote those students who, because of low grades, lack of interest in school, personal problems outside school, financial concerns, etc., are at risk of dropping out of high school.

Educational content. Apprenticeship combines, in an integrated and coordinated way, conceptual or theoretical education with practical or specific education, sometimes referred to as the integration of academic and vocational education. Apprenticeship programs are also designed to teach broader employability and social skills.

Location of instruction. In an apprenticeship, a significant part of the basic education program of the participating youth takes place on the job. Location of instruction for secondary students enrolled in a career and technical institution would take place at the facility and not necessarily on the job site. Although not working on a job site the students are exposed to real-world conditions at the school. Of the four components location of instruction is the most flexible and most easily replicated (Christman, 2012).

Credentialing. Graduating apprentices should acquire a credential that is recognized by a wide range of employers as certifying the achievement of a given level of skill.

Even though many agree on the importance of the above-mentioned components, Bailey and Merritt (1993) stated Jobs for the Future (JFF), a nonprofit organization, feels youth apprenticeships should be based on the following six principles:

1. Collaboration among secondary schools, post-secondary educational institutions, and employers.
2. Provision of work-based training by employers as part of the program.
3. High-quality, integrated academic and occupational education.
4. A focus on preparation for high-skilled occupation.
5. Certification of occupational as well as academic skill levels of participating young people.
6. An attempt to reach back into the early secondary-or middle-school years and to link youth apprenticeship to a broad strategy of career exploration (Kazis, 1991).

Imel (1993), who published a study titled, *Youth Apprenticeship: Trends and Issues Alerts*, found though no one model is necessarily better than the other there are some key design elements found in most:

- Employers provide both paid work experience and structured worksite learning.
- Academic and Vocational instruction are integrated at the high school level.
- Workplace and school instruction are coordinated and integrated.
- Postsecondary and high school programs are articulated and last at least 2 years.

- There is a myriad of widely recognized credentials earned by completers in both academic and occupational skill mastery.
- There is a broad coalition of industrial partners who govern the programs.

Pre-Apprenticeship Models

Creating the link between Career and Technical Education (CTE) and Registered Apprenticeships (RA), the National Center for Innovation in Career and Technical Education (NCICTE) studied six-state models that include pre-apprenticeship and/or apprenticeship components. Programing, administration and financial policies were areas of study. The six states included were Connecticut, Florida, Kentucky, North Carolina, Rhode Island, and Washington. These states have developed programs to connect CTE and RA in a meaningful and effective way (Rice, Hudson, Foster, & Klein, 2016).

While each state's approach was different, the curriculum and program components fell into three similar categories as described by (Rice et al., 2016):

- Registered Apprenticeships-High school students were participants in registered apprenticeship programs and were considered registered apprentices.
- Pre-Apprenticeships – High school students were participants in pre-apprenticeship programs that prepared them to, upon graduation, enroll in and become registered apprentices in their chosen field.
- Registered CTE Curriculum – High school students completed CTE course work which was aligned to RA programs in high-demand industries. All students earned credit toward the RA program in the chosen field.

Listed below are highlights from each state system for the school year 2014-15:

- North Carolina has both pre-apprenticeships and registered apprenticeships in their secondary system. This system was created in 1994 and had 200 combined student participants. Advanced manufacturing, mechatronics, robotics, machining, electronics, and welding were the top fields and have the below-listed components:
 - Participants are registered with the U.S. Department of Labor’s Office of Apprenticeship.
 - Programs are locally/regionally developed.
 - Secondary students are dually enrolled in CTE and RA programs.
- Connecticut’s pre-apprenticeship model was established in 1981 and is the oldest model studied. They had 100 students participate in 2014-15 in the areas of construction trades, green energy construction, solar energy construction, and photovoltaics. Key items include:
 - Connecticut Technical High School System offers programs to youths and adults.
 - Participants earn related instruction credits in RA programs.
- Florida’s model is labeled “Youth Pre-apprenticeship” and started around 2000. One hundred fifty-three students participated in either manufacturing or construction trades. Florida’s critical components include:
 - As in North Carolina, programs are developed locally or regionally.
 - Students receive On the Job Training (OJT) with an active RA sponsor.
 - Instruction takes place at local career and technology centers.

- Kentucky's model, Tech Ready Apprentices for Careers in Kentucky, was put into place in 2013 and is the newest model studied. Like the Florida model, the 140 participating students are in the field of construction and manufacturing.

Critical items include:

- Instruction delivered via high school.
 - Students engage in OJT depending on the field and an RA Sponsor.
 - Programming is developed at the state level and not at the local/regional level.
- Washington's model labeled Apprentice Preparation was founded in 2006. Participation in construction, culinary arts, aerospace, and early child care education was between 350-500 students in 2014-15 and included the following highlights:
 - Locally developed apprenticeship preparation programs link high school students to an RA program.
 - Provides Work-based learning (WBL) and related instruction through CTE coursework.
 - Rhode Island started a registered school-to-apprenticeship program in 1990, and it easily had the most student participation at approximately 3000 students. These students studied construction trades, programs in the medical field, and information technology. High participation was due partly to the state's initiative to help develop and promote the pathway from secondary CTE programs to the RA system (Rice, Hudson, Foster, & Klein, 2016). Some key elements of their

system is the secondary CTE curriculum's alignment and it is approval status for credit toward RA programs.

Pennsylvania Pre-Apprenticeship Model

In 2016, Pennsylvania's Governor Tom Wolf established the new Apprenticeship and Training Office (ATO) under the arm of Labor and Industry (L&I) (Herzenberg & Polson, 2019). Governor Wolf and his administration are hoping to double the number of apprenticeships in Pennsylvania by 2025. In 2018 Governor Wolf signed a state budget with an additional \$30 million for the PAsmart initiative including \$7 million for apprenticeship programs. Governor Wolf is not alone in his political effort to move apprenticeship programs forward; President Clinton endorsed youth apprenticeship programs and felt it was a way of meeting the demands of the high-skill workforce (Clinton, 1991).

However, according to Rice et.al. (2016), of the 67 counties in Pennsylvania, 23 counties do not have any type of pre-apprenticeship program. These same counties typically are lacking any post-secondary option.

Though the programs differ in many ways, they all accomplish the same goal which is connecting meaningful secondary instruction linked to apprenticeship programs either through pre-apprenticeship programs or career and technical education instruction.

Typical Pre-Apprenticeship Participant Demographics

Specific participant program knowledge. As students are looking at pre-apprenticeship options and deciding which program to pursue, there are predominantly three levels of knowledge (Evanciew, 1994). In level one, a student or participant has no prior knowledge of the program or trade but demonstrates the pre-requisite skills

typically needed to excel in the chosen trade. At the second level, the participant has limited or some knowledge about the trade and would like to pursue the craft further while also demonstrating the above-mentioned pre-requisite skills needed. The final level contains students who, for one reason or another, have a tremendous amount of pre-requisite knowledge and skill and wish to base their career on the chosen trade.

Each level requires a different approach from the instructor. However, the result is the same; each student completes the required pre-apprenticeship and moves into a full apprenticeship program in the chosen trade. All students enter the program differently but leave with the required skills and knowledge to continue moving forward on their career path.

Participant Demographics

According to Dumbrell and Smith (2007), from 2000-2004 the gender split was 88 percent male compared to 12 percent female. This disproportionate gender breakdown is not uncommon. However, in 2004 for all vocational education trainees (VET) 48 percent were female.

Rice et. al (2016) found 64 percent of the participants were 15-19 age males and 71 percent of all VET students were in this age group, an additional 9 percent were males aged 20-24. In 2004 about 39 percent of pre-apprenticeship graduates in traditional trades were 19 years or younger. According to a survey completed by 63 business sponsors, the percentage and age groups served in Pennsylvania were as follows: 33 percent of the participants were 18-21, 33 percent were between 22-24, and the last one third were 25 and older (Rice et al., 2016).

Dumbrell and Smith (2007) also found most enrollments, about 51 percent were in larger cities. However, this figure is lower than the larger city's share of the total population at 61 percent. Approximately 33 percent of the students had a 10th-grade equivalent education as their highest grade completed. About 40 percent registered higher grade levels.

The shortage of non-traditional participation is not only an ongoing struggle in regular career and technical education, but this trend continues in pre-apprenticeships and apprenticeships alike. Non-traditional participation is defined as a participant opposite the traditional gender norm, e.g. male nurse, female engineer, etc. Non-traditional participation is a key indicator in many areas such as Perkins (Carl D. Perkins and Applied Technology Act of 1984, 98 U.S.C. 542) funding and the Pennsylvania Information Management System. Specific organizations such as the Chicago Women in Trades have developed a specialized curriculum designed to reach out to women who are interested in the skilled trades and to help them prepare for the mental, physical and psychological demands of working in the trades (Kreutz, 1992).

Typical Pre-Apprenticeship Employer Characteristics

In 1997 the Wisconsin State Department of Workforce Development commissioned a youth apprenticeship employer survey. This survey was an examination of employers' attitudes toward Wisconsin's Youth Apprenticeship Program (WYAP) was completed with the help of a survey completed by 260 of the 733 employers involved in the WYAP (Phelps & Jin, 1997). Phelps and Jin (1997) sent a two-page survey to the above-mentioned employers to gauge reactions and collect comments on reasons for participating, what needed to change, and general advice on

how to improve the programs. Not only did this questionnaire reveal characteristics of employers, it also included why they participate, possible program design changes, overall benefits, recommended improvements, and incentives for employer participation. The next section includes the results of this employer survey conducted by Phelps and Jin (1997).

The responses were grouped into the nine career clusters listed below with percentage participation listed as well:

- Biotechnical 2.7%
- Drafting and Design 4.7%
- Auto 22.8%
- Tourism 1.3%
- Printing 10.1%
- Manufacturing 17.4%
- Hotel/Motel 2.0%
- Health 11.4%
- Finance 27.5%

With 84% of the Wisconsin workforce working for small businesses (one to nine employees) only 28% of the youth apprenticeship employers surveyed worked at a small firm. Medium-size businesses (20-99 employees) and large businesses (100+ employees) accounted for 38% and 34% respectively while employing 14% and 3% of the overall workforce in Wisconsin. The conclusion to be drawn using this information is smaller firms do not have the capital or money to sponsor a youth apprenticeship. The smaller employers tend to be in auto collision and service, hotel/motel industries, and tourism;

while the larger employers are in the health, biotechnology, and manufacturing areas. Smaller firms also tend to sponsor only one employee.

Listed below is the number of apprentices sponsored per employer surveyed

- 1 apprentice 67.4%
- 2 apprentices 21.5%
- 3 apprentices 5.6%
- 4 apprentices 2.1%
- 5+ apprentices 3.5%

Employer responses indicated over 60% found out about a youth apprenticeship program from local school counselors or high school staff. The remaining 40% found out about the program from their local chamber of commerce, local technical college, or other sources.

Of the responding businesses, a large percentage 36% stated their primary reason for participating as a sponsor in the youth apprenticeship program was to provide a service to the community. Training skilled workers, recruiting new employees or other reasons accounted for 15.4%, 5.4%, and 8.1% respectively. Thirty-four percent of the respondents listed a combination of the above-listed reasons.

The employers were asked to rate three program design changes using strongly agree, agree, or disagree. The results are listed below.

	Strongly Agree	Agree	Disagree	Strongly Disagree
Allow summer hours	45.2%	46.6%	8.6%	
Condense the program	18.1%	56.6%	18.9%	8.4%
Reduce core competencies	29.7%	52%	14.9%	1.4%

Table 1 – Program Design Changes

When asked about the benefit to their organization, 42% felt they benefitted “A lot”, 43% felt it “somewhat” benefitted them, 4.7% felt “a little” benefit, and 4.7% felt it did not benefit their business “at all”.

It is not surprising 4.7% of the respondents would not recommend the program to other employers while 90.5% said they would recommend it to other stakeholders and 4.7% who were unsure. In a similar survey conducted by Lerman et al. (2009) 97% said they would, including 86% who would “strongly” recommend registered apprenticeships and 11% who said they would with reservation.

Each business surveyed was asked to respond to the open-ended question, “What incentives would encourage more employers to participate in the Youth Apprenticeship program?” Fifty-four percent or 80 businesses responded and the results are as follows:

Financial support (tax credit, apprentice wage reimbursement)	45%
Expanded advertising, promotion, or marketing	36.2%
More flexibility/less paperwork	10%
No additional incentives needed	8.8%

Pre-Apprenticeship Benefits

Four key stakeholders benefit greatly from quality pre-apprenticeship programs. Those stakeholders are the participants, the employers, the schools, and the local economy. Of the 63 businesses who completed an online survey done by the state of Pennsylvania, all perceived some type of benefit for each of the mentioned stakeholders. Eighty-six percent felt they benefitted, 83 percent felt the participants benefitted and 68 percent of the businesses surveyed felt the school benefitted as well (Rice, Hudson, Foster, & Klein, 2016).

Just as there are benefits to individual companies and organizations, according to Shenon (1992), organized labor unions feel there are eight positive characteristics or benefits of youth apprenticeships as well. They provide not only a transition from work to adulthood but also skilled training. Pre-apprenticeships are not only for traditional trades; non-traditional trades can utilize the pre-apprenticeship model. Young adults are exposed to a large number of potential occupations. Pre-apprenticeships afford contextual learning and motivate young people to learn. They help foster relationships between adults and young people and connections are made which could result in a permanent career.

According to Jarosz (2006) additional benefits include:

- Career exploration.
- Minimum requirements for the selection of an apprenticeship.
- Training is both classroom and technology-based.
- Built-in workplace readiness skills.
- Typically graduate with a portable credential.
 - A portable credential is recognized across the county ensuring the participant has completed a defined list of competencies.
- Builds strong academic and technical skills (Craig, Stokes, & Walter, 1993).
- Contextual learning is accomplished by integrating academic and vocational curriculum.
- Emphasis on counseling and planning.
- It provides work-based learning experiences.

