A COMPARISON BETWEEN INTERPERSONAL STYLE AND LEARNING-STYLE: AN EXPLORATORY STUDY OF SECONDARY CAREER AND TECHNICAL EDUCATION TEACHERS IN WESTERN PENNSYLVANIA

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ABSTRACT

The purpose of this quantitative research study was to explore the distribution (profiles) of interpersonal styles and learning-styles of secondary Career and Technical Education (CTE) teachers in western Pennsylvania. The population for this study was a group of secondary CTE teachers from the Center for Career and Technical Personnel Preparation Program located at the Indiana University of Pennsylvania. The study utilized two instruments and a participant questionnaire to address four research questions. The Interpersonal Style Profile by the Management Development Program Services at the Penn State University was the first instrument used to assist participants in identifying their interpersonal style. The Learning-Style Inventory by David Kolb was the second instrument used to assist participants in identifying their learning-style. The participant questionnaire was used to collect specific demographic and program information about the participants. The results suggested that most participants had a Harmonizer interpersonal style and an Assimilating learning-style. Additionally, the analysis of data revealed a distribution (profiles) between interpersonal style and learning-style in secondary CTE teachers in western Pennsylvania.
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Chapter 1

Introduction

Career and Technical Education Teacher Preparation

Today, a majority of Career and Technical Education (CTE) teachers are trained through the alternative teacher education programs in Pennsylvania. CTE teachers need to understand how they will be prepared through this alternative education pathway to become secondary education professionals.

The U.S. Office of Vocational Education and Adult Education, as well as the U.S. Department of Education funded the National Research Center for Career and Technical Education to develop a research study titled the Study of State Certification/Licensure Requirements for Secondary Career and Technical Education Teachers. The research team of Zirkle, Martin and McCaslin (2007, p. 5) found that “historically, vocational/career and technical education (CTE) teachers have not always followed the same pathways to teacher certification/licensure as public school teachers in other subject areas” (Lynch, 1997, p. 5). This study also noted (Zirkle, Martin & McCaslin, 2007, p. 5) that “work experience in the occupation to be taught has long been a prime consideration in the certification/licensure of CTE teachers, primarily due to a stipulation in the Smith-Hughes Act of 1917 that only personnel with practical work experience be permitted to teach in a federally reimbursed program” (Miller, 1982). In a more recent article, Camp and Heath-Camp (2007), discuss that CTE leaders before the Smith Hughes Act were contemplating how teachers should be trained. CTE leaders, at that time, thought trade knowledge was the primary factor necessary to be a good teacher and pedagogical skills were not as important. However, Camp and Heath-Camp (2007), support alternative CTE teacher preparation programs but do not agree that industry
professionals necessarily make the best teachers.

Teacher preparation programs for Career and Technical Education differ depending upon the state but all states offer:

Two routes to certification/licensure exist in CTE, a traditional and a non-traditional route. The traditional route consists of an approved degree-based teacher education program that includes pedagogical preparation, general education, content coursework, and field experiences. The non-traditional or alternative routes differ greatly and include requirements such as work experience, portfolio reviews, completion of coursework, completion of teacher preparation programs, entry and exit tests, peer reviews, and professional certification. (Zirkle, Martin, & McCaslin, 2007, p. 19)

According to subject matter expert, Darling-Hammond (2007), whom advocates that all teachers should be fully prepared and certified in dramatically improved university programs before taking full responsibility for students.

Preparation for CTE teachers is very difficult since these individuals usually are selected directly from industry. According to Thorton, Peltier, and Hill (2005), the teaching profession is very stressful and more stressful for a CTE educator without pedagogical skills. The CTE pre-service teacher is selected by the school administration and then required to enroll in a traditional or alternative teacher preparation program. The three CTE teacher preparation programs in Pennsylvania do not have control over the selected individual sent for training (Riggs, 2013; Zirkle et al., 2007).

Zirkle et al. (2007), indicates whether enrolled in a traditional or alternative CTE Teacher preparation program, the program needs to include requirements such as work experience, portfolio reviews, completion of coursework, completion of teacher preparation programs, entry and exit tests, peer reviews and professional certification (Zirkle et al., 2007) are necessary for the future CTE teacher. Also, Zirkle et al. (2007), points out that almost half of the
teachers leave the career, indicating something must be missing during the teacher preparation program to help teachers transition from industry to education.

CTE Teacher preparation programs, as well as public and private schools realize teacher retention is an issue. In an article written by Riggs (2013), schools that do a better job managing student behavioral issues and support their teaching staff are more likely to retain teachers; thus, reducing the number of new teachers leaving the profession.

Consequently, if student behavior issues are part of the problem then additional educational strategies need to be implemented in the teacher preparation programs. If the issues are not addressed, then teacher frustration will continue.

The Importance of the CTE Teachers Interpersonal Style and Learning-Style

The primary investigator believes that after acceptance into the CTE teacher preparation program, new teachers should be given an interpersonal style assessment allowing them better insight and understanding of who they are, how they learn, as well as how their delivery of content knowledge will affect instruction. According to Gardner (1999), "intelligence is inborn and that a person can do little to alter his or her quantitative intellectual birthright" (p. 15); thus, understanding a person's interpersonal style will benefit how relationships pertaining to teacher learning can be cultivated.

In his first book titled The Color Code (Hartman, 2007) and now the revised and updated book titled The People Code (2007), Taylor Hartman discusses the fundamentals of personality in an easy and understanding way. According to Hartman (2007), is the following enlightenment about people:

Personality is that core of thoughts and feelings inside you that tells you how to conduct yourself. It's a checklist of responses based on strongly held values and beliefs. It directs you to respond emotionally or rationally to every life experience. It even determines your knee-
jerk reaction to others. Personality is an active process within each individual that dictates how he or she feels, thinks, and behaves.

(Hartman, 2007, p. 13)

One of the leading researchers in this field and still prominently utilized today is John Holland (Holland, 1996). Holland's theory, as explained by Gray and Herr (1998), "can be summarized by its emphasis on individual behavior as a function of the interaction between one's personality and one's environment and on choice of behavior as an expression of personality" (p. 128). Holland's approach and Hartman's approach are both centered on a person's core personality except Hartman's (2007), ideas are more specific to the individual and understanding who they are and developing that mature understanding of their core self. When an individual understands his or her core self, the Holland and Messer (1995) personality profile is an excellent way of matching interests, abilities and values to an occupational area with great success.