- Many programs enable the participant to obtain an associate degree with advanced standing.
- May provide a paid work experience and tuition assistance for post-secondary study.
- Smooth transition from school to employment.

The benefits of pre-apprenticeships are apparent and are found in programs around the world. Dumbrell and Smith (2007) studied pre-apprenticeship programs in Australia and found they are utilized as a valuable strategy for increasing the supply and quality of potential apprentices. Dumbrell and Smith (2007) found four key takeaways. First, the employer favored pre-apprenticeships; they were used as a vetting process for weeding out unsuitable candidates. Second, potential apprentices thought pre-apprenticeships were valuable. They felt it was a useful way into apprenticeships. Thirdly, those who experienced pre-apprenticeships were more engaged in the chosen occupation and were more likely to seek higher-level training upon completion of their apprenticeships. Lastly, pre-apprenticeships were not necessarily about getting students ‘work ready’ but they were more about engagement with the trade. Additionally, Case Western Reserve and the U.S. Department of Commerce (2016) studied thirteen companies and found 80 percent of the companies’ experience at least a 50 percent payback the first year of their initial investment and the remaining companies were closer to 100 percent payback the first full year after the pre-apprenticeship.

In a separate study conducted by Craig, Stokes, and Walker (1993) additional benefits to employer sponsors include:

- Job-ready apprentices

- A larger pool of qualified candidates
- Participants are well-prepared and fully-oriented for the employer
- Reduces associated costs for in-house training and new employee retention

Additionally, three common metrics are used to measure the benefits of the apprenticeship model. These metrics are production, workforce, and soft skills (Case Western Reserve and United States of America Department of Commerce, 2016). The production metric includes items such as higher output during an apprenticeship at a lower wage, higher post-apprenticeship output compared to their tenured counterparts, and reduction of mistakes and errors. The workforce metric includes but is not limited to lower turnover, better match of skills and participant character with employer needs, lower recruiting costs, and a pipeline of future managers. Reduced need for supervision, adaptability, and employee engagement and loyalty are three items included in the soft skills metric according to Case Western Reserve and the U.S. Department of Commerce (2016).

Local Economic Benefits

The local economic benefits of pre-apprenticeships are not immediately realized however a more skilled labor force typically translates into higher wages.

Apprenticeships can improve the local economy in several ways. The purpose of apprenticeships is to improve the skills, wages and future career progression of the participants. Companies employing apprentices have higher productivity than those who do not participant in apprenticeship programs (What Works Centre for Economic Growth, 2019). According to Case Western Reserve and the U.S. Department of

Commerce (2016), 91 percent of apprentices find employment upon completion of their apprenticeship, and their average starting wage is \$60,000 (Perez & Zients, 2016).

Pre-Apprenticeship Challenges

Participant based challenges. Craig et al. (1993) offer words of caution and challenges facing pre-apprenticeship programs. First, many employers are excited and show an interest in pre-apprenticeship programs but are reluctant to participate once the amount of preparation is revealed. They may choose to participate in other work-based learning opportunities such as cooperative education or student internships. Second, enthusiasm from faculty, administrators and others is great; however, many times this eagerness causes improper planning, and the time and effort is not spent developing one good program. Administration, staff, students, and employers try to develop multiple pre-apprenticeship programs when efforts should be spent on developing one solid program. Lastly, program developers tend to choose a program experiencing enrollment issues or one which suffers from an image problem within the school community. In every case, pre-apprenticeship programs should be employer-driven fulfilling the needs of their business.

Additionally, with the average age of a new apprentice being 28 (Sack & Allen, 2018) the pre-apprenticeship model tends to target the ages of 18-24 which is outside the average age. On many occasions there is a disconnect from school and there is no clear pathway for this age group and the opportunities offered by pre-apprenticeships. There are several theories as to why this divide exists and is a challenge for pre-apprenticeship programs. Many employers do not consider recruiting this population and do not include it in their employee pipeline (Sack & Allen, 2018). There is no school to engage and

more importantly a consistent institution to call upon. The lack of pre-apprenticeship and apprenticeship programs for this narrow demographic is a national problem. Agencies whose job it is to help this population are too often unfamiliar with this specialized area of workforce development. These challenges are not unique to this age group, however, these challenges affect them the most.

Employer-based challenges. Fifty-six pre-apprenticeship programs responded to a survey conducted by Keystone Research Center on behalf of the Pennsylvania Workforce Development Board. When asked to check all the main challenges that their pre-apprenticeship program experiences, the results were as follows:

- Establishing the program 38%
- Recruitment of participants 41%
- Curriculum 11%
- Engaging employers 18%
- Engaging app programs 18%
- Funding 61%
- Administrative needs 30%
- Other 30%

The survey showed the overwhelming challenge facing the respondents was the ability to secure funding for their program.

These same pre-apprenticeship programs were asked open questions about what they felt were the main challenges. The construction field is one industry which utilizes a great deal of apprenticeships. According to Herzenberg and Polson (2019), the six main challenges in the pre-apprenticeships in the construction-related fields were:

1. Enrollment timing caused some participants to wait a long period of time to apply and therefore take their test.
2. A valid driver's license requirement for all apprenticeship programs.
3. Not only the driver's license requirement, but students who had a valid driver's license was an issue.
4. The costs associated with the post-completion application and initiation fees.
5. Finding employer sponsors for those candidates who pass the joint apprenticeship committee (JAC) exam.
6. Participants cannot start apprenticeship until dues are paid. Each trade's dues vary.

Herzenberg and Polson (2019) found a whole other set of challenges for school-based programs. Coordination was listed as the main challenge for several respondents. The day-to-day operation and logistics of dealing with school districts was also a challenge. This carried into coordination related to schedules, student availability, and curriculum. The time required to get schools 'on-board' was lengthy. A big challenge was the hoops and red tape. The general lack of respect for CTE programs by parents, fellow educators, and the workforce development system posed a problem. This lack of respect has been a challenge my entire career and continues to be a challenge. John William Gardner, Secretary of Health, Education, and Welfare under President Lyndon Johnson said: "The society which scorns excellence in plumbing as a humble activity and tolerates shoddiness in philosophy because it is an exalted activity will have neither good plumbing nor good philosophy: neither its pipes nor its theories will hold water."

(Tifft, 1992) The “college for all” mentality and breaking this construct was also a challenge listed by many school-based pre-apprenticeship programs. Recruiting isn’t the problem, but translating the recruits to actual CTE students is the challenge. Lastly, it is a challenge trying to help parents understand and accept any CTE program.

Among the many challenges listed above, financing a pre-apprenticeship is many times a hurdle. Funding was an issue mentioned by employers’ time and time again. Equipment and materials needed for training is increasing in cost. Local workforce development boards (LWDB) are helping, but many times there is a gap in funding. The boards typically contribute around \$5,500 per participant but costs of \$6-7,000 leave \$500 to \$1500 left for employers to pay (Fischback, 2016).

Assistance is needed promoting and selling the pre-apprenticeship programs to employers. Pre-apprenticeship programs are useless unless there is a company or business training and using apprentices to fill their need for skilled labor.

Included with the above-mentioned challenges is a clear understanding of both the child labor laws and workers’ compensation for apprentice minors and apprentices under age 18. According to the U.S. Department of Labor Wage and Hour Division, both federal and state laws govern the employment of young workers, and when both are applicable, the law with the stricter standard must be obeyed.

The federal youth employment provisions **do not**:

- require minors to obtain "working papers" or "work permits," though many states do.
- restrict the number of hours or times of day that workers 16 years of age and older may be employed, though many states do.

- apply where no FLSA employment relationship exists.
- regulate or require such things as breaks, meal periods, or fringe benefits.
- regulate such issues as discrimination, harassment, verbal or physical abuse, or morality, though other federal and state laws may.

Hours of employment are regulated by the Pennsylvania Department of Labor and Industry. For ages 16 & 17 a maximum of eight hours per day and 28 hours per week may be worked during the week and an additional eight hours over the weekend. These stipulations are effective during the school year. During school vacations a student may work up to 48 hours per week and 10 hours per day but may refuse to work any amount over 44 hours. Participants in school-based pre-apprenticeship programs typically work during the school day as part of their work-based learning.

Pre-Apprenticeship Program Creation

Employer sponsorship. Employer sponsorship is a critical component in meaningful and effective pre-apprenticeship programs. Craig, Stokes, and Walter (1993) comprised a list of what they felt were the ten most important roles of an employer sponsor. The roles were as follows:

1. There must be a progressive experience for a period of three years from training to hiring.
2. The employer must actively participate in the development, implementation, and evaluation of the pre-apprenticeship program.
3. The employer must provide worksite supervisors or mentors.
4. The employer must use a nondiscriminatory selection process when choosing apprentices.

5. Hands-on instruction cannot exceed 20 hours per week as not to interfere with classroom instruction.
6. The employer must ensure their mentors and supervisors have adequate training in the area of mentoring and supervision.
7. The employer must provide input into the school curriculum as needed to support worksite learning.
8. The employer must develop worksite learning competencies that increase the scope and sophistication throughout the program.
9. The employer must provide financial assistance for tuition and other related degree costs.
10. The employer must offer full-time employment upon completion of the program.

The U.S. Department of Labor's quality pre-apprenticeship framework singles out employers and other apprenticeship sponsors such as industry associations and labels them critical components of pre-apprenticeship programs. Employers have a unique view of the needs and requirements of a highly skilled workforce and bring a unique perspective to pre-apprenticeship design and development (Nichols & Sofer, 2019). Industry associations can also serve as a pathway for pre-apprenticeship employment upon program completion because they reach a large number of individual companies. Many times employers favor using industry associations to help curtail costs associated with pre-apprenticeship programs.

Participant selection. As the keynote speaker at The Pathways to Career Readiness: An Education and Workforce Development Symposium I attended several

years ago, Mark Perna, founder and CEO of TFS in Cleveland, Ohio, a full-service strategic consulting firm whose mission is to share and support every client's passion for making a difference, said, "Career and technical schools need the right student in the right program for the right reason." Selecting students to participate in pre-apprenticeship programs is no different. The selection will be done on a non-discriminatory basis. Student screening, recruitment, and testing are necessary. Consent from parents must be obtained and formalized. Imel (1993) devised a list of eleven requirements for student entry into youth or pre-apprenticeship programs which are:

1. Participants must be a junior or senior in high school and at least 16 years old.
2. Participants must have experienced at least one year of secondary career training in the area of interest.
3. Participants must have solid math and/or science foundation.
4. Participants must have an interest in the trade and the desire and ability to complete an apprentice program.
5. Participants must pass a written exam given by the career/tech instructor in the chosen field.
6. Participants must have parental consent.
7. Participants should maintain a minimum 2.0 GPA (a 3.0 may be required by some employers).
8. Participants must have a good attendance record.
9. Participants cannot have discipline issues.
10. Participants must have transportation, either personal or school provided.

11. Participants should possess a good attitude.

Some employers necessitate more requirements, some employers require less, but the list above is a good base from which to build.

Pre-Apprenticeship Curriculum

Curriculum by definition is the subjects comprising a course of study in a school or college. Work-based curriculum identifies the learning objectives, competencies, and instructional activities to achieve the desired work outcome. Curriculum is also a basis for assessment using the achievement of the work objectives (Hamilton & Hamilton, 1993). Modules, which are curriculum-based, focus instruction and mastery on one specific aspect of the occupation. Work-based curriculum centered on stackable modules shows the employer exactly what concepts and aspects of the trade participants have mastered and those they have not. Additional requirements by the employer may require the apprentice to complete further modules. This curriculum is utilized in Sweden and by many American companies. The German apprentice receives a blanket certification for all competencies in their given occupational area. The stackable aspect of modules makes this more flexible and more desirable for many American companies, according to Hamilton and Hamilton (1993).

As an example, The Association of Builders and Contractors (ABC) has endorsed the National Center for Construction Education & Research (NCCER) as their pre-apprenticeship curriculum for construction trades and many associated fields such as plumbing and electrical. This curriculum consists of a core program of study which is a prerequisite to all other Level 1 craft curriculum. Its modules cover topics such as Basic Safety, Communication Skills and Introduction to Construction Drawings (National

Center for Construction Education and Research, 2019). This requirement is an example of a module-based curriculum currently used by an organization utilizing pre-apprenticeship and apprenticeship programs.

Each trade area has its own curriculum, but all work-based courses of study have the same goal, which is to align training and education to assess and show competence of the students participating in the work-based experience, either through written testing or hands-on skills tests.

Conclusion

The history of apprenticeship and pre-apprenticeship programs is documented from its early form of indentured servitude to programs of today. Through this literature review, common characteristics of quality pre-apprenticeship programs have emerged. Benefits for employers and for participants have also been identified. Characteristics of pre-apprenticeship programs include:

- Strong collaboration between secondary schools and employers.
- Work-based training provided by employers.
- High-quality academic and occupational education integration.
- A clear focus on preparation for high-skilled occupation.
- Issued certifications for proficient occupational and academic skills.

Two main stakeholders form a partnership in any quality pre-apprenticeship program: the employer and the participant.

Benefits for the participant include:

- Exposure to career exploration.
- Training in both the classroom and the workplace.

- Development of key workplace readiness skills.
- Career counseling and planning.
- The ability to receive an associate's degree with additional educational requirements.
- It provides a smooth transition from school to employment.

The employer benefits include:

- Job-ready employees upon completion.
- A larger pool of qualified candidates to choose from.
- Future employees who are well prepared and fully-oriented.
- Cost reduction for in-house training and new employee retention.

Though not easily implemented, pre-apprenticeship programs provide a clear pathway for students to develop a skilled trade and move directly into the workplace upon completion and earn a living wage in a field of their choice. The challenge is building those relationships and getting a business to commit to the process. It is my goal through this action research project to implement a pre-apprenticeship program at the Huntingdon County Career and Technology Center by September of 2020.

CHAPTER III

Methodology

Introduction

This section will discuss the methodology used in my action research project, Improving Student Employability through a Pre-Apprenticeship Program in Career & Technical Education. This chapter will cover the following topics:

- Purpose - Why this project? What are the desired outcomes?
- Setting & Participants – Who and where?
- Intervention & Research Plan – Does the intervention or research plan correlate with the findings of the literature review?
- Research Design – What methods were used and how was the data collected?
- Validity – Does the project show general validity and data interaction from various sources?
- Summary – Is the methodology section fully summarized?

Throughout this section there will be reference to the novel coronavirus or Covid-19. Covid-19 is a global pandemic which is believed to have its origin in Wuhan, China on or about December 31, 2019. Covid-19, at the time of this writing, is still a global pandemic with case and death counts rising on a daily basis. This pandemic reached into and became part of every living person's life with stay at home orders across the world. Non-essential businesses were and still are shut down at the time of this project. I have included a timeline in Appendix E for reference.

Purpose

The need for skilled labor in America has never been greater. Apprenticeships and pre-apprenticeships are two concepts currently being used to help solve this problem. As the director of the Huntingdon County Career and Technology Center, I feel there is an underutilized pool of potential employees available to companies sooner than they realize. According to Campbell (2019), the number of unfilled jobs each month has been higher than the number of people looking for work. Over the last twenty years, employment has been trending this direction. However, the employment numbers over the last eleven months confirm this trend (Campbell, 2019). According to Campbell (2019) labor market data shows unfilled jobs that require college degrees stand at about one million. This includes lawyers, consultants, and computer programmers. There are far more that do not require a four-year degree. Openings in retail, hotel, manufacturing, and restaurants are among the positions going unfilled.

The purpose of this action research project is twofold. First, as the executive director of a career and technology center, I feel it is my obligation to provide the best education to my students and give them the best opportunity for employment upon graduation. Starting a pre-apprenticeship program would have beneficial outcomes. It would enable students to gain the additional education and knowledge required for a particular job, and it would help local companies or businesses fill the positions that continue to go unfilled. The second reason for this project is to create a template that may be used to start additional pre-apprenticeship programs at my facility. This template may also be used as a guide for other schools and career and technology centers to start their own pre-apprenticeship programs.

Common elements of successful pre-apprenticeship programs according to Merritt (1993) and Jobs for the Future include but are not limited to:

- Collaboration among secondary schools, post-secondary educational institutions, and employers.
- Providing work-based training by employers as part of the program.
- Integrating high quality academic and occupational education.
- Focusing on preparation for high-skilled occupations.
- Some type of credentialing or certification upon completion.

To move forward in creating a successful pre-apprenticeship program there are two questions which must be answered.

The first question is:

1. From a business's perspective, what makes a pre-apprenticeship program successful or not, and what can we change in either instance to encourage participation?

A survey, which will be discussed later in the chapter was sent to prospective employers to gauge their attitudes and knowledge on pre-apprenticeship programs. This information will be used to develop contacts and move forward in creating a pre-apprenticeship program starting in the fall of 2020.

The second question is:

2. What do instructors feel is necessary for successful implementation of a pre-apprenticeship program, and how do they envision the plan progressing?

One-on-one interviews were conducted with every instructor at the Huntingdon County Career and Technology Center. These interviews were semi-structured with all

instructors being asked the same questions. Teachers could elaborate as much or as little as they felt necessary and with the format, I was able to ask follow up questions when needed.

Setting and Participants

Setting. There are four main components that are vital in starting a pre-apprenticeship program at the secondary level. They are:

1. A school, usually a career and technology center or a comprehensive school which includes career and technical training as well as academic classes.
2. Qualified instructors with extensive industry-based knowledge in their area of expertise.
3. A business or company that acts as a sponsor for the pre-apprenticeship program.
4. Students able to commit to rigorous training in the chosen area and the willingness to, upon graduation, continue their training and work for the sponsoring company or business.

This first item on the list is a school or facility to house the pre-apprenticeship program. The educational facility to be used for this project is the Huntingdon County Career and Technology Center in Mill Creek, Pennsylvania. This school is a small career and technology center located in a rural area of Central Pennsylvania. The school offers 12 Pennsylvania Department of Education approved Career and Technical programs. These programs are listed below with the state-approved CIP code, program name, and the current number of students in each program.

Student Population

<u>CIP Code</u>	<u>Program Name</u>	<u>Number of Students</u>
47.0604	Auto Mechanics	27
46.9999	Construction Trades	31
11.0901	Computer Networking	21
47.0603	Collision Repair	13
12.0401	Cosmetology	36
12.0508	Culinary Arts	25
46.0399	Electrical Occupations	23
51.0899	Health Occupations	41
43.9999	Public Health & Safety	21
51.2604	Rehabilitation Aide	6
48.0508	Welding Technology	18
47.0201	HVAC-R	14
	Total	279

The 279 students come from four sending school districts which are:

- Huntingdon Area School District
- Juniata Valley School District
- Mount Union School District
- Southern Huntingdon Area School District

The projected enrollment for the 2020-21 school is not yet available. We are looking at level enrollment or a slight increase due to scheduling changes from the sending districts.

Annual Budget

The annual budget for the CTC is \$2,678,051. About half of this budget is provided by the four sending schools. The percentage each school pays is based on average daily

membership from the previous year. The projected budget for the 2020-21 school year is \$2,727,793.

Campus

Listed below are some key areas of the school facility.

Campus Area	13.5 Acres
Main Building	58,300 SF
Transportation Building	12,500 SF

The transportation building is a new building with substantial completion of construction to be the end of April 2020. The facility was to be completed by the end of March but the Covid-19 pandemic pushed this date back. The impact of the Covid-19 pandemic on this project will be discussed further in this methodology. This facility will house our Auto Mechanics and Collision Repair programs. We feel there could be a slight increase in enrollment in those two programs with the addition of a new building.

Staff

The composition of the Huntingdon County CTC faculty is as follows:

12	Full time Career and Technology Instructors
3	Paraprofessionals
1	Business Assistant to the Director
1	Administrative/JOC/Business Secretary
1	Receptionist
1	Maintenance Supervisor
2	Custodial Staff
3	Administrators

- 1 Nursing Administrator
- 2 Licensed Practical Nursing Instructors

According to career and technical education (CTE) statistics for Pennsylvania, the Huntingdon County Career and Technology Center is one of 73 CTCs in Pennsylvania together serving over 200,000 students (Office of Career and Technical Education, Pennsylvania Department of Education, 2018).

Participants

Students. Of the available 279 students, 105 are juniors. Although not participants of this project, this group will serve as the potential pool of eligible students for a pre-apprenticeship program at the Huntingdon County Career and Technology Center in 2020-21. The culmination of this project will result in a pre-apprenticeship program of which students will participate.

Instructors. Although any one of our instructors could teach and be involved in a pre-apprenticeship program there are several in which apprenticeships are common. Welding technology, electrical occupations, HVAC-R, and construction trades typically have apprenticeships associated with them. More recently because of the shortage in workforce, health occupations has been added to that list. This would narrow the field of possible instructors from 12 down to five. All instructors were interviewed and responses recorded concerning pre-apprenticeships and their willingness to potentially participate.

Businesses or collaborators. I have identified a list of approximately fifty businesses from Huntingdon County that could serve as a pre-apprenticeship sponsor or collaborator. They are listed below.

Running Head: DEVELOPING A PRE-APPRENTICESHIP PROGRAM

1. Trinity Plastics
2. J C Blair Memorial Hospital
3. Philips Ultrasound
4. ACCO Brands, Inc.
5. First Quality Baby Products
6. Walmart Associates, Inc.
7. Bonney Forge Company
8. AC Products, Inc.
9. Lake Raystown Resort
10. Benchmark Therapies, Inc.
11. N.E. Reihart & Sons
12. Standard Steel LLC
13. Mutual Benefit Insurance Company
14. Valley View Haven
15. Overhead Door Corp.
16. Presbytery Homes/Huntingdon
17. Containment Solutions, Inc.
18. Woodland Park Rehab Center
19. IFC Services, Inc.
20. Raystown Developmental Services, Inc.
21. Giant Food Stores LLC
22. CMH Manufacturing, Inc.
23. Nittany Paper Mills, Inc.
24. Weis Markets, Inc.
25. FourG LLC
26. Sheetz, Inc.
27. PRN Medical Staffing of Lewistown
28. Huntingdon Park Rehab Center LLC
29. Evergreen Farms, Inc.
30. Helpmates, Inc.
31. Jarden Plastics Solutions
32. Broad Top Area Medical Center, Inc.
33. Huntingdon Fiberglass Products
34. Maines Roofing
35. Huntingdon County Child Development Center
36. Home Nursing Agency & VNA
37. J C Blair Medical Services
38. JLG Industries, Inc.
39. New Enterprise Stone & Lime Co.
40. US Municipal Supply, Inc.
41. US Silica Company
42. Valley Rural Electric Co-Op, Inc.
43. Martin Oil Company
44. Your Building Centers, Inc.
45. D C Goodman & Sons, Inc.

46. Park's Garbage Service, Inc.

49. Bleyer Gift Packs LLC

47. Sandy Ridge Market LLC

50. Eat'n Park Hospitality Group

48. ATJ Printing Inc.

The above-listed companies are geographically local to our facility. However, I am collaborating with the Huntingdon County Chamber of Commerce and the Juniata River Valley Chamber of Commerce to send the survey out to an additional 1,500 potential sponsors. The list is subject to change depending on availability and survey response rate. Final companies, businesses, and results will be addressed in the conclusions section of this action research project. When searching for a potential company or business to sponsor for a pre-apprenticeship program a wide net must be cast in order to increase the odds of finding a sponsor. There is a substantial amount of time and money spent when developing and implementing a successful pre-apprenticeship program. This I believe will prove to be the hardest aspect of starting a program in a secondary school.

Research Plan

The extensive literature review completed for this action research project revealed several common or key areas to include in my action research project. There are four components in every effective pre-apprenticeship program. These include:

- A business or industry sponsor – This is a business or company that will benefit from the pre-apprenticeship program by hiring and continuing to train the prospective employee.

- An educational facility – This will be where the individual(s) receives the bulk of the pre-apprenticeship training and education. The training will be taught by a certified instructor currently employed at the educational facility.
- A willing participant – This is the actual student or students completing the pre-apprenticeship program in the mutually agreed upon program.
- Approved curriculum – This curriculum is agreed upon and approved by the school and, more importantly, the business or company sponsor.

As previously stated this action research plan will include surveys and interviews of potential business sponsors and the teaching staff respectively at the Huntingdon County Career and Technology Center.

Teacher surveys will be conducted face to face during a one-on-one meeting held with every instructor. However, not every program is able to implement a pre-apprenticeship program. Some programs of study such as health occupations have work-based learning already embedded in their current curriculum. Potentially certified nursing assistants' complete clinical rotations exposing those students to real-world work-based learning. There is not a pre-apprenticeship model used in this particular field. Regardless, I will still be interviewing those instructors to gauge their attitudes and knowledge about the potential of a pre-apprenticeship program in other areas of the health occupations field. Data will be collected and interpreted once the teacher interviews are complete. The Huntingdon County CTC has twelve full-time teachers in twelve different programs.

Potential business or company sponsors will be sent a survey to be completed either online or on paper. I have partnered with Huntingdon County and Juniata Valley

River Chambers of Commerce to disperse the surveys to their current database. The survey includes questions about participation and pre-existing knowledge of apprenticeships and pre-apprenticeships.

Action

Once all teacher interviews and employer surveys are completed, the data will be analyzed. The goal of this action research project is to collect meaningful data to be used in creating a pre-apprenticeship program at the Huntingdon County Career and Technology Center. This program will include at a minimum, a fiscal obligation and curriculum modification. There is an inherent fiscal obligation required with the implementation of a pre-apprenticeship program. Currently the Huntingdon County CTC is being proactive with the modification of curriculum in several programs anticipating some type of pre-apprenticeship implementation. The Pennsylvania Department of Education approved CTE programs operate under program specific Programs of Study or POS. The task list associated with programs of study mirror real-world skills typically associated with any given career. Curriculums are designed to cover these tasks in any given program so modification or adaptation to potential employer's needs is easily done. That being said, some curriculums are inherently better suited for employers' needs and potential pre-apprenticeship programs than other curriculums.

The literature review for this research project reinforced the above statement, which is, some career fields are more suited for pre-apprenticeships than others. Pre-apprenticeships were originally designed in the early 1970s for the construction industry to increase employment and integration for women and people of color (Nichols & Sofer, 2019). The focus has shifted but the construction industry has continued to be

a leader in the area of apprenticeships and pre-apprenticeships. For this reason, we have decided to move to a curriculum endorsed by many construction and trade unions across the state. Moving to this curriculum will not cause any disruption in the current program of study we offer at the Huntingdon County CTC. In fact, it will enhance an already robust program. We are taking this opportunity as we cycle through our program curriculum reviews, which are done on a rotating basis every three years, to adopt the National Center for Construction Education and Research Core curriculum (NCCER). NCCER was established in 1995 by the world's largest and most progressive construction companies and national construction associations. It was founded to address the severe workforce shortage facing the industry and to develop a standardized training process and curricula (National Center for Construction Education and Research, 2019). The cost of implementing this curriculum into our construction trades program is minimal. The largest expense will be the textbooks with a cost of approximately \$2,500. A small amount of teacher training will be required, and this expense will be less than \$1,000. Upon completion of this action research project, one course of study will be used as a pilot program for a pre-apprenticeship program. If our construction trades course is not the chosen program, we will investigate an appropriate curriculum or modify our existing one to meet the needs of the employer sponsor.