Both Holland (1996) and Hartman (2007), realize personality is an import way of matching individuals for life-long learning, leading to a career path and future success. Career and Technical Education in Pennsylvania is designed to meet a dual mission of developing students with College Readiness skills and a Career Path (Pennsylvania Department of Education, 2009). Gray stated that:

For students who (a) are at risk of dropping out of high school, (b) seek employment directly after high school, or (c) want to go to college at the one or two-year level to prepare them for pre-professional technical careers, CTE is arguably the most important curriculum in the American high school. Together, these three groups make up a majority of all high school students. (Gray, 2004, p. 5)

In a recent study in Arkansas, Dougherty (2016), found that CTE courses improve education and labor market outcomes for students. He also found that students who are CTE concentrators
(taking more than three CTE courses in a program of study) compared to non-concentrators with similar demographics, test scores and courses are 21 percentage points more likely to graduate high school. One year after high school they are more likely to be employed, as well as more likely to enroll in their 2-year college (p. 26).

Ultimately the goal is to engage student learning (van Uden, Ritzen & Pieters, 2014). It is important to understand how the CTE teacher can foster student engagement in pre-vocational and vocational education programs (van Uden, Ritzen & Pieters, 2014).

The research team of van Uden, Ritzen and Pieters (2014), conducted a study “to investigate teacher beliefs and interpersonal teacher behavior that could influence student engagement” (p. 22). In the Netherlands, after elementary education, students can continue on to general secondary education or enroll in pre-vocational education. Pre-vocational education lasts for four years and the students range in age from 12 to 16. Upon completion of pre-vocational education, the students can then enroll in the vocational education program. After fulfilling the secondary vocational education program students can then advance to the applied university programs (van Uden, Ritzen & Pieters, 2014).

In a study conducted by van Uden et al. (2014), the authors wanted to know if a relationship exists between the teachers’ interpersonal behavior and student engagement in the context of pre-vocational and vocational education. Questionnaires were the chosen method for collecting data. The independent variable was the teachers’ motives, attitude toward teacher knowledge, self-efficacy and interpersonal behavior. The dependent variable was behavioral, emotional and cognitive student engagement (van Uden, Ritzen & Pieters, 2014). A total of 118 male teachers and 82 female teachers, as well as a total of 2,288 students participated in the research study (van Uden, Ritzen & Pieters, 2014). The results concluded that perceived interpersonal teacher behavior was the most important predictor of student engagement in pre-vocational and vocational education in the Netherlands (van Uden, Ritzen & Pieters, 2014).
To help foster secondary CTE student engagement in western Pennsylvania, if teachers understood how they learn "two things can be established, (a) that learning is a process and (b) people learn in different ways" (Lawrence, 1997, p. 160). Therefore, teachers who understand their own interpersonal style and learning-style may relate better and differentiate their instruction for all students to be successfully engaged (Kolb, 2001; Management Development Program Services, 2000).

The Problem

Today's educators need to be prepared for the students they will teach. In CTE, teachers come into the profession older, confused regarding management techniques, not understanding where to start and lacking teaching pedagogy (Wubbels, Cretan & Hermans, 1993). This state of confusion creates an environment of high stress and possible failure for the teachers, as well as the students (Thorton et al., 2005). The transition CTE teachers face from industry to the classroom is challenging; however, it would be beneficial for the teachers to understand how they learn, as well as insights into their personality which may strengthen and improve student engagement (Mehta, 2012). According to Threeton, Walter and Evanoski (2013), the "relationship between personality and learning-style within an educational setting...could yield valuable data regarding how to better meet the educational needs of students" (p. 41).

The purpose of this quantitative research study was to explore the distribution (profiles) of interpersonal styles and learning-styles of secondary Career and Technical Education (CTE) teachers in western Pennsylvania.

Research Questions

This research study sought to answer the following questions:

1. What are the interpersonal style profiles of secondary western Pennsylvania Career and Technical Education Teachers as determined by the Pennsylvania State University
Interpersonal Style Profile assessment?

2. What are the learning-style inventory profiles of secondary western Pennsylvania Career and Technical Education Teachers as determined by the Kolb Learning-Style Inventory Profile assessment?

3. What is the distribution (profiles) of secondary western Pennsylvania Career and Technical Education Teacher’s Interpersonal Style profile and their Learning-Style Inventory Profile?

4. What is the distribution (profiles) between the secondary western Pennsylvania Career and Technical Education Teachers Interpersonal Style Profile and the program CIP code?

The Significance of the Study

The primary investigator believes this study will be significant because it may provide educators a comprehensive understanding of the interpersonal styles and learning-styles of secondary CTE teachers in western Pennsylvania. This study sought to answer the questions, do secondary CTE teachers in western Pennsylvania have a predisposition towards (1) a distinct interpersonal style profile; (2) a distinct learning-style profile; (3) a distribution between the interpersonal style profiles and the learning-style profiles of the teachers; and (4) finally, is there a distinct distribution between the teachers’ interpersonal style profiles and the program CIP codes. If this study confirms the research questions and a distribution (profiles) exists, then educators need to rethink how secondary CTE teachers are being trained. This study may have the potential to help post-secondary CTE teaching faculty, at the three CTE preparation centers in Pennsylvania, to better understand the value in modifying curriculum and pedagogy to improve instruction of new secondary CTE teachers.

Limitations of the Study

As a cautionary comment regarding the interpersonal style and learning-style inventory profile results from this study; there are no correct or incorrect profiles and
participants used portions of each interpersonal style and learning-style to some extent allowing a better understanding of themselves and others. Even though the results represent the population of 453 participants out of a possible 513 for a participant response rate of 88% the findings of this study are limited because: (a) the participants were certificated secondary CTE teachers in western Pennsylvania and not generalizable outside this target population; (b) the participants were teaching in secondary career and technical education programs in western Pennsylvania during the spring of 2018; and (c) the participants used a self-reporting questionnaire format and data could have been recorded incorrectly. Therefore, the conclusions should be viewed as an instrument to better assist in understanding the population of secondary Career and Technical Education teachers in western Pennsylvania.

Assumptions

Before performing the study, it was the foregone conclusion of the primary investigator that there would be a distribution (profiles) between the interpersonal style and learning-style of secondary CTE teachers in western Pennsylvania.

What did the PI assume? The primary investigator assumed that the majority of the secondary CTE teachers in western Pennsylvania would: (a) not respond well to the study questionnaires; thus, receiving a low response rate; (b) most secondary CTE teachers in western Pennsylvania who took part in the study would have a Harmonizer interpersonal style; and (c) the interpersonal style of secondary CTE teachers would be aligned to the Classification of Instructional Programs (CIP) codes they teach.