There are financial obligations to the associated business sponsor. Pre-apprenticeship programs require the participant to be paid while receiving the training. This is one aspect that distinguishes pre-apprenticeship programs from something like an unpaid internship or job shadowing. This payment responsibility falls to the business or company that is sponsoring the program/participants. Pennsylvania has created several

initiatives and grants to assist employers with these costs. One such program is the PAsmart. PAsmart which is a statewide movement for accountability, readiness and training (Pennsylvania Workforce Development Board & Pennsylvania Department of Labor and Industry, 2019). According to the PA Workforce Development Board and The Pennsylvania Department of Labor and Industry (2019), PAsmart is a “strategic approach to education and workforce development.” The PAsmart initiative is designed to better align education, workforce, and economic development initiatives and funding. With multiple avenues of possible funding, businesses will be able to access assistance should they choose to participate as a sponsor.

To reiterate, of the twelve programs offered at the Huntingdon County Career and Technology Center, one will be chosen to move forward with a pre-apprenticeship program. The program chosen will have the necessary resources to implement and maintain not only the specific training and skills required by the potential sponsor but will also continue to move the students forward in completing their programs of study in their assigned CTE areas.

Research Design

Improving Student Employability through a Pre-Apprenticeship Program in Career & Technical Education is a mixed-method action research project, combining qualitative and quantitative data. With several key stakeholders involved in the research, each in a different capacity, a mixed-method design is chosen for this project. A mixed-method design allows the quantitative data gathered with an online survey and the qualitative data gathered with structured interviews to be evaluated and compiled. According to Caruth (2013), mixed methods research (MMR) has become a valid

alternative to either quantitative or qualitative research designs. There are six types of MMR commonly used in education and they are as follows (Caruth, 2013):

1. Convergent parallel – This method involves simultaneously collecting, merging and using both quantitative and qualitative data.
2. Explanatory Sequential – In this method, quantitative data is gathered first then qualitative after in order to enhance the initial findings.
3. Exploratory sequential – This method is the mirror image of explanatory sequential: one first collects qualitative data to investigate a phenomenon and second gathers quantitative data to explain the first results.
4. Embedded – to gather quantitative and qualitative data at the same time while one's design purpose is to support the findings of the other.
5. Transformative – This method uses either convergent, explanatory, exploratory, or embedded design types while including the design types within an evolving context.
6. Multiphase – This method allows the researcher to examine a subject or issue through several studies.

Although not all methods were utilized for this project I felt it was important to list commonly used mixed method research types in order to demonstrate their differences.

Research Method

Interview design. For this project, I used a convergent parallel type of mixed-method research. I conducted one on one, semi-structured interviews with all teaching staff over several weeks. This method of discussion contains but is not limited to a predetermined set of questions to be answered by all interviewees. The interviewees do

have the option to elaborate on questions, which many times involves follow-up questions to clarify or further explain issues or subjects. This type of interview is the most flexible and gives the option to ask additional questions as needed. According to Dudovskiy (2018) using interviews as a qualitative method of data collection gives the researcher direct control over the flow of the process and allows the interviewer to clarify certain issues during the process if needed.

Interview questions were prepared according to the research project's purpose. Each individual was asked a series of 10 questions and their responses were recorded. Each interview was then transcribed and coded for data comparison. The data was coded using the data coding strategies described by Maykut and Morehouse (2002). These strategies suggest that the researcher provides a code for each type of data, the source of the data, and the page number in the upper right-hand corner of each data page. Please see Appendix B for the teacher interview questions.

Survey design. Employer surveys were sent out to approximately 1,850 businesses/companies. These companies were located in the counties of Huntingdon, Mifflin, and Juniata Counties. I chose to use a survey method of research for this demographic of the research project. According to Isaac & Michael (1997) survey research is used

“to answer questions that have been raised, to solve problems that have been posed or observed, to assess needs and set goals, to determine whether or not specific objectives have been met, to establish baselines against which future comparisons can be made, to analyze trends across time, and generally, to describe what exists, in what amount, and in what context.”

Survey research contains three distinguishing characteristics. The results are used to describe specific aspects of a given population in a quantifiable manner. The data required for survey research are collected from individuals and therefore inherently subjective. Lastly, survey research uses a selected portion of the population, in this case, businesses, from which the findings can later be generalized back into the population (Glasow, 2005). The ability to obtain information from a large population sample is the advantage of using a survey in this type of action research project. Gaining demographic information from the surveyed sample is another advantage (Mcintyre, 1999). According to Glasow (2005), the determination of sample size depends on five factors. They are:

- A desired degree of precision
- Statistical power required
- The ability of the researcher to gain access to the study subjects
- The degree to which the population can be stratified
- Selection of the relevant units of analysis

The sample chosen for this survey was not randomly chosen. All businesses with a valid email within the tri-county area were selected. The purpose of the survey is intended to gain a general sense of attitude or belief. Therefore, a lower level of precision is acceptable. I obtained access to the survey group via the chambers of commerce for Huntingdon, Mifflin, and Juniata counties. Stratification was easily accomplished based on the type or area of business the respondents chose. The units of analysis in this project will be businesses or companies as a group instead of individuals. That being said, it is possible to have a single proprietor business where there is only one

individual. However, for purposes of this research project they will be treated as a company or business.

The survey contained two open-ended questions and nine closed-ended questions. The open questions enabled the respondent to add comments at the end of the survey and to list any affiliations they may have. I could have created a list of affiliations but would have been tedious and monotonous for the respondent to answer. I felt it would be easier for them to input their response. The remaining nine questions were closed-ended questions to measure the responses to ideas, analyses, and proposals (Glasow, 2005). Please see Appendix A for a copy of the employer survey. Based on the responses from the initial survey, randomly selected businesses or companies will be chosen to conduct one-on-one interviews. Each responding business will be assigned a number and a random number generator will be used to choose which businesses will be interviewed. These interviews will take a deeper dive into the attitudes and knowledge of pre-apprenticeship programs from the businesses' perspectives and measure their willingness to serve as a potential employer sponsor for a yet to be determined program slated to start during the 2020-21 school year. As stated above, initial surveys were sent out to approximately 1850 respondents with the first survey going to Huntingdon County Chamber members on March 2, 2020. Juniata and Mifflin county surveys were sent out on March 12, 2020.

On Friday, March 13, 2020 around 3:10 pm Governor Wolf and State Education Secretary Rivera announced all Pennsylvania public schools will be closed until April 6, 2020 due to the coronavirus pandemic discussed earlier. This was followed quickly by non-essential business closures and large numbers of unemployed individuals.

I received seventeen responses from the initial Huntingdon County survey, but to date, I have received no responses from the Mifflin and Juniata Chamber surveys, and I do not expect to. At the time of this writing businesses are fighting to stay afloat and with approximately 22,000,000 individuals filing for unemployment the last thing on any of their minds is starting a pre-apprenticeship program. In my opinion, many businesses are hoping to rehire their pre-existing staff who worked for them prior to the Covid-19 outbreak.

Timeline

Teacher interviews were conducted between November 25, 2019, and January 31, 2020. A common online survey tool was utilized and the first wave of employer surveys was sent via email on March 2, 2020, and the second mass email was sent on March 12, 2020. No deadlines were stated and responses to the emailed survey started within 24 hours of the first email sent. I continued to receive responses until the Covid-19 pandemic gripped the nation and engulfed Pennsylvania in its wake. I expected to resend the survey to all three counties in mid-April to gather some additional data. This final wave of surveys did not take place because of the Covid-19 situation. The data collected will be analyzed and results compiled even with a limited number of business responses.

IRB Approval

All survey and interview questions were approved under the research plan submitted to IRB on November 24, 2019. Below is the IRB statement approval. I have included the entire email correspondence in Appendix C.

“Please consider this email as official notification that your proposal titled “Improving Student Employability Through a Pre-Apprenticeship Program in Career and

Technical Education” (Proposal #18-085) has been approved by the California University of Pennsylvania Institutional Review Board as amended.”

Validity

Validity is the extent to which answers or scores from a measurement represent the variable they are intended to (Maykut & Morehouse, 2002). According to ActiveCampaign (2009), there are seven key types of validity in research. Those being:

- *Face Validity* – Results seem valid based on what they look like. This is the least scientific method and is not quantifiable.
- *Content Validity* – This method is a subjective measure. This method assesses to what degree the content is covered for the subject one is trying to measure. Content validity requires all of the content to be explored.
- *Construct Validity* – This measures to what extent one’s research measures the construct compared to things outside the construct.
- *Internal Validity* – This refers to the extent to which the independent variable can accurately be stated to produce the observed effect.
- *External Validity* – This method measures the extent to which the results can be generalized beyond the sample. Can the findings be applied to other people or settings?
- *Statistical Conclusion Validity* – This is a determination of whether a relationship exists between cause and effect variables.
- *Criterion-related Validity* – This validity method measures the accuracy of a measure from a study compared to a measure that already exists. One’s measures

are accurate because other similar measures were found to be accurate in previous research.

For purposes of this research project, external validity and criterion-related validity were used to validate the findings of my research. Teacher interviews and employer survey results echoed findings and general attitudes about pre-apprenticeships found in my extensive literature review which supports external validity. For the very same reasons, criterion-related validity was used to validate my findings.

The validity, in general, is the representation of your results to a preconceived notion as to what they should represent. Many variables in survey data depend on the respondent. Did they answer the questions honestly? Were they having a good or a bad day? We can only assume the results from survey data represent the best attempt of the respondent to answer the questions.

Triangulation

According to Oliver-Hoyo and Allen (2005): “Triangulation involves the careful reviewing of data collected through different methods in order to achieve a more accurate and valid estimate of qualitative results for a particular construct.” Triangulation involves the use of multiple measures to examine the same problem or topic. In this case, semi-structured interviews with teachers and online surveys to employers are the two methods used to measure attitudes and knowledge related to pre-apprenticeships.

According to Jick (1979), the effectiveness of triangulation rests on the premise that the weakness in every single method will be compensated by the counter-balancing strengths of another. This is assuming the same weakness is not shared by the chosen methods of

research. In this case, the semi-structured interview and survey are the chosen methods of research.

Summary

During the PASA/PABA School Leadership Conference held in February, Dr. Lee Burket, Pennsylvania Department of Education's Director of the Bureau of Career and Technical Education, included a "Why rethink CTE?" facts card as part of her presentation. On this card was the following information:

- 7,136,000 unfilled jobs open in United States.
- By 2020, 2/3 of jobs will require some post-secondary education.
- 85% of the jobs today's learners will do in 2030 haven't been invented yet.
- One quarter of high schools do not offer CTE courses.
- \$1.5 TRILLION in college debt.

The bottom of the card had three simple sentences. "Students deserve better. Employers demand better. America must do better." Please see Appendix D for a copy of this brochure. Dr. Burket went on to explain the need for pre-apprenticeships and apprenticeships to help close the gap in jobs and the available people to fill them. For that reason, I felt it was important to move forward in investigating and looking to create a quality pre-apprenticeship program at the Huntingdon County Career and Technology Center with the help of an action research project. As previously mentioned there are four key components to having a successful pre-apprenticeship program. They are:

1. A school, usually a career and technology center or a comprehensive school that includes career and technical training as well as academic classes.

2. Qualified instructors with extensive industry-based knowledge in their area of expertise.
3. A business or company that acts as a sponsor for the pre-apprenticeship program.
4. Students able to commit to rigorous training in the chosen area and the willingness to, upon graduation, continue their training and work for the sponsoring company or business.

This action research project concentrates its effort on the second and third items, qualified instructors and a business or company sponsor respectively. Mixed-method research is used for this project. Mixed-method research mixes the quantitative aspects of employer surveys with the qualitative aspects of teacher interviews. Examining the results of both teacher interviews and employer surveys will help triangulate the data making the results clear and useful moving forward as we look to implement a pre-apprenticeship program for the 2020-21 school year.

CHAPTER IV

Data Analysis and Results

Introduction

The results of both the semi-structured teacher interviews and the employer surveys are below. The teacher interviews proved very helpful and informative in many ways and revealing in others. The teachers involved in our trade programs including electrical, construction, HVAC, and welding were knowledgeable and offered good information. The interview results will show this. The online employer surveys provided good information and addressed what would help to encourage participation at the employer level. I did not receive any surveys which addressed how pre-apprenticeships could be improved or more successful in their company. This was due to the low employer response after the onset of the COVID-19 pandemic.

Results

Semi-structured teacher interviews. What do instructors feel is necessary for successful implementation of a pre-apprenticeship program and how do they envision the program progressing? This was one of two research questions asked for this action research project. The interviews were conducted over a period of time from November 25, 2019, to January 31, 2020. All interviews were conducted prior to the Covid-19 pandemic and subsequent school closures. All instructors were asked the same ten questions with the ability to elaborate as necessary. The first four questions were general logistics questions such as their name, years in education, program area and any professional organizations to which they belong. Questions five through ten specifically asked them opinions and prior knowledge about pre-apprenticeship programs. These five

questions and their answers constitute the bulk of the qualitative results from the interviews.

The familiarity of pre-apprenticeship programs by one third or four out of twelve of the HCCTC teachers provided good information on successful implementation of a pre-apprenticeship. The remaining two thirds had heard of pre-apprenticeships, however, their interview answers did not offer information on program implementation. All teachers were in favor of a successful implementation but only the instructors in the trade areas had the necessary background knowledge. Interview data revealed and reaffirmed what I discovered during the literature review for this project. That is, pre-apprenticeship and apprenticeships are commonly found in skilled trades such as carpentry, electrical trades, heating-ventilation and air conditioning, automotive mechanic, and welding. Few apprenticeships or pre-apprenticeships exist in service areas such as health occupations, rehabilitation therapy, culinary arts, public health and safety, collision repair, and cosmetology.

Following are the answers from the teachers of six of the twelve programs offered at the Huntingdon County Career and Technology Center to the question, *Are you familiar with apprenticeship or pre-apprenticeship programs?* Pre-Apprenticeships, according to Nichols and Sofer (2019), were originally designed in the early 1970s to help increase minority participation in the construction industry where fewer than three percent were minority workers. By 2020, other industries such as health care, hospitality, retail, and information technology will start to take advantage of both pre-apprenticeships and apprenticeships, according to Fischback (2016). The responses from my health occupations, computer networking, culinary, cosmetology, public health and safety, and

rehabilitation aide instructors show they have knowledge of pre-apprenticeships but are not aware opportunities exist in their program areas because the concept of pre-apprenticeships and apprenticeships are new concepts in those career fields, at least in Huntingdon County.

The following matrix was used to compile interview responses.

Researcher	R
Cosmetology Instructor	CI
Sports, Exercise, and Rehabilitation Therapy Instructor	SI
Culinary Arts Instructor	CA
Health Occupations Instructor	HO
Computer Networking Instructor	CN
Collision Repair Instructor	CR
Automotive Technology Instructor	AI
Public Health and Safety Instructor	PS
Electrical Occupations Instructor	EO
Welding Instructor	WI
Construction Trades Instructor	CT
HVAC-R Instructor	HI

Table 2. Respondent Code

The interview question is listed above the answer matrix. When a follow-up question was needed it is shown between responses and is labeled R for researcher.

Question: Are you Familiar with apprenticeship or pre-apprenticeship programs?

CI		“Are they similar to internships?”
	R	“Yes, but many times the individual is paid for the experience and often times internships are voluntary.”
CI		“Oh, I see. I do not have much experience, or know much about pre-apprenticeships. A lot of my experience was voluntary or if I was paid it was more like a real job.”
SI		“No, not necessarily in this area. I have seen interns work at rehab facilities.”
CA		“Yes, I am, but typically internships are young students get into a kitchen. I know the concept of pre-apprenticeships but like I said not typically in a restaurant setting. I also know many apprenticeships are preceded by pre-apprenticeships, at least I think that is what the pre is for.”
HO		“I have heard the terms, but my students are required to do what are called clinical visits.”
	R	“Can you explain those to me?”
HO		“That is when my students are placed on the floor of a hospital or health care facility and required to initially watch but then eventually perform nursing duties as they would if they were employed at whatever facility they are at. They have an instructor and/or another nurse with them at all times to ensure no patient is placed in any type of danger. Common things they do are: take

		blood pressures, change beds, take temperatures, practice good bedside manner, you know, the same things all nurses do.”
	R	“So this is part of the health occupations curriculum?”
HO		“Yes.”
PS		“Yes, but many times individuals who want to become police officers or fire fighters attend dedicated academies for each discipline. Once they graduate from their respective academies they move directly into the workforce. There are no apprenticeship programs or pre-apprenticeship programs associated with public health and safety jobs. At least not in firefighting or law enforcement.”
CN		“Somewhat, yes. I think it is very similar to internships or a co-op.”
	R	“Similar in some regards but typically apprenticeships and pre-apprenticeships go hand-in-hand and there is a specific amount of hours associated with each process.”
CN		“Similar to the required hours in our CTC programs?”
	R	“Yes, however, the students are also getting paid while in both pre-apprenticeships and full apprenticeships.”
CN		“I have heard of apprenticeships in areas like plumbing and carpentry. I have never really heard of anything like that in computer networking or IT (information technology).”

Contrast the above answers to the responses below given by construction trades, welding, auto mechanics, collision repair, HVAC-R, and electrical occupations instructors. Coincidentally or maybe not, these programs are physically located together in our building and are grouped together in our budget under the category of “trades.” I have included some additional questions from the interviews of these programs.

Question: Are you Familiar with apprenticeship or pre-apprenticeship programs?

EO		“Yes, I am familiar with both. I believe a company called Cheran in or around Dillsburg offers electrical apprenticeships. I personally was not ever involved in either, but I know the concept.”
WI		“Yes. One of my first jobs was as a shipwright at The Seafarers Harry Lundeberg School of Seamanship in Piney Point, Maryland.”
	R	“Really?”
WI		“Yes, I actually was in that position for about a year and then I helped create the welding program for their apprenticeship agreement, which required a two-year commitment.”
	R	“Yes.”
CT		“Yes. Having worked in the construction field for over 30 years, I am familiar with both apprenticeships and pre-apprenticeships. I have worked with the Pennsylvania Builders Association (PBA) and the Associated Builders and Contractors (ABC). After our discussion earlier in the year. I have been investigating the NCCER (National Center for Construction Education & Research) curriculum you told me about, and I think it would work well if we

		would use it in construction trades. It has stackable card or credentials that ABC uses as placement in their construction trades apprenticeship programs.”
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Question: Were you ever in an apprenticeship program?

EO		“No, I never was in a program.”
WI		“Not as a member.”
CT		“No.”

Question: Would you be willing to be an instructor for a pre-apprenticeship program if we could offer a program in electrical occupations?

EO		“Yes, for sure, I believe it would be a good opportunity for my students, especially if they are getting paid to learn. Who wouldn’t want to do that? I’m used to paying for my education not the other way around.”
WI		“Yes.”
CT		“Definitely.”

Question: Would you be willing to alter your curriculum to accommodate something additional a potential employer sponsor might require, assuming it still meets the state’s program of study?

EO		“Definitely, you know we add additional items, new technology, etc. all the time to the POS (program of study).”
WI		“Yes.”
CT		“Yeah, the curriculum is hours based and every module the student completes they receive a card. If after graduation they go to work for the carpenters’ union they would receive advanced standing, if you will, and they would also start at a higher pay rate.”
	R	“So if we could find an employer sponsor who uses the carpenters’ union for hiring we may be able to create a pre-apprenticeship program with them?”
CT		Sounds doable. I am moving to that curriculum next year regardless of a pre-apprenticeship program. I feel it covers everything my POS [(program of study)] requires plus it has the added benefit of the credentialing.

Question: Do you think your students would benefit from such a program? Why or why not?

EO		“Yes. A lot of my students enter directly into the workforce. I had six grads last year and four of them went directly to work and two went to college. Having a job directly out of high school shows them the time spent in the program is worth it.”
WI		“Yes, it gives them a clearer path to employment.”

Question: Would you be willing to spend additional time preparing for a pre-apprenticeship program?

EO		“Within a reasonable amount.”
WI		“Whatever it takes.”
CT		“Sure, I am a fairly new instructor, and I don’t know what I don’t know. If it helps my students, I am willing to put in the time.”

After my interview with the welding instructor, I had to research The Seafarers Harry Lundeberg School of Seamanship. According to their website:

The Seafarers Harry Lundeberg School of Seamanship (“SHLSS” or “School”), affiliated with the Seafarers International Union of North America, Atlantic, Gulf, Lakes and Inland Waters District, AFL-CIO (SIU) is a vocational school dedicated to preparing students for successful careers as U.S. merchant mariners. The School has been training individuals for careers at sea since 1967. The SHLSS provides entry-level training for individuals who wish to begin a seafaring career (Seafarers International Union, 2019).

Whatever direction or program we use to implement a pre-apprenticeship program my welding instructor will be an invaluable resource.

The following list of questions were questions 5-10 of the 10 question interview conducted with the twelve program instructors. See Figure 1 below for instructors’ responses. Complete interview questions can be viewed in Appendix B.

5. Are you familiar with apprenticeship programs? Pre-apprenticeship programs?
6. Were you ever in an apprenticeship program?
7. Would you like to be an instructor for such a program?

8. Would you be willing to alter your curriculum, assuming it would still meet the state’s program of study, to accommodate a pre-apprenticeship program?
9. Do you think your students would benefit from such a program? Why or why not?
10. Would you be willing to spend additional time preparing for a pre-apprenticeship program?

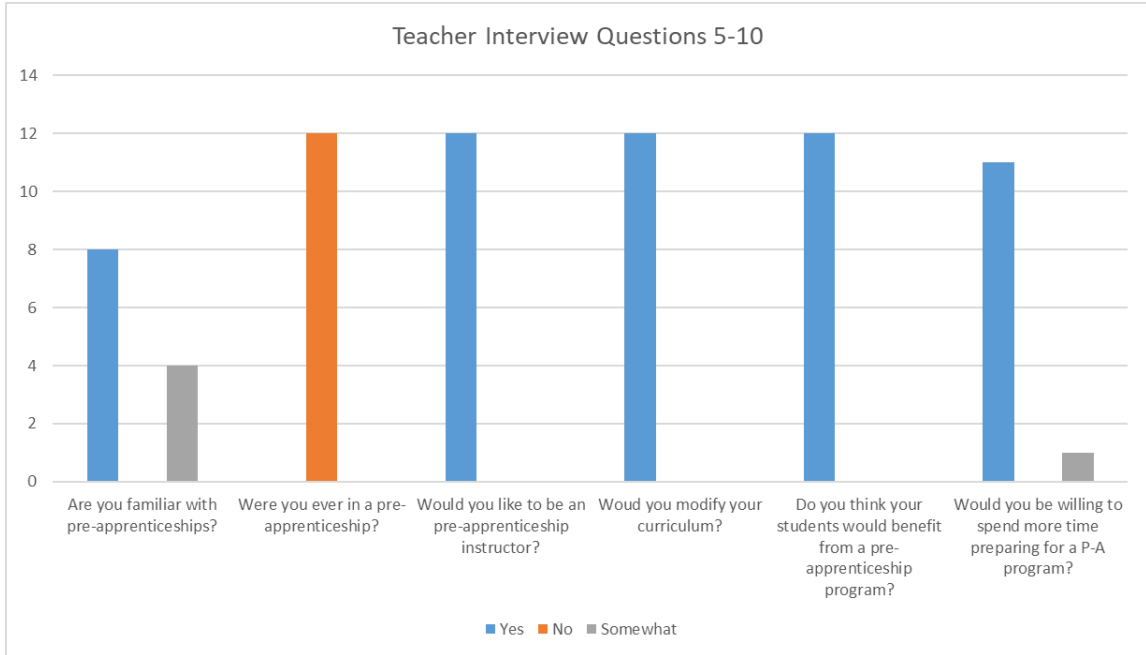


Figure 1 – Instructor responses

Referring to Figure 1, not all instructors were totally familiar with pre-apprenticeship programs. After some discussion with those who were not, all instructors felt it would be beneficial to the students and would be willing to modify their curriculum if needed to accommodate such a program. Benefits of a pre-apprenticeship program to students, according to Jarosz (2006), include but are not limited to providing career exploration, building workplace readiness skills, and forming strong academic and technical skills. The teachers’ responses are not a surprise based on prior research.

Online employer surveys. The research question asked of potential employer sponsors was a two-part question, it was: From a business’s perspective, what makes a

pre-apprenticeship program successful or not, and what can we change in either instance to encourage participation?

There was great anticipation awaiting the results from sending out over 1850 employer surveys to employers over three counties in Central Pennsylvania. The first were sent out on March 2, 2020, to about 250 businesses, and the second group was sent out on March 12, 2020, to about 1600 additional employers.

The following day, March 13, 2020, the educational and professional lives of hundreds of millions of people changed forever. The state was placed on a shelter-in-place order and schools both secondary and post-secondary were shut down. The shelter-in-place order meant all non-essential businesses were closed for an undetermined length of time. This shut down had and as of the writing of this paper continues to have long lasting and profound effects on local businesses.

After the first wave of surveys was sent I received seventeen responses within a two-day period. It was sent out on a Friday, so I believe the slow response rate was because of this timing. It was due to be resent on March 16, 2020. I was very excited to see the results from the second wave of surveys', unfortunately I received no replies. My online business survey had a reply rate of 0.92%. A less than one percent response rate is unsuitable for research purposes, but given the circumstances not surprising. As of the time of this writing, local and state-wide businesses are trying to re-open and return back to some semblance of what is now being described as a "new-normal." They are concerned with staying in business and trying to bring back many of the employees they had to lay off. I cannot speak for them, but I feel the very last thing on their list of

priorities at this point in time is creating a pre-apprenticeship program. With that being said, the few survey results I do have mirror what past research has shown which are:

- Employers are always looking for quality employees.
- Employers would be willing to participate in a pre-apprenticeship program.
- Employers have trouble finding qualified candidates when hiring.

Of the sixteen respondents, 42% were from industries we currently offer at our facility. Of those 42%, 70% were from either the automotive industry or the constructions field. Figure 2 shows the breakdown of industry responses.

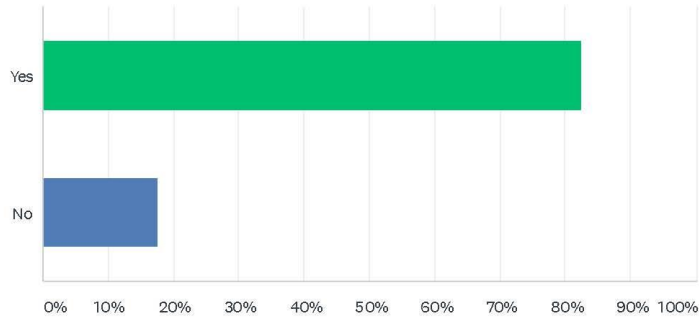
ANSWER CHOICES	RESPONSES	
Automotive Technology	11.76%	2
Computer Networking	0.00%	0
Cosmetology	0.00%	0
Health Occupations	5.88%	1
Public Health and Safety	5.88%	1
Welding Technology	0.00%	0
Electrical Occupations	5.88%	1
Collision Repair	5.88%	1
Construction Trades	17.65%	3
Culinary Arts/Restaurant	0.00%	0
HVAC/Refrigeration	5.88%	1
Sports, Exercise and Rehabilitation Therapy	0.00%	0
Manufacturing	0.00%	0
Other (please specify)	58.82%	10
Total Respondents: 17		

Figure 2 - Business Description

Over 88% of the business respondents have been in business for 10+ years. This shows the need for qualified applicants has been an ongoing issue and continues to be one. When asked, "Does your business or company have trouble finding qualified candidates when hiring?", over 82% answered yes to this question.