Conceptual and Theoretical Framework

The conceptual framework used for this study includes the Interpersonal Style Profile (Management Development Program Services, 2000) and the theoretical framework used for this study was Kolb’s Experiential Learning Theory (Kolb, 1984). The Management
Development Program Services (2000) Interpersonal Style Profile was developed at the Pennsylvania State University but has not been used in a research study according to Dr. Donahue (W.E. Donahue, personal communication, October 25, 2016); however, it has been used thousands of times in classes with students and would be appropriate for use in this exploratory research study. Thus, this instrument would instinctively support the research of this study to determine the interpersonal style profiles of secondary CTE teachers in western Pennsylvania. The Management Development Program Services (2000) Interpersonal Style was based on the following ideologies:

Interpersonal Style is a behavior model that helps people better understand themselves and others. It refers to the consistent pattern of actions that a person uses when interacting with others and is a relatively stable behavior pattern in most people. There is no doubt that how people interact with others is influenced by personality, motives, and values. When looking at interpersonal style, however, the focus is on the behaviors and not underlying dynamics that predispose people to behave in one way as opposed to another. (Management Development Program Services, 2000, p.6)

Teachers who understand their interpersonal style are able to relate to different individuals personally and professionally in the classroom, as well as relationships with administration, colleagues, parents and the community.

According to the Pennsylvania State University (Management Development Program Services, 2000) publication, individuals are either part of the assertive dimension or expressive dimension. A person can be a highly assertive or less assertive individual. A person can also be expressive or controlled (less expressive). Individuals who move quickly, tell others what to do, opinionated, delegates effectively, decisive, and independent are more assertive individuals. Taking more of a back seat, good listener, supportive, sincere and loyal is the less
assertive individual. A controlled individual keeps their feelings close, reflective, quiet, calm under pressure and accommodating. People who are energized, spontaneous, adventurous, friendly, looks at the broad picture, fun, loves to socialize and talks a lot are expressive individuals (Management Development Program Services, 2000). Therefore, based on these two different interpersonal style dimensions, and related to individual behaviors, an interpersonal style assessment has been created.

There are four interpersonal styles and each is different. There is no one perfect style (Management Development Program Services, 2000). The following is an explanation of the interpersonal styles from the Management Development Program Services (2000) Interpersonal Style Profile booklet.

The driver has an interpersonal style that is action-oriented, aggressive, not patient, focused on achieving results, impulsive, decisive, fast, bad listener and impatient.

The energizer has an interpersonal style that is action-oriented, fun loving, talkative, not very organized, creative, not able to follow through, unfocused, overbearing and can be very overwhelming.

The harmonizer has an interpersonal style that is methodical, steady, comfortable, decisive after careful consideration, not a risk-taker, focused on people, build deep long-term relationships, dependable, supportive, cooperative and not really opinionated

Finally, the analyzer has an interpersonal style that is methodological, systematic, deliberate, keeps their feeling close, logical, common sense, factual, predictable, accurate, perfectionist, analytical and detail oriented.

The theoretical framework used for this study was Kolb’s (1984) Experiential Learning Theory (ELT). The Kolb Experiential Learning Theory aligns well with this
research study because it will be used to determine the learning-style of secondary CTE teachers in western Pennsylvania.

Experiential Learning relates back to scholarly work most notably by John Dewey and many others. Kolb and Kolb (2005), define experiential learning theory as "the process whereby knowledge is created through the transformation of experience" (p. 194). Kolb and Kolb (2005), believe that Experiential Learning is designed around six concepts: (1) learning is a process; (2) all learning is relearning; (3) learning requires the resolution of conflict; (4) learning is holistic; (5) learning results from connecting new experiences with prior experiences; and (6) learning is the process of creating knowledge (p. 194). Kolb (1984), has also noticed that personality links to learning styles in four major areas that he calls: (1) experience, (2) reflection, (3) application, and (4) abstraction. According to Kolb and Kolb (2005) and the LSI 3.1:

The purpose of the LSI was to provide learners with information about their preferred approach to learning. The most relevant information for the learner is about intra-individual differences, his or her relative preference for the four learning modes, not inter-individual comparisons. Ranking relative preferences among the four modes in a forced-choice format is the most direct way to provide this information. While individuals who take the inventory sometimes report difficulty in making these ranking choices, they report that the feedback they get from the LSI gives more insight than had been the case when we used a normative Likert rating scale version. (Kolb & Kolb, 2005, p. 11)

Using the Experiential Learning Theory (ELT) model Kolb and Kolb (2005), discuss the four different learning-styles used in the study. The four learning-styles are: Diverging, Assimilating, Converging and Accommodating. The Diverging learner likes concrete
situations from different points of view. This learner enjoys observation rather than taking action, has lots of ideas, prefers working in a group and enjoys brainstorming sessions. The Assimilating learner is very logical and concise regarding information. The person with this learning-style would rather work with ideas and concepts than people. The Converging learner is a problem solver and has the ability to make decisions based on technical tasks and data rather than deal with social or interpersonal issues. Finally, the Accommodating learner is impulsive, hands-on and intuitive. This learning-style needs to get things done, set goals, accomplish tasks and have deadlines.

Thus, the conceptual and theoretical framework used for this research study included the Management Development Program Services (2000) Interpersonal Style Profile and Kolb’s Experiential Learning Theory (1984). Both of these foundations are well respected and have stood the test of time in their field.

Terms and Definitions

The following terms are specialized vocabulary used throughout the research study:

- **CTE**: Refers to Career and Technical Education which has replaced the term Vocational Education;

- **CIP code**: Refers to the Classification of Instructional Programs which is numbering system to identify CTE programs from the Pennsylvania Department of Education. (2018, August, 26);

- **IEP**: Refers to and Individualized Education Plan which are legal documents specifically for students who have disabilities; and

- **Work Experience**: Refers to individuals interested in becoming a CTE teacher. An individual must show proof of a minimum of 4-years of fulltime documented work experience in the specific CIP code area they are interested in teaching.
The following terms are specialized vocabulary used throughout the research study associated with the Interpersonal Style:

- **Interpersonal Style**: A behavior model that helps people better understand themselves and others (Management Development Program Services, 2000, p. 3); and

- **Social Flexibility**: Means respectful adjustment to the style of others (Management Development Program Services, 2000, p. 18).

The following terms are specialized vocabulary used throughout the research study associated with the Kolb (2005) Learning-Style Inventory:

- **LSI**: The Learning-Style Inventory (LSI) by Kolb (2005), is an assessment to help individuals identify how they learn from experience; and

- **ELT**: Stands for Experiential Learning Theory (ELT) and is defined as “the process whereby knowledge is created through the transformation of experience” (Kolb, 2005, p. 2).
Chapter 2

Review of the Literature

The purpose of this literature review is to explore the literature related to interpersonal styles and learning-styles. The literature was selected because it represents the scholarly work that has been conducted on this topic. The review will be divided into the following sections: (a) CTE teacher preparation, (b) interpersonal style, (c) interpersonal profiles, (d) learning-style, and (e) chapter summary.

In his book *Intelligence Reframed*, Howard Gardner talks about how individuals learn differently and that our school system does not really promote this concept:

The essence of uniform schooling is the belief that every individual should be treated in the same way: study the same subjects in the same way and be assessed in the same way. At first, this seems fair: no one has special advantages. And yet, a moment’s thought reveals the essential inequity in the uniform school. (Gardner, 1999, p. 150)

When giving thought to this statement, Gardner's analogy supports the research as to why high school students are not doing well.

According to an article in Education Week by Debra Viadero (2010), "most high school students feel bored and disconnected from school…" (Viadero, 2010, p.4). For instance Viadero (2010), documents that:

(1) Just 2 percent of students said they'd never been bored in school; (2) less than half of students--41 percent-said they went to school because of what they learned there; (3) twenty-three percent reported attending because they liked their teachers; and (4)
among students who considered dropping out of school, half said it was because they didn't like their school. (Viadero, 2010, p.4) Therefore, 98 percent of students have been bored sometime during their high school education; fifty-nine percent did not learn anything while attending high school; seventy-seven percent did not like their teachers; and about half dropped out of school because they did not like their school because of rules and did not want to comply (Viadero, 2010).

Seventy-seven percent of the students surveyed from the Education Week poll did not like their teachers (Viadero, 2010). This may give credence to the need for professional development or pre-service training on how to develop relationships to engage students regarding content satisfaction. In a recent article written by Judy Willis (2014), "the most frequent response now given by high school students who drop out is boredom. Students say they're bored when they have to focus on material that's uninteresting and/or not relevant to their lives" (Willis, 2014, p. 28). However, "sadly, dropping out does remain an option for many young people - 1.3 million students leave high school each year without a diploma" (Washor & Majkowski, 2014, p. 8).

**CTE Teacher Preparation**

The Smith Hughes Act required vocational teachers to have years of work experience in the skilled content area and until recently that philosophy was appropriate. Work experience is still important but the future CTE teacher needs a better instructional foundation that is up-to-date. Most CTE teachers have not been in the classroom since leaving high school but yet are being required to relate technical program content to academic content. Reflecting back on casual conversations with CTE teachers, the primary investigator believes the university education courses would have been more helpful before entering the CTE program as a teacher.
Understanding instructional pedagogy would have been more helpful before entering the technical area and reduced the stress of learning how to teach while being the teacher of record.

Whether a traditional or alternative CTE teacher preparation program, academics will be part of the training to prepare students for college and careers. However, before teachers can instruct students they must understand instructional pedagogy and the importance of developing trusting relationships. According to Gardner (1999), knowing students will help cultivate an understanding of how they learn best; thus, allowing specialized education to be implemented for each student. In a recent article Washor and Majkowski (2014), believe student disengagement is part of the boredom problem. Their research identifies 10 expectations that students have for schools. One of those expectations is teachers need to develop professional relationships with students. Washor and Majkowski (2014), contend that if teachers took a little more interest in their students by knowing their interests and talents, students would be less likely to drop out of school. Gardner (1999), has stated the same argument related to the power of knowing the student.

In the end, students need and want approval from their teachers. They want structure. According to Thorton, Peltier and Hill (2005), "colleges of education could improve the quality of new teachers by developing better selection processes for pre-service teachers. Personality type may be an important factor to consider..." (Thorton, Peltier, & Hill, 2005, p. 490). New teachers need to understand their students but before that can take place, they need to understand themselves and then be taught how to build those professional relationships with students. Therefore, secondary CTE teachers need interpersonal and learning-style training.

**Interpersonal Style**

Interpersonal style is the ability to understand yourself and others. According to Gardner (1999), teachers tend to teach the way they were taught; however, students do not
necessarily learn from instructional methods used in the past. Understanding this information means the teachers need to have multiple tools available in their tool box. One of those tools available is the interpersonal style of the teacher and their ability to transfer information into a meaningful multidimensional delivery style. As a result, it is very important the teacher first understand who they are?

There is a great deal of research available related to interpersonal style but limited articles devoted to career and technical education. In a study conducted by Tessier, Sarrazin and Ntoumanis (2010), they examined if the teacher understood their interpersonal style would they be more supportive to their students? Three physical education teachers (one male and two females) and their 185 students were selected. The three teachers were new with minimal teaching time and were interested in learning new teaching strategies. Because they had not established highly seasoned teaching habits but still had an impressionable interpersonal style, they were chosen. The study was broken down into three parts.

The first part videotaped the teachers giving their lessons. The second parts of the experiment, the teachers were invited to the university to attend an informational session. The presentation covered different types of student's motivation, different types of teacher interpersonal styles and their outcome on students. By using their video footage, the three teachers were shown examples of physical education instruction. The teacher's lessons were reviewed and explanations were given as to how to provide more opportunities to use instructional strategies. Finally, the teacher was videotaped again. An individual guidance plan was created for each teacher. The video was critiqued with the researcher and the teacher to analyze their interpersonal style. This debriefing was used to help the teacher find different ways to reduce direct commands and controlling language. The discussion was then directed towards using positive commands and
language reflecting from the student's perspective. Finally, the results showed that
teacher's participation in the information session and positive critique during the
individualized guidance plan promoted positive change in the educator's interpersonal
style.

Van Petegem, Creemers, Rossel and Aeltennan (2005), provided another study "to
detect if there is a link between formal teacher characteristics, the interpersonal relationships
experienced by the teacher within a classroom, and the way the teacher perceives his own
wellbeing" (p. 34). The link between teacher behavior and student behavior suggests that
teachers benefit directly from knowing their own interpersonal behavior (Wubbels & Levy,
1993). Van Petegem et al. (2005), focused on nineteen technical schools with approximately
260 teachers of which 41 percent were male and 59 percent were female. The researchers
used two questionnaires in their study: (1) the Questionnaire on Teacher Interaction (QTI) and
(2) the Questionnaire on Teacher Wellbeing (QTW). In the classroom certain communications
develop between the teacher and their students which consist of particular behaviors that were
observed (Watzlawick, Beavin & Jackson, 1967). Leary (1957), suggests that interpersonal
style can be used by teachers to reduce student anxiety but maintain teacher self-esteem.
Continued practice by the teacher can eventually establish an identifiable interpersonal teacher
style that students understand and relate too, thus, creating an interactive classroom between
the students and teacher; along with, the teacher having a better feeling of wellbeing (Van
Petegem et al., 2005, p. 36).