Q4 Does your business or company have trouble finding qualified candidates when hiring?

Answered: 17 Skipped: 0



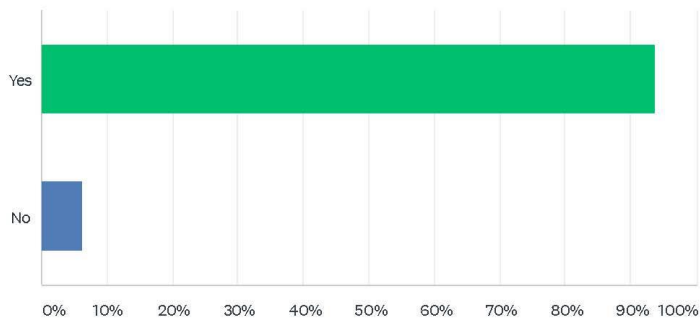
ANSWER CHOICES	RESPONSES	
Yes	82.35%	14
No	17.65%	3
TOTAL		17

Figure 3 - Trouble finding qualified candidates

When asked, *“If you could increase your chances of obtaining a quality employee or employees would you consider participating in a pre-apprenticeship program?”*

Q7 If you could increase your chances of obtaining a quality employee or employees would you consider participating in a pre-apprenticeship program?

Answered: 16 Skipped: 1



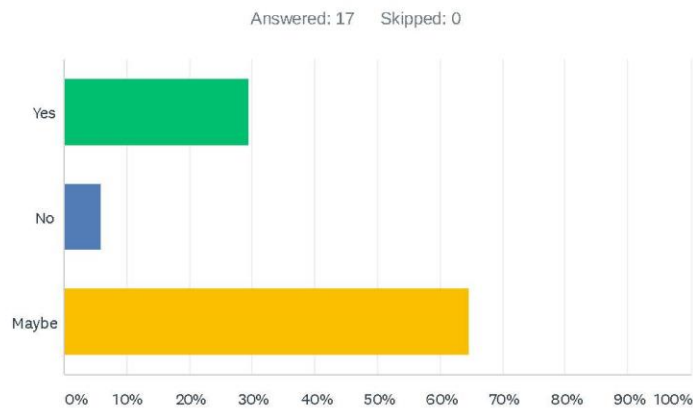
ANSWER CHOICES	RESPONSES	
Yes	93.75%	15
No	6.25%	1
TOTAL		16

Figure 4 - Possible pre-apprenticeship program participation

Over 93% would participate in a pre-apprenticeship program if the odds of increasing quality candidates were increased.

When asked about participation in a pre-apprenticeship program and associated costs to do so, it is clear financial help in implementation could be a determining factor in whether an employer participates or not. Figure 5 shows potential participation based on associated costs being absorbed by the employer. Figure 6 shows a substantial increase in affirmative responses based on the cost of the program being covered by an outside source.

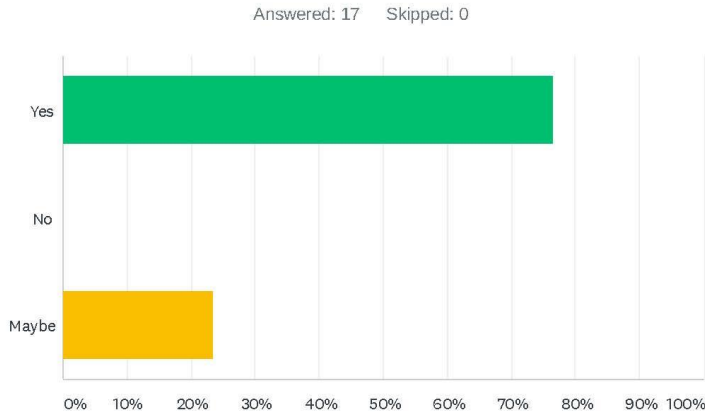
Q8 Would you still be interested in participating in a pre-apprenticeship program if there were costs associated with implementation?



ANSWER CHOICES	RESPONSES	
Yes	29.41%	5
No	5.88%	1
Maybe	64.71%	11
TOTAL		17

Figure 5 - Associated Costs

Q9 If the costs associated with implementation were covered by an outside source and there was no cost to your business would you be interested in participating in a pre-apprenticeship program?



ANSWER CHOICES	RESPONSES	
Yes	76.47%	13
No	0.00%	0
Maybe	23.53%	4
TOTAL		17

Figure 6 - Covered associated costs

It is clear that financing a pre-apprenticeship program is a concern of potential employer sponsors. The participation rate moves from 29% to 76% if costs are covered by an outside source. Funding is an issue mentioned often by employers. According to Fischback (2016) local workforce development boards typically contribute around \$5,500 per participant, but costs of \$6-7,000 leave anywhere from \$500 to \$1500 left as part of employer contribution. When comparing the responses for the questions concerning self-funding or third-party funding a pre-apprenticeship, one could conclude if there was a partial coverage in expenses the employer participation rate would fall somewhere between 29% and 76% based on the answers above. For survey results for all the employer questions, see Appendix F.

Data Triangulation

Both the teacher survey and the employer survey revealed perceived benefits of a pre-apprenticeship program. The benefits to the employer are the creation of a more qualified pool of candidates for open positions, which was a major concern for over 94% of those surveyed. The instructors also saw the benefits of a pre-apprenticeship to their students in the form of gaining valuable workplace skills and defining a clearer pathway to a career in their chosen field.

The associated cost to implement a pre-apprenticeship program was also a concern from both the employer sponsor and the school. Although the direct cost to the school was not talked about in the instructor interviews, they were concerned if additional curriculum had to be purchased, would that cost come out of their budget? If so, that would reduce the amount they had to use for other program requirements. Even though they personally do not have to pay, it was surprising to see their overall budgetary concern. When asked, over 76% of the employers would consider participation in a pre-apprenticeship program if the associated costs were covered by a third party. Although the accompanying expense to implement a pre-apprenticeship program was a concern, 30% of the surveyed employers would still consider implementation if they were required to pay.

The qualitative results of the instructor survey coupled with the quantitative results of the employer survey both revealed the same concerns on funding, and both felt pre-apprenticeship programs benefitted students. Employers more importantly felt that pre-apprenticeship programs could benefit their businesses.

CHAPTER V

Conclusion and Recommendation

Conclusion

The first research question, which was a two-part question asked of the potential employers was: From a business's perspective, what makes a pre-apprenticeship program successful or not, and what can we change in either instance to encourage participation? With the low response rate the first part of the research question was not addressed to the degree I had wished. No responding employer had previously had a pre-apprenticeship. Therefore, the respondents did not address what makes a pre-apprenticeship program successful or not.

The results of the employer survey indicated business participation would increase from 29% of those surveyed to 76% if there were limited to no costs associated with implementation of a pre-apprenticeship program. The results of the employer survey and structured instructor interviews also showed a common perception that pre-apprenticeship programs, when implemented correctly, are beneficial to the employer and the student. Choosing which program to develop into a pre-apprenticeship is many times a function of an employer willing to make the commitment of time and money for the benefit of their business. As the results show, 76% of the businesses are willing to participate in a pre-apprenticeship program if a third party covers the associated costs. According to Phelps and Jin (1997), research has shown this to be a consistent concern for businesses who wish to implement or who have implemented a pre-apprenticeship program. When asked "What incentives would encourage more employers to participate in pre-apprenticeship programs?" 45% of the surveyed businesses said some type of financial support, either in the form of a tax credit or apprenticeship wage reimbursement

would be needed. The financial concern to businesses has now become an even greater burden with the arrival of COVID-19 and the coronavirus. This global pandemic which took hold of the US, particularly Pennsylvania businesses, on March 13, 2020, has proven to be the demise of many small to medium size businesses across the county, but also the world. As the HCCTC was looking for businesses to partner with and start a pre-apprenticeship program, the challenge became even greater during the pandemic. As many businesses struggled to survive by furloughing employees and cutting staff, we did not want this to deter our effort to create some type of pre-apprenticeship program here at the Huntingdon County CTC.

The second research question asked was: What do instructors feel is necessary for successful implementation of a pre-apprenticeship program and how do they envision the program progressing?

After instructor interviews I had a clearer vision of which programs it would be easier to implement a pre-apprenticeship. This conclusion was based on instructor interviews and their pre-existing knowledge or lack of knowledge of the pre-apprenticeship process. Offerings dealing with trades such as electrical, welding, HVAC and construction are courses typically associated with pre and full apprenticeships. That is not to say other programs do not have any affiliation with apprenticeships, but looking to create a new program at the CTC would be a daunting task in programs such as culinary arts or rehabilitation aide. This realization coupled with the literature review completed led the CTC to look at starting a program in one of the above mentioned trade areas. Once it was determined which set of programs offered at the CTC to look at, the

CTC moved on to those programs that would be the best option for pre-apprenticeship implementation.

Recommendation

One solution to the problem of lack in individual business participation is to implement a program and curriculum that is tied to an organization or association and not to an individual business or employer. Organizations such as the North America's Building Trades Union sponsor comprehensive apprenticeship readiness programs across the United States in the area of trades including but not limited to pipe fitters, electrical, welding, construction, and HVAC. When choosing which program to look at, I leaned heavily on the knowledge and experience of the instructors of those programs. My four trades instructors have a combined 75 years of field experience, knowledge, and connections, which proved invaluable in choosing which program to use. After interviews and discussions with those instructors, we chose our construction trades program as the area of study in which to implement some form of a pre-apprenticeship program. The deciding factor for choosing this program over the other trade programs was the affiliation we have with an organization by the name of Associated Builders and Contractors, more commonly known as ABC. ABC is an organization that specializes in connecting a skilled labor force with companies and contractors in Pennsylvania and across the country. ABC also provides formal apprenticeship training programs that are registered with the United States Department of Labor. Completion in an ABC apprenticeship program enables individuals to start at the journeyman level, and they are also awarded an apprenticeship certificate. Not only will our students have the ability to complete the ABC apprenticeship program upon graduation but they will also receive

credit for a full year toward their apprenticeship. To be eligible for this advanced standing, we will need to modify and or supplement our construction trades curriculum. This curriculum change will be discussed later in this paper. The curriculum change will not only satisfy what is required by ABC but also satisfy our state program of study task list requirement. One of the biggest benefits of partnering with ABC is their network of contractors and businesses who use them for accessing a pipeline of skilled workers.

We have chosen a program, construction trades, and an organization, Associated Builders and Contractors, with which to center our efforts in creating a quality pre-apprenticeship program. According to Merritt (1993) quality pre-apprenticeships share and provide the following elements:

- They provide collaboration among secondary schools, post-secondary educational institutions (in our case ABC), and employers.
- They integrate high quality academic and occupational education.
- They focus on preparing individuals for highly-skilled occupations.
- They provide some type of industry recognized credentialing upon completion.

The following sections will define how we plan to address all of the above listed elements to create a quality pre-apprenticeship program in the construction trades program of study at the Huntingdon County Career and Technology Center.

Pre-apprenticeship Program Design

Collaboration. Our construction trades program currently has student chapters in the Pennsylvania Builders Association (PBA) and the Associated Builders and Contractors (ABC). Collaboration between our facility and ABC happens now in a more

generic form through our student chapter. However, moving forward into the 2020-21 school year, there will be a more deliberate approach and regular contact with the local ABC representative. We are modifying our curriculum to accommodate the requirements for ABC while still completing the task list associated with CIP code 46.9999, Construction Trades as required by the Pennsylvania Department of Education's Bureau of Career and Technical Education.

Regular communication between the HCCTC and ABC will continue throughout a student's secondary career, and upon graduation, the student will have the ability to move directly into ABC's apprenticeship program with an advanced standing.

High quality academic and occupational education. As a career and technology center, we are always looking to provide our graduates as many industry credentials as possible, regardless of their program. This translates into our instructors in every program looking to improve or supplement their curriculum on a regular basis to achieve the credentialing goal. I became aware of a curriculum when working for another school which had progress credentialing as part of its arrangement. This meant that as students finished what this company called 'modules' they received a card certifying them as proficient in that particular area of study. As the student progressed through the curriculum, you continued to "stack" additional credentials. This curriculum was developed by the National Center for Construction Education and Research (NCCER). I made the instructor aware of this curriculum during our interview. At that point, we had not determined which program was going to be chosen, but we decided to do a deeper dive into the NCCER curriculum and how well it cross walked into PDE'S program of study task list for the construction trades program (see Appendix F). There is

no one curriculum or text book which covers all tasks on the program of study (POS), but the NCCER curriculum covers as much if not more than most. About 85% of the required POS tasks can be covered in the NCCER curriculum.

We also discovered in our curriculum review that the NCCER curriculum is the preferred curriculum of ABC and is in fact the required curriculum to be completed to receive the advanced standing mentioned earlier. According to the Associated Builders and Contractors website (2020), “ABC now works closely with its educational affiliate, the National Center for Construction Education and Research (NCCER), in the development, revision and publication of the NCCER Curriculum, which is competency-based, task-driven, modular craft training curricula based on today's construction industry practices.”

Listed below is the index from the NCCER core curriculum including the required modules with brief descriptions, to be completed to receive a one-year apprenticeship credit based on the NCCER curriculum (National Center for Construction Education and Research, 2015). This includes nine core modules and nine specialized components in carpentry. The estimated hours are listed also.

Core Curriculum Modules

1. Basic Safety (12.5 Hours) (Module ID 00101-15) Presents basic jobsite safety information to prepare workers for the construction environment. Describes the common causes of workplace incidents and accidents and how to avoid them. Introduces common PPE, including equipment required for work at height, and its proper use. Information related to safety in several specific environments, including welding areas and confined spaces, is also provided.

2. Introduction to Construction Math (10 Hours) (Module ID 00102-15)

Reviews basic math skills related to the construction trades and demonstrates how they apply to the trades. Covers multiple systems of measurement, decimals, fractions, and basic geometry.