Van Petegem et al. (2005), derived a simpler pilot test based off the Questionnaire for
Teacher Wellbeing by (Aelterman et al., 2003). The pilot was qualified using a confirmed
factor analysis with the statistical program LISREL (Van Petegem et al., 2005, p. 36). The
importance of this qualitative questionnaire was to extract data showing teacher efficacy.
They wanted to know if a relationship exists between the teacher's interpersonal behavior and their feeling of wellbeing while in the classroom. The results from this study concluded with the following:

The focal point of this study is the teacher and more precisely the way in which the teacher's characteristics influence his interpersonal behavior within a classroom setting. Results of the analysis indicate that the gender of the teacher influences his perceptions of his own interpersonal behavior. Male teachers appear to score higher within the submission-opposition quadrant than do their female counterparts.

Male teachers obtain the higher scores within the submission-opposition quadrant and simultaneously score significantly higher within the dominance-cooperation quadrant when parental status and job security were taken into account. Male teachers with children evaluate themselves significantly higher on leadership qualities and on helpful/friendly interpersonal behavior than their childless male colleagues and all their female colleagues.

These two observations lead us to the conclusion that male teachers with children will be typically located near the cooperative pole of the proximity dimension, or in the right half of the typology of interpersonal behavior. It is important to mention the flexibility factor, as it relates to the influence dimension. Male teachers with children not only score high on the dominance pole of the influence dimension, they also achieve a more relaxed communication with their students than their childless male colleagues and their female colleagues. In their interpersonal behavior, this allows them to score significantly higher on student responsibility, freedom and understanding. We can conclude that interpersonal teacher behavior and the wellbeing
of the teacher are important aspects of the classroom environment. (Van Petegem, 2005, pp. 41-42)

This particular study shows that interpersonal behavior of male teachers, who have children of their own, tend to relate better to their school students, feel better about themselves and create an optimistic classroom environment.

In order to help CTE teachers, whether they are new to the profession or seasoned, understanding their own interpersonal style is advantageous to the classroom dynamics. Why does this matter? Gardner (1999) states, "interpersonal intelligence denotes a person's capacity to understand the intentions, motivations, and desire of other people and, consequently, to work effectively with others" (p. 43). Thus for teachers to better appreciate their students, it only makes sense for the teacher to understand their own interpersonal style which will ultimately drive student success. According to Brekelmans (Brekelmans, 1989; Brekelmans, Wubbels & Levy, 1993), they established that students, who perceive the interpersonal style of their teacher as relatively dominant, have relatively high scores on standardized tests on cognitive performance. It was also noted that students who felt their teacher cared how they performed in school, scored relatively high on questionnaires regarding motivation for the subject and the lessons taught by that teacher.

In another study looking at student perceptions of the teacher's interpersonal style, Van Tartwijk, Brekelmans and Wubbels (1998) wanted to know if where and how the teacher delivers instruction matters in the classroom. Thirty-three science and math teachers, along with one social science teacher from 12 Austrian schools in the Perth metropolitan area were involved in the study. The researcher's videotaped the teachers conducting a lesson to the whole class and videotaped a second lesson with the students
individually or in small groups. Using the Wubbels, Creton, Levy, and Hooymayers (1993), Influence and Proximity two dimensional communication systems are both sufficient and necessary to describe teacher behavior from an interpersonal perspective. Separate judges, who had previous experience with the Interpersonal Style Influence and Proximity dimensional system, were used to review the two different videotaped lessons. The judges’ results from the Influence and Proximity dimensional system show high student correlations in Influence and Proximity of the teacher’s interpersonal style when delivering information to the whole class from the front of the classroom (Van Tartwijk, Brekelmans & Wubbels, 1998, p. 614).

The Pennsylvania State University (PSU) publication called the Interpersonal Style Profile (Management Development Program Services, 2000), discusses the theory of Interpersonal Style:

Interpersonal Style is a behavior model that helps people better understand themselves and others. It refers to the consistent pattern of actions that a person uses when interacting with others and is a relatively stable behavior pattern in most people. There is no doubt that how people interact with others is influenced by personality, motives, and values. When looking at interpersonal style, however, the focus is on the behaviors and not underlying dynamics that predispose people to behave in one way as opposed to another. (Management Development Program Services, 2000, p.6)

Teachers who understand their interpersonal style are able to relate to different individuals personally and professionally in the classroom, as well as relationships with administration, colleagues, parents and the community.

According to the Pennsylvania State University (Management Development Program Services, 2000) publication, individuals are either part of the assertive dimension or expressive
dimension. A person can be a highly assertive or less assertive individual. A person can also be expressive or controlled (less expressive) (pp. 6-7). Individuals who move quickly, tell others what to do, opinionated, delegates effectively, decisive, and independent are more assertive individuals. Taking more of a back seat, good listener, supportive, sincere and loyal is the less assertive individual. A controlled individual keeps their feelings close, reflective, quiet, calm under pressure and accommodating. People who are energized, spontaneous, adventurous, friendly, looks at the broad picture, fun, loves to socialize and talks a lot are expressive individuals (Management Development Program Services, 2000, pp 6-7).

Therefore, based on these two different interpersonal style dimensions, and related to individual behaviors, an interpersonal style assessment has been created.

**Interpersonal Profiles**

There are four interpersonal styles and each is different. There is no one perfect style (Management Development Program Services, 2000, p.6). The following is an explanation of the interpersonal styles from the Management Development Program Services (2000) Interpersonal Style Profile booklet (pp. 8-17).

The driver has an interpersonal style that is action-oriented, aggressive, not patient, focused on achieving results, impulsive, decisive, fast, bad listener and impatient.

The energizer has an interpersonal style that is action-oriented, fun loving, talkative, not very organized, creative, not able to follow through, unfocused, overbearing and can be very overwhelming.

The harmonizer has an interpersonal style that is methodical, steady, comfortable, decisive after careful consideration, not a risk-taker, focused on people, build deep long-term relationships, dependable, supportive, cooperative and not really opinionated
Finally, the analyzer has an interpersonal style that is methodological, systematic, deliberate, keeps their feeling close, logical, common sense, factual, predictable, accurate, perfectionist, analytical and detail oriented.

The research involving interpersonal style is vast and most does not pertain to CTE but lessons can be learned from others. The problem is to determine the interpersonal styles of secondary CTE teachers and develop a training program to help them better understand their style and help improve instruction.

**Learning-Style**

In an article by Dunn, Honigsfield, Doolan, Bostrom, Russo, Schiering, Suh, and Tenedero (2009) about 30-years ago, St. John's University and the National Association of Secondary School Principals (NASSP) collaborated to investigate learning-style and the impact on student achievement. Over a five-year period, the group expanded into a network now known as the International Learning Styles Network (ILSN). Over the many years of research through their 30 centers on four continents, Dunn et al. (2009) states "teacher training must accomplish clear processes for differentiating instruction on the basis of learning-style so that each individual is taught effectively" (p. 139). This particular study and many others that have been conducted by the ILSN demonstrate validity, reliability and merit to the importance of learning-style.

Hermanussen, Wierstra, de Jong and Thijsen (2000), were interested in how learning-style relates to work experience. According to Hermanussen et al. (2000), "an important component of vocational education programs is the work experience component. In many countries vocational education contains both a school component and a field component" (p. 445). Since a specific learning-style assessment was not developed for their research they decided to modify Kolb's instrument. Hermanussen et al. (2000), in their article states:
Researchers and educators interested in on-the-job learning often resort to the experiential learning-style model of David Kolb (e.g. Kolb, 1984) and his followers, since this model is more geared to learning in practical setting, although claimed to be generally applicable. (Hermanussen et al., 2000, p. 447)

After researching and studying Kolb's (1984) work a new instrument had to be developed. Slaats (1999) as stated by Hermanussen et al. (2000), declares "further research might produce a more suitable questionnaire than Kolb's LSI for measuring learning-styles in practical settings" (p. 117). Therefore, the group decided to develop an instrument that would measure work-based learning. Ultimately they developed an instrument similar to the LSI but incorporated "four learning modes assumed by current experiential learning models". Hermanussen et al. (2000), "developed alternative items for each of the four modes, tailored to learning from work experience and using a systematic differential format" (Hermanussen et al., 2000, p.453). The group developed three learning-style clusters: (a) cluster 1 was focused on working with incidental learning; (b) cluster 2 was learning on the basis of external regulation; and (c) cluster 3 was self-regulated learning on the basis of theory and reflection (Hermanussen et al., 2000, pp. 464-465). Hermanussen et al. (2000), defined cluster 1 as the students were busy working but do not reflect or integrate any of the theory taught in class. Cluster 2 was defined as the students were busy but do reflect and relate some of the classroom theory to the practical activities. Finally, cluster 3 was defined as the students were busy and did incorporate the classroom theory into the practical activities. The following results were found:

- Immersion: Cluster 1 scores were significantly higher than clusters 2 and 3;
- Reflection: Cluster 1 scores significantly lower than the clusters 2 and 3.

Cluster 3 scores significantly higher than the clusters 1 and 2;
• Conceptualization: Cluster 1 scores significantly lower than clusters 2 and 3.
  Cluster 3 scores significantly higher than the clusters 1 and 2;
• Experimentation: Cluster 2 scores significantly lower than the clusters 1 and 3.
  Cluster 3 scores significantly higher than the clusters 1 and 2; and
• Regulation: Cluster 3 scores significantly higher than the clusters 1 and 2.
  Cluster 2 score significantly lower than the clusters 1 and 3.

Consequently, it appears that application and reflection using self-regulated learning from both the classroom theory and efficient work experience is the preferred learning-style.

Experiential Learning relates back to scholarly work most notably by John Dewey and many others. Kolb and Kolb (2005), define experiential learning theory as "the process whereby knowledge is created through the transformation of experience" (p. 194). Kolb and Kolb (2005), believe that Experiential Learning is designed around six concepts: (1) learning is a process; (2) all learning is relearning; (3) learning requires the resolution of conflict; (4) learning is holistic; (5) learning results from connecting new experiences with prior experiences; and (6) learning is the process of creating knowledge (p. 194). Kolb (1984), has also noticed that personality links to learning-styles in four major areas that he calls: (1) experience, (2) reflection, (3) application, and (4) abstraction. According to Kolb and Kolb (2005), and the LSI 3.1:

The purpose of the LSI was to provide learners with information about their preferred approach to learning. The most relevant information for the learner is about intra-individual differences, his or her relative preference for the four learning modes, not inter-individual comparisons. Ranking relative preferences among the four modes in a forced-choice format is the most direct way to provide this information. While individuals who take the inventory sometimes report difficulty in making these ranking
choices, they report that the feedback they get from the LSI gives more insight than had been the case when we used a normative Likert rating scale version. (Kolb & Kolb, 2005, p. 11)

What they have been able to determine is different interpersonal styles have different learning-styles. However, learning can begin with any of the four areas mentioned above but all four areas must be used in the development of the lesson or curriculum. Kolb’s four learning-styles: concrete experience, abstract conceptualization, reflective observation and active experimentation could be related to the Interpersonal Style Profile (Management Development Program Services, 2000) to help better understand how to build instruction that would affect all CTE teachers. According to Clark, Threeton, and Ewing (2010), "teacher education programs, especially in career and technical education and agricultural education, should continue or begin to, include instruction on the entire process of experiential learning… (p.58). They also mention the most often missed part in the experiential learning process, by CTE teachers, is reflection. Reflection is crucial to wrapping up all the components involved in the learning so the knowledge is transferred from the experience. Therefore, this research study will attempt to determine the learning-style distribution of secondary CTE teachers using the Kolb (2005) Learning-Style Inventory among the Pennsylvania Career and Technical Preparation programs.