3. Introduction to Hand Tools (10 Hours) (Module ID 00103-15) Introduces common hand tools used in a variety of construction crafts. Identifies tools and how to safely use them. Proper hand tool maintenance is also presented.

4. Introduction to Power Tools (10 Hours) (Module ID 00104-15) Identifies and describes the operation of many power tools common in the construction environment. Provides instruction on proper use, as well as on safe-handling guidelines and basic maintenance.

5. Introduction to Construction Drawings (10 Hours) (Module ID 00105-15) Introduces the basic elements of construction drawings. The common components of drawings are presented, as well as the most common drawing types. The use of drawing scales and how to measure drawings is also covered.

6. Introduction to Basic Rigging (7.5 Elective Hours) (Module ID 00106-15) Provides basic information related to rigging and the associated hardware, such as slings, rigging hitches, and hoists. Emphasizes safe working habits in the vicinity of rigging operations.

7. Basic Communication Skills (7.5 Hours) (Module ID 00107-15) Provides good techniques for effective communication on the job. Includes examples that emphasize the importance of both written and verbal communication skills.

Describes the importance of reading skills in the construction industry and covers proper techniques to use in a variety of different written communication formats.

8. Basic Employability Skills (7.5 Hours) (Module ID 00108-15) Describes the opportunities offered by the construction trades. Discusses critical thinking and essential problem-solving skills for the construction industry. Also identifies and discusses positive social skills and their value in the workplace.

9. Introduction to Material Handling (5 Hours) (Module ID 00109-15)

Describes the hazards associated with handling materials and provides techniques to avoid both injury and property damage. Common material-handling equipment is also introduced.

The core curriculum is a pre-requisite to move forward with specialized areas of instruction. For our students to be eligible for advanced standing in ABC's apprenticeship program they must complete the NCCER curriculum in carpentry. Listed below is the index from the carpentry curriculum with a brief description of the modules and associated hours for each. (National Center for Construction Education and Research, 2013)

Carpentry Modules:

1. Orientation to the Trade (5 Hours) (Module ID 27101-13) Reviews the history of the trade, describes the apprentice program, identifies career opportunities for carpentry and construction workers, and lists the skills, responsibilities, and characteristics a worker should possess. Emphasizes the importance of safety in the construction industry.

2. Building Material, Fasteners, and Adhesives (*7.5 hours*) (Module ID 27102-13) Introduces the building materials used in construction work, including lumber, sheet materials, engineered wood products, structural concrete, and structural steel. Also describes the fasteners and adhesives used in construction work. Discusses the methods of squaring a building.
3. Hand and Power Tools (*7.5 Hours*) (Module ID 27103-13) Provides descriptions of hand tools and power tools used by carpenters. Emphasizes safe and proper operation, as well as care and maintenance.
4. Introduction to Construction Drawings, Specifications, and Layout (*20 Hours*) (Module ID 27104-13) Covers the techniques for reading and using construction drawings and specifications with an emphasis on drawings and information relevant to the carpentry trade. Introduces quantity takeoffs.
5. Floor Systems (*27.5 Hours*) (Module ID 27105-13) Covers framing basics and the procedures for laying out and constructing a wood floor using common lumber, as well as engineered building materials.
6. Wall Systems (*20 Hours*) (Module ID 27111-13) Describes procedures for laying out and framing walls, including roughing-in door and window openings, constructing corners, partition Ts, and bracing walls. Includes the procedure to estimate the materials required to frame walls.
7. Ceiling Joist and Roof Framing (*40 Hours*) (Module ID 27112-13) Describes types of roofs and provides instructions for laying out rafters for gable roofs, hip roofs, and valley intersections. Covers stick-built and truss-built roofs. Includes the basics of roof sheathing installation.

8. Basic Stair Layout (*12.5 Hours*) (Module ID 27110-13) Introduces types of stairs and common building code requirements related to stairs. Focuses on techniques for measuring and calculating rise, run, and stairwell openings, laying out stringers, and fabricating basic stairways.

9. Introduction to Building Envelope Systems (*12.5 Hours*) (Module ID 27109-13) Introduces the concept of the building envelope and explains its components. Describes types of windows, skylights, and exterior doors, and provides instructions for installation.

Total Level Hours: 225 Hours (Includes 72.5 hours of Core Curriculum)

One of the most attractive features of this new curriculum is each module comes with an industry recognized credential. So if for some reason a student has to leave the program they can always continue where they left off with any institution who uses the NCCER curriculum. This curriculum combined with the academic course layout offered at each student's sending school will ensure we are checking off the second item needed for a quality pre-apprenticeship program, the integration of a high quality academic and occupational education.

Another key feature that ensures students are receiving a quality occupational education is the instructor certification through NCCER. This will maintain instructional quality and continuity. According to NCCER (2020) a certified instructor must possess the following skills and characteristics.

They must:

- Have journeyman- or technician-level skill in his/her craft or specialty
- Demonstrate leadership ability

- Practice ethics and stewardship on the job and in the classroom
- Be willing to share knowledge and skill and must be motivated to do so

Focus on preparing individuals for high-skilled occupations. The NCCER curriculum is broken down into a “core” curriculum which must be taught before any other specialized curriculum. The areas taught are listed above. The focus on high-skilled occupation preparation is reinforced once the student moves into the specialized area of study. In our construction trades program, each student will cover the following NCCER areas:

- Core Curriculum
- Construction Technology
- Carpentry

The core curriculum is very important and is a pre-requisite for of all other areas, but once a student finishes the core, they are then moved into a more focused specialized area. If we are successful in implementing this curriculum in our construction trades program, we may look at adopting it in other programs such as electrical and HVAC.

Industry recognized credentialing. According to the National Center for Construction Education and Research (2019):

“In an effort to provide students and craft professionals with industry-recognized credentials and assure national portability of skills, NCCER maintains a credentialing and certification system through its Registry. This online database tracks both training and/or assessments for its participants.”

The NCCER Registry System provides transcripts, certificates and wallet cards to students who successfully complete NCCER training through an NCCER Accredited

Training Sponsor. These industry credentials allow participants to provide easy verification of training for current or potential employers. Any individual may earn an NCCER training credential by passing the applicable module tests and performance profiles. Use of the NCCER curriculum, while recommended, is not required to earn a credential (National Center for Construction Education and Research, 2019). NCCER maintains an online registry system, so employers can use NCCER's Online Verification through the Registry System and a Wallet Card Number to verify that a craft professional has an NCCER credential and/or certification. Online Verification will allow an employer to view an individual's transcript indicating any NCCER credentials he/she possesses.

According to NCCER (2019), in addition to the written assessments, NCCER offers Performance Verifications designed to assess an individual's skill level on specific tasks within the corresponding craft. Performance Verifications require a participant to demonstrate their skill level in a controlled, observable, and measurable manner and must be administered by a qualified objective performance evaluator. After successfully completing a Performance Verification, an individual becomes Performance Verified and is awarded the credential as mentioned above. Individuals who pass both the written assessment and corresponding Performance Verification become certified and are awarded the Certified Plus, the highest credential offered by NCCER.

The Huntingdon County CTC feels the National Center for Construction Education and Research curriculum satisfies the requirements of a quality pre-apprenticeship program, which are collaboration, integration of academic and occupational instruction, preparing students for high skilled occupations, and providing

industry recognized credentialing. The HCCTC will be moving forward with this curriculum for the construction trades program for the 2020-21 school year.

Fiscal Implications

Switching a curriculum in a career and technology program, or any academic area for that matter, does not come without a cost. The NCCER curriculum is credential based and requires the instructor to become a certified NCCER instructor. This instructor certification helps to maintain the integrity and consistency of the program so that a student who leaves the Lehigh Valley Career and Technology Center for instance, has the same level of training and education as the student who graduates from the Huntingdon County Career and Technology Center. The cost associated with implementing the NCCER curriculum is found below.

Item	Quantity	Amount	Total
NCCER Instructor Training	1	\$240.64	\$240.64
Substitute	2	\$100.00	\$200.00
Core Curriculum	15	\$57.00	\$855.00
Construction Technology	15	\$140.00	\$2,100.00
Carpentry Level I	15	\$140.00	\$2,100.00
Shipping and Handling	1	\$221.63	\$221.63
Total			\$5,717.27

Table3. Fiscal Implications

The 2019-20 construction trades supplies budget was \$17,815. Although the COVID-19 pandemic handed us many disadvantages as educators, in a school that relies heavily on hands-on instruction involving a lot of consumable supplies, it left us with a financial surplus in some areas. This surplus in construction trades allowed us to move forward with the purchase of materials and instruction training that otherwise would have been pushed to the 2020-21 budget. With an anticipated pre-apprenticeship program to start at the beginning of the 2020-21 school year, the advanced purchase of materials and instructor training was beneficial.

Future Research

Moving forward looking into the 2020-21 school year and beyond, additional research in the area of successful pre-apprenticeship implementation and progress would prove beneficial. My original plan was to have a pre-apprenticeship program running a few months into the 2019-20 school year and do research on the successful implementation and progress of the pre-apprenticeship program. However, with a job change in November of 2019, I had to re-evaluate my project and its direction. This resulted in a modification of the project. My focus and research then shifted to the challenges associated with starting a pre-apprenticeship program and the qualities of a pre-apprenticeship look like? I modified my original research questions. However, my second research question- "What do instructors feel is necessary for successful implementation of a pre-apprenticeship program and how do they envision the program progressing?"- did not give me the results I anticipated. The instructors in electrical, HVAC, welding, and construction were very familiar with pre-apprenticeships and apprenticeships, and their interviews provided valuable information. This was not the

case in the other areas of study. It was interesting to learn what they did or did not know about pre-apprenticeships, but it was also interesting to hear how similar such things as clinical rotations in health occupations were to occupational training and the pre-apprenticeship model. To answer the question posed to the instructors as originally intended will require additional research once the pre-apprenticeship is started and running for a period of time.

Additional research in the differences and success rates of pre-apprenticeships and apprenticeships with business sponsorships compared to pre-apprenticeships and apprenticeships tied to associations or organizations used as employee agencies, such as Associated Builders and Contractors. Each method has benefits and challenges, but knowing which method is more successful would be very helpful to other secondary schools looking to implement pre-apprenticeships.

Next Steps

If our construction trades students have success in the partnership between ABC and employers, we will look to expand the curriculum into other program areas at the Huntingdon County CTC. Specialized curriculum is provided by NCCER in the following areas:

- HVAC
- Electrical
- Plumbing
- Welding
- Numerous specialized construction areas
 - Concrete Finishing

- Drywall
- Masonry
- Painting
- Scaffolding
- Sheet Metal

Additional research will be done to determine which programs at the CTC would benefit the most from a pre-apprenticeship program.

Summary

The U.S. Department of Labor's quality pre-apprenticeship framework singles out employers and other apprenticeship sponsors such as industry associations and labels them critical components of pre-apprenticeship programs. Employers have a unique view of the needs and requirements of a highly skilled workforce and bring a unique perspective to pre-apprenticeship design and development (Nichols & Sofer, 2019). Industry associations can also serve as a pathway for pre-apprenticeship employment upon program completion because they reach a large number of individual employers. Many times employers favor using industry associations to help curtail costs associated with pre-apprenticeship programs. Our partnership with NCCER and respectively their partnership with ABC and employers, I hope, will prove to be beneficial for the HCCTC students. Based on four key components-collaboration, integration of academic and occupational instruction, preparing students for high skilled occupations, and providing industry recognized credentialing- I feel we have designed a quality pre-apprenticeship program ready for implementation at the Huntingdon County Career and Technology Center for the 2020-21 school year.

As we move forward with the implementation for the 2020-21 school year we are faced with some unique challenges involving COVID-19 and the Center for Disease Control recommendations for the start of school. The biggest concern and the item that would affect the pre-apprenticeship the most would be a modification in our schedule. Many schools are moving to alternate days for their students which would translate into alternate days for our students. The HCCTC is working diligently on a health and safety plan for next year to address the possibility of a combination of remote and onsite learning for our students.

The NCCER curriculum we are implementing has good online resources and although not the best scenario for a career and technology course, will enable the students to complete some material remotely. The remote work partnered with the hands-on skills acquired while onsite will enable our students to complete the required work.

The Huntingdon County Career and Technology Center is committed to providing a quality education to all students. We know this upcoming year will present some challenges but we are focused on keeping our students safe and educating them to the best of our ability. For this reason, the HCCTC is not deviating or changing our plan to implement the pre-apprenticeship program in our construction trades course.

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Appendices

Appendix A

Pre-Apprenticeship Program Employer Survey

IRB Approval Date: 11/24/2016 Expires:11/23/2020 IRB #-18-085

Question Title

1. From the list below, which best describes your company or business?

- Automotive Technology
- Computer Networking
- Cosmetology
- Health Occupations
- Public Health and Safety
- Welding Technology
- Electrical Occupations
- Collision Repair
- Construction Trades
- Culinary Arts/Restaurant
- HVAC/Refrigeration
- Sports, Exercise and Rehabilitation Therapy
- Manufacturing
- Other (please specify)

Question Title

2. How long have you been in business?

- 0-5 Years
- 6-10 Years
- 10+ Years

Question Title

3. Is your business or company affiliated with any professional organizations? e.g. AWS, ADA, etc.

Question Title

4. Does your business or company have trouble finding qualified candidates when hiring?

- Yes
- No

Question Title

5. Are you familiar with pre-apprenticeship and/or apprenticeship programs in your industry?

- Yes
- No

Question Title

6. Were you or your business ever involved in a pre-apprenticeship or apprenticeship program?

- Yes
- No

Question Title

7. If you could increase your chances of obtaining a quality employee or employees would you consider participating in a pre-apprenticeship program?

- Yes
- No

Question Title

8. Would you still be interested in participating in a pre-apprenticeship program if there were costs associated with implementation?