**Chapter Summary**

It is the belief of the primary investigator, in general, that most CTE teachers have not been in the classroom since leaving high school; but yet, are being asked to relate technical program content and academic content to their secondary students. According to Thorton, Peltier, and Hill (2005), the teaching profession is very stressful and more stressful for a CTE educator. Most CTE teachers come to the teaching profession from industry lacking
educational pedagogy and the importance of developing trusting professional relationships with students. However, according to Gardner (1999), getting to know the students helps to cultivate an understanding of how they learn best, as well as Washor and Majkowski (2014) contend that if teachers took a little more time getting to know their student’s interests and talents, students would perform better. New teachers who understand their interpersonal style are able to relate to different individuals personally and professionally in the classroom, as well as relationships with students, administrators, colleagues, parents and the community (Thorton, Peltier, & Hill, 2005). The topic of learning-style and interpersonal style has received considerable attention in the past but the field of study still needs more research (Sims & Sims, 2006). This literature review focused on interpersonal style and learning-style of teachers, as well as student efficacy with the hope of being able to help CTE teachers; along with, their education preparation programs to leave an impression by placing a quality teacher in every classroom (Thorton, Peltier & Hill, 2005).
Chapter 3

Methodology

According to Thorton, Peltier and Hill (2005) the:

Teaching profession is a very stressful occupation and beginning teachers leave the profession at a rate far above the attrition rate experienced in private industry. This ongoing attrition of educators has a significant impact on efforts to place a quality teacher in every classroom.

Thus, an issue of paramount importance is how to increase the long-term success of new teachers. One approach would be to determine if personality profiles of teachers could be helpful in this regard. (Thorton, Peltier, & Hill, 2005, p. 489)

Thus, this research study concentrated on teachers’ interpersonal styles and teacher learning-styles. More specifically, this study examines what is the distribution (profiles) that exists between the teachers’ interpersonal style and their individual learning-style. Therefore, assuming a distribution exists between the teachers’ interpersonal style and the learning-style how will this knowledge be used to improve CTE teacher preparation programs? First, postsecondary teacher preparation programs may need to rethink and possibly retool how secondary CTE teachers are taught. Second, all new secondary CTE teachers may need to be assessed to determine their interpersonal style and learning-style. Third, faculty may need to be assessed to determine their interpersonal style and learning-style. And fourth, teacher education faculty may need to be trained to teach new CTE teachers how understanding their unique styles will be affecting their future classrooms someday. This study will seek to
provide additional awareness regarding how secondary CTE teachers can better serve the educational needs of their students.

The Participants

Since there is a deficiency of research regarding the relationship between interpersonal style and learning-style in CTE, this study examined the research questions through the broad lens of the 13 career clusters used in secondary western Pennsylvania CTE programs. The target population for this study were secondary CTE teachers from the Center for Career and Technical Personnel Preparation program located at Indiana University of Pennsylvania. Secondary CTE teachers in Pennsylvania are educated by three preparation programs located in the western, central and eastern regions of the state. Indiana University of Pennsylvania (IUP), Pennsylvania State University (PSU) and Temple University (TU) are charged with educating personnel who are hired at Career and Technology Centers from these respective regional areas. Therefore, this study was conducted demographically in the western region of Pennsylvania (see Figure 1).

Figure 1. County map of the western region of Pennsylvania.
Secondary western Pennsylvania CTE teachers qualified to participate in this study were categorized as: (1) newly hired emergency certificated teachers enrolled in the preparation program in the first year; (2) CTE teachers currently in their first three years of teaching, working towards the Vocational I certificate; (3) CTE teachers currently Vocational I certificated working towards the Vocational II certificate over an eight year time span to achieve permanent certification in Pennsylvania; and (4) CTE teachers holding permanent certification.

There are a total of 35 career and technical education (CTE) entities in the western region serviced by Indiana University of Pennsylvania (K. Rivosecchi, personal communication, October 17, 2016). Of those 35 entities, 29 are career and technology centers, three are part of large public school districts that offer CTE programs, one is a comprehensive special education school offering CTE programs, and two are reform or adjudicated youth schools. There are 15 different career clusters in career and technical education in Pennsylvania. Each career cluster represents certain programs and each program is identified by the Classification of Instructional Programs (CIP) code. The 13 utilized career clusters are as follows: (a) Agriculture, Food and Natural Resources; (b) Architecture and Construction; (c) Arts, AIV Technology and Communications; (d) Business Management and Administration; (e) Health Science; (f) Hospitality and Tourism; (g) Human Services; (h) Information Technology; (i) Law, Public Safety and Security; (j) Manufacturing; (k) Marketing, Sales and Service; (l) Science, Technology, Engineering and Mathematics; and (m) Transportation, Distribution and Logistics. In the western region of Pennsylvania, the 35 school entities use 13 of the 15 career clusters which consist of 55 different technical areas for a total of 450 programs.
In western Pennsylvania, during the spring semester of 2018, there were a total of 513 secondary CTE teachers eligible to participate in this study within the geographic area serviced by the Center for Career and Technical Personnel Preparation program at Indiana University of Pennsylvania. The following selection process was used to identify the target population:

1. The researcher reviewed the websites of all 35 CTE school entities in western Pennsylvania;
2. From the school entity websites reviewed a spreadsheet of all programs were recorded by CIP code, program name, teacher name and email address;
3. The Director or Superintendent of each school entity was emailed their list of possible participants from their school and asked to verify the information;
4. Upon information verification the data were tabulated.

Therefore, a total eligible population of 513 CTE teachers were invited to participate in the study from the Center for Career and Technical Personnel Preparation program at Indiana University of Pennsylvania.

**Research Questions**

This research study sought to answer the following questions by utilizing the Pennsylvania State University, Management Development Program Services, Interpersonal Style Profile and the Kolb’s Learning-Style Inventory as a base to determine:

1. What are the interpersonal style profiles of secondary western Pennsylvania Career and Technical Education teachers as determined by the Pennsylvania State University Interpersonal Style Profile assessment?
2. What are the learning-style inventory profiles of secondary western Pennsylvania Career and Technical Education teachers as determined by the Kolb Learning-Style Inventory Profile assessment?

3. What is the distribution (profiles) of secondary western Pennsylvania Career and Technical Education Teacher’s Interpersonal Style Profile and their Learning-Style Inventory Profile?

4. What is the distribution (profiles) between the secondary western Pennsylvania Career and Technical Education Teachers Interpersonal Style Profile and the program CIP Code?

**The Dependent Variable**

The dependent variable in this research study was the learning-style of the secondary western Pennsylvania Career and Technical Education teachers. Using the Experiential Learning Theory (ELT) model, Kolb and Kolb (2005) discuss the four different learning-styles used in the study. According to Kolb and Kolb (2005), the four learning-styles are: Diverging, Assimilating, Converging and Accommodating. The Diverging learner likes concrete situations from different points of view. This learner enjoys observation rather than taking action, has lots of ideas, prefers working in a group and enjoys brainstorming sessions (Kolb & Kolb, 2005). The Assimilating learner is very logical and concise regarding information. The person with this learning-style would rather work with ideas and concepts than people (Kolb & Kolb, 2005). The Converging learner is a problem solver and has the ability to make decisions based on technical tasks and data rather than deal with social or interpersonal issues (Kolb & Kolb, 2005). Finally, the Accommodating learner is impulsive, hands-on and intuitive. This learning-style needs to get things done, set goals, accomplish tasks and have deadlines (Kolb & Kolb, 2005).
Utilizing the Kolb Learning-Style Inventory (LSI) as the dependent variable, the objective was to determine the learning-style profiles of the study participants.

According to Kolb (2007), the Learning-Style Inventory (LSI) consists of twelve (12) sentences that describe learning. Each sentence has four (4) pre-determined endings. The study participants were asked to rank the endings of each pre-determined sentence according to how each ending describes their learning.

The directions asked for the study participants to write a four (4) next to the sentence ending which best or most describes their learning-style. Write a three (3) next to the sentence ending which better or more describes their learning-style. Write a two (2) next to the sentence ending which good or typically describes their learning-style. Finally, write a one (1) next to the sentence ending which worst or least describes their learning-style (Kolb, 2007). This inventory was designed to evaluate the teacher’s learning-style.

Each teacher was sent the LSI 3.1 assessment to complete. Permission was granted by the Korn Ferry Hay Group (November 29, 2016) to use the LSI 3.1 printed or paper version (see Appendix A). The primary investigator made the decision to use the LSI 3.1 paper version and not the LSI 4.0 electronic version since the level of the participant’s computer skills were not known. Consequently, to obtain better questionnaires results from the population, the questionnaires were mailed to each school. Directions were included and the results were collected and sent back to the primary investigator for analysis.

The Independent Variable

The independent variable in this research study was the interpersonal style of the secondary western Pennsylvania Career and Technical Education teachers. Using the Interpersonal Style Profile (Management Development Program Services, 2000) model, a short discussion of the four different interpersonal styles used in the study will follow:
(a) Drivers tend to be highly assertive and action oriented. They are controlled and tend to focus on tasks and results more so than on people and process. They trust facts and data more so than intuition and may concentrate on more time seeing that the job gets done than on developing relationships. Drivers are comfortable proceeding on a base of assumptions rather than verified facts and are sustained by the confidence they have the ability to respond quickly in complex, challenging situations; (b) Energizers tend to be highly assertive and action oriented. Energizers are expressive and tend to focus on people and idea-generating more so than tasks and results. They trust and use intuition more than facts and data and may concentrate more time developing relationships than on seeing the job gets done. They enjoy situations where there is a creative challenge, and prefer jumping into things quickly over planning and analysis. Energizers can operate quite comfortably on the basis of emotions or intuitions and prefer remaining open to possibilities over locking in on one result or course of action; (c) Harmonizers tend to think things through carefully before acting and prefer not to be highly assertive in expressing their ideas and preferences. They generally do not direct others, or impose their opinions on them, and may ask rather than tell when interacting with others. They are expressive and tend to focus on people and working in harmony more so than on tasks and results. They are dependable, and generally agreeable, willing contributors to team effort; and (d) Analyzers tend to think things through carefully before acting and prefer not to be highly assertive in expressing their ideas and preferences. They are controlled and tend to focus on tasks, results, and on effective process more so than on people. They trust facts and data more than intuition and concentrate more time on getting the job done correctly than on developing relationships. They help create an orderly
environment, where individuals can contribute their knowledge, skills and best thinking to ensure highest quality results. (pp. 8-14)

Using the Interpersonal Style Profile (Management Development Program Services, 2000), as the independent variable the overall purpose was to determine the teacher's interpersonal style. The 15 word forced-choice questionnaire using descriptive words to solicit two responses from each set would accumulate quantitative data results. This data was then used numerically and graphically to determine the teacher's interpersonal style. Each teacher was sent the Interpersonal Style Profile (Management Development Program Services, 2000) assessment to complete.

Instrumentation

There were two options considered when disseminating information to the group of research participants. The first option was to use the Internet and electronic mail. The second option was to use the U.S Postal Service and mail the information directly to the school entities. Since the uncertainty of participants to use an internet based questionnaire; along with, the participant's level of computer skills, availability to internet access and their willingness to participate, the second option was chosen.

This research study used a quantitative research methodology incorporating a census format to allow the primary investigator to acquire and record data from the CTE teacher's population in western Pennsylvania. The exact method chosen to examine the research questions were a paper-based participant questionnaire and two paper-based standardized instruments. Using the U.S. Postal Service for delivery of the data collection materials was the chosen option. By having all the survey information in front of the research participant, it may have improved data collection rates from the various school entities. Although nothing is
guaranteed to improve data collection; the primary investigator, believed this method of data collection may net better results.

The questionnaire method was to send the research instruments to the Director of the school asking them to distribute the information to the faculty member participants. When completed the research instruments were collected and returned to the primary investigator. The first paper based questionnaire was a participant survey, asking a series of questions regarding gender, age, ethnicity, education, certification, career cluster, years teaching, program area, years of work experience before entering education and percentage of students with disabilities in the program (see Appendix B).

**Interpersonal Style Profile (ISP).** Interpersonal style is the ability to understand yourself and others. According to Gardner (1999), teachers tend to teach the way they were taught; however, today's students do not necessarily learn the same way. Understanding this information means the teachers need to have multiple tools available in their tool box. One of those tools available is the interpersonal style of the teacher and their ability to transfer information into a meaningful multidimensional delivery style.

This instrument was selected because the study investigates the interpersonal style of secondary western Pennsylvania Career and Technical Education teachers. The ISP is a self-administered, self-scored and interpreted assessment. The research participant selected two words from 15 sets until all sets are complete for a total of 30 words. The words are then counted and totaled using a four letter code system with each individual letter having a total number. The total numbers from each letter are then plotted on a graph and lines are drawn between the points to show a visual representation of the teacher's interpersonal style (Management Development Program Services, 2000, pp. 4-5). The profile data and predominate quadrant were used to evaluate the teacher's interpersonal style (see Appendix C).
**Validity and Clarity for ISP.** The Interpersonal Style Profile (Management Development Program Services, 2000), has not been used as a research tool; however, it has been used many times according to Dr. Wesley E. Donahue, Professor of Education in the Workforce Education and Development Program at the Pennsylvania State University. During a telephone interview with Dr. Donahue (W.E. Donahue, personal communication, October 25, 2016), the researcher asked “how many times has the Interpersonal Style Profile (Management Development Program Services, 