- Yes
- No
- Maybe

Question Title

9. If the costs associated with implementation were covered by an outside source and there was no cost to your business would you be interested in participating in a pre-apprenticeship program?

- Yes
- No
- Maybe

Question Title

10. Would you be interested in additional information on pre-apprenticeship and/or apprenticeship programs

- Yes
- No
- If yes, please provide contact information.

Question Title

11. Please add any comments or questions you may have.

Appendix B**Employee Interview Questions**

11. What is your name?
12. How long have you been an instructor?
13. Do you belong to any professional organizations? e.g. AWS, etc?
14. What program do you teach?
15. Are you familiar with apprenticeship programs? Pre-apprenticeship programs?
16. Were you ever in an apprenticeship program?
17. Would you like to be an instructor for such a program?
18. Would you be willing to alter your curriculum, assuming it would still meet the state's program of study, to accommodate a pre-apprenticeship program?
19. Do you think your students would benefit from such a program? Why or why not?
20. Would you be willing to spend additional time preparing for a pre-apprenticeship program?

Appendix C

Institutional Review Board
California University of Pennsylvania
Morgan Hall, 310
250 University Avenue
California, PA 15419
instreviewboard@calu.edu
Melissa Sovak, Ph.D.

Dear Robert,

Please consider this email as official notification that your proposal titled “Improving Student Employability Through a Pre-Apprenticeship Program in Career and Technical Education” (Proposal #18-085) has been approved by the California University of Pennsylvania Institutional Review Board as amended.

The effective date of approval is 11/24/19 and the expiration date is 11/23/20. These dates must appear on the consent form.

Please note that Federal Policy requires that you notify the IRB promptly regarding any of the following:

- (1) Any additions or changes in procedures you might wish for your study (additions or changes must be approved by the IRB before they are implemented)
- (2) Any events that affect the safety or well-being of subjects
- (3) Any modifications of your study or other responses that are necessitated by any events reported in (2).
- (4) To continue your research beyond the approval expiration date of 11/23/20 you must file additional information to be considered for continuing review. Please contact instreviewboard@calu.edu

Please notify the Board when data collection is complete.

Regards,

Melissa Sovak, Ph.D.
Chair, Institutional Review Board

Appendix D

Brochure Front

Why  reTHiNK CTE ?

SO students
have more **PATHWAYS**
and better **PREPARATION**
for **WHAT COMES NEXT.**

7,136,000
unfilled jobs open
in United States

By **2020**, 2/3 of
jobs will require some
post-secondary education

85% of the jobs
today's learners will
do in 2030 haven't
been invented yet

1/4 of high schools
don't offer CTE courses

\$1.5 TRILLION
in college debt

Students **DESERVE BETTER.**
Employers **DEMAND BETTER.**
America **MUST DO BETTER.**

Brochure Back



WHY...

Question

EVERYTHING

Aren't work-based learning and "earn and learn" programs the rule and not the exception?

Can't employers play a larger role in preparing students for their futures?

Is CTE for some and not all students?

Must students wait until middle and high school to explore career interests?

Haven't we developed a teacher pipeline to meet the need of existing and emerging career pathways in every community?

Isn't every community empowered to create high-quality CTE approaches to meet local needs?

Do barriers exist between the levels and types of education?

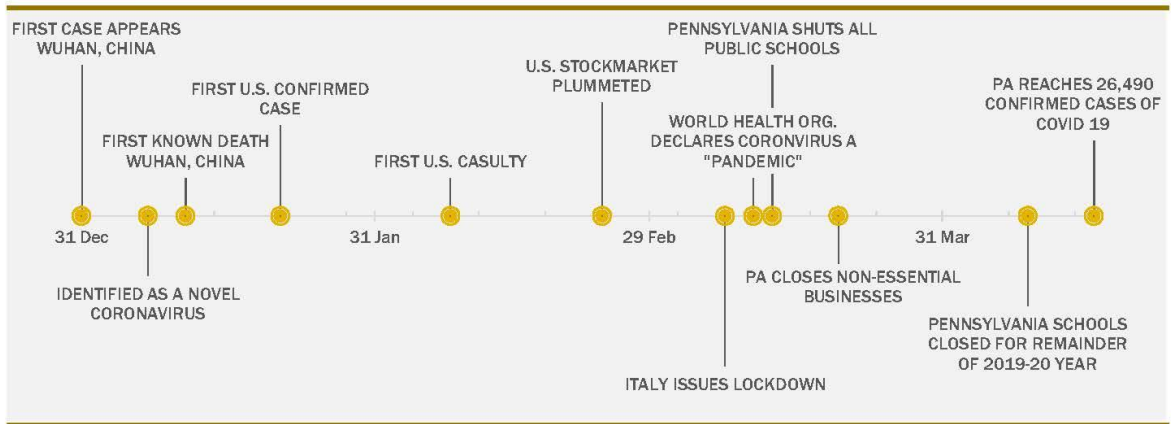
Is access to high-quality CTE often limited by zip code?

Is a credential considered the "end of the line" for learning?

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Appendix E

Covid-19 Timeline



Covid-19 Key Milestones

DATE	MLESTONE	POSITION
31-Dec	First Case Appears Wuhan, China	20
7-Jan	Identified as a Novel Coronavirus	-8
11-Jan	First Known Death Wuhan, China	5
21-Jan	First U.S. Confirmed Case	12
8-Feb	First U.S. Casulty	5
24-Feb	U.S. Stockmarket Plummeted	15
8-Mar	Italy issues Lockdown	-20
11-Mar	World Health Org. declares coronavirus a "pandemic"	5
13-Mar	Pennsylvania shuts all Public Schools	20
20-Mar	PA closes non-essential businesses	-12
9-Apr	Pennsylvania schools closed for remainder of 2019-20 year	-20
16-Apr	PA reaches 26,490 confirmed cases of Covid 19	10

Appendix F

Unit/Standard Number	High School Graduation Years 2020, 2021 and 2022	Proficiency Level Achieved: (X) Indicates Competency Achieved to Industry Proficiency Level
Construction Trades CIP 46.9999 Task Grid		
Secondary Competency Task List		
100	CONSTRUCTION TRADES SAFETY	
101	Follow OSHA standards.	
102	Explain hazard communications.	
103	Work with hazardous materials.	
104	Use personal protective equipment.	
105	Follow rules and regulations for fire protection.	
106	Handle and store construction materials.	
107	RESERVED	
108	RESERVED	
109	Follow electrical safety procedures.	
110	Differentiate "stuck-by" and "caught-in-between" hazards.	
111	Follow working from heights safety procedures.	
112	Follow excavation site safety procedures.	
113	RESERVED	
114	Follow concrete and masonry safety procedures.	
115	Use ladders and scaffolding.	
116	Follow safety procedures working in confined spaces.	
117	RESERVED	
200	HAND TOOLS	
201	Use and maintain hand tools.	
202	Use and maintain layout & measuring tools.	
203	Use and maintain cutting tools.	
204	Use and maintain shaping tools.	
205	Use and maintain fastening tools.	
206	Use and maintain dismantling tools.	
300	POWER TOOLS AND EQUIPMENT	
301	Operate a circular saw.	
302	Operate battery and electric drills.	
303	Operate belt and hand sanders.	
304	Operate reciprocating saws.	
305	Operate routers.	
306	Operate a pneumatic nailer.	

Revised October 2018

1

Unit/Standard Number	High School Graduation Years 2020, 2021 and 2022	Proficiency Level Achieved: (X) Indicates Competency Achieved to Industry Proficiency Level
Construction Trades CIP 46.9999 Task Grid		
307	Operate a miter saw.	
308	Operate a table saw.	
309	Operate an electric planer.	
310	Operate a grinder.	
311	Operate powder-actuated tools.	
400	PLANS AND BLUEPRINTS	
401	Interpret building codes, zoning regulations and permits.	
402	RESERVED	
403	Interpret plans, sketches and blueprints.	
404	Interpret standard abbreviations and symbols.	
405	Estimate material from a print.	
406	Use an Architect scale.	
407	Identify structural components.	
408	Interpret Americans with Disabilities Act (ADA) regulations.	
500	SITE AND BUILDING LAYOUT	
501	Use a builder's level, transit and/or laser level to determine site layout and building elevations.	
502	Square a structure using Pythagorean Theorem or by measuring diagonals.	
600	CONCRETE	
601	Use modern concrete materials.	
602	Determine appropriate concrete finishing processes and equipment.	
603	Estimate the amount of concrete needed for footers and slabs.	
604	Lay out and build concrete forms.	
605	Use equipment and tools for concrete.	
606	Prep and place concrete.	
607	Perform basic concrete finishing processes.	
608	Use tools to edge, groove, and cut concrete.	
700	BLOCK AND BRICK MASONRY	
701	Describe the most common types of masonry units.	
702	Identify concrete block by size and type.	
703	Estimate masonry units needed for block construction.	
704	Use masonry cutting techniques.	

Revised October 2018

2

Unit/Standard Number	High School Graduation Years 2020, 2021 and 2022	
	Construction Trades CIP 46.9999 Task Grid	
		Proficiency Level Achieved: (X) Indicates Competency Achieved to Industry Proficiency Level
705	Lay out and construct a block laying project.	
706	Perform various masonry positions and bonds.	
707	Lay block to a line.	
708	Install masonry fasteners.	
709	RESERVED	
710	Mix mortar to proper proportions and consistency.	
711	Compare mortar types and applications.	
712	Perform proper brick and block laying techniques.	
713	Install block or brick walls.	
800	FLOOR FRAMING	
801	Identify and estimate different types of framing materials and systems.	
802	Install girders and sills.	
803	Perform layout of floor joists and openings.	
804	Install various floor joists and band joists.	
805	Install various types of bridging.	
806	Install various types of columns and supports.	
807	Install various types of subfloor materials.	
900	WALL FRAMING	
901	Install various components of interior and exterior walls.	
902	Install various ceiling systems.	
903	Install various steel framing components.	
904	Identify and estimate different types of framing materials and systems.	
1000	ROOF FRAMING	
1001	Identify and estimate different types of framing materials and systems.	
1002	Install various roof components for gable roofs.	
1003	Install various types of roof trusses.	
1004	Install various types of roof sheathing materials.	
1005	RESERVED	
1006	Calculate, layout and cut roof rafters.	
1100	ROOF COVERINGS	
1101	Install various types of asphalt shingles.	

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3

Unit/Standard Number	High School Graduation Years 2020, 2021 and 2022	
	Construction Trades CIP 46.9999 Task Grid	
		Proficiency Level Achieved: (X) Indicates Competency Achieved to Industry Proficiency Level
1102	Install various types of underlayment materials.	
1103	Install various types of flashing.	
1104	Identify and estimate different types of roof covering materials and systems.	
1200	INSULATION MATERIALS	
1201	Install various types of insulation and ventilation.	
1202	Identify and estimate different types of insulation and ventilation materials.	
1300	EXTERIOR FINISHES	
1301	Install various types of horizontal sidings.	
1302	Install various types of vertical sidings.	
1303	RESERVED	
1304	Identify and estimate different types of exterior finish materials.	
1305	Install various types of windows.	
1306	Install various types of exterior doors.	
1307	Install various types of soffit and fascia.	
1308	Install house wrap.	
1400	BASIC PLUMBING	
1401	Use and maintain basic plumbing tools.	
1402	RESERVED	
1403	Identify and estimate different types of pipes and fittings.	
1404	RESERVED	
1405	Install various types of pipes, fittings, valves and devices.	
1406	Install faucets and drain assemblies.	
1407	RESERVED	
1408	RESERVED	
1409	Install water supply systems.	
1410	Install drain, waste and vent systems.	
1411	Install fixtures and equipment.	
1412	Troubleshoot and repair common plumbing problems.	
1500	RESIDENTIAL ELECTRIC CIRCUITS AND COMPONENTS	
1501	Identify electrical hazards and practice electrical safety.	
1502	Apply the National Electric Code (NEC) to common residential installations.	

Revised October 2018

4

Unit/Standard Number	High School Graduation Years 2020, 2021 and 2022	
	Construction Trades CIP 46.9999 Task Grid	
		Proficiency Level Achieved: (X) Indicates Competency Achieved to Industry Proficiency Level
1503	Interpret electrical drawings.	
1504	Apply electrical theory.	
1505	Construct electrical circuits.	
1506	Use various wire types and sizes.	
1507	Use electrical tools.	
1508	Install ground fault circuit interrupters.	
1509	Install arc fault circuit interrupters.	
1510	Install over current protection devices.	
1511	Install various electrical boxes.	
1512	RESERVED	
1513	Install various light fixtures.	
1514	Install various receptacle circuits.	
1515	Install various switch circuits.	
1516	Install a 220-volt circuit.	
1517	RESERVED	
1518	Trim out and finish electrical circuits.	
1519	Identify service entrance installation.	
1520	Install low voltage electrical circuits.	
1521	Install electrical panel installation.	
1600	WALL COMPONENTS	
1601	Install various wall surfaces (including drywall).	
1602	Install various interior moldings.	
1603	Identify and estimate various materials for wall surfaces.	
1604	Identify and estimate various types of interior moldings.	
1700	INTERIOR FINISHES	
1701	Identify and estimate different types of paints, stains and their uses.	
1702	Apply different paints and stains to different surfaces.	
1703	Clean painting tools.	
1705	Apply various types of caulking.	
1706	Install ceramic tile.	
1800	STAIRWAYS	
1801	Identify and estimate different types of stairways and components.	

Revised October 2018

5

Unit/Standard Number	High School Graduation Years 2020, 2021 and 2022	
	Construction Trades CIP 46.9999 Task Grid	
		Proficiency Level Achieved: (X) Indicates Competency Achieved to Industry Proficiency Level
1802	Calculate, layout and cut stair stringers.	
1803	Install stairways and components.	

Revised October 2018

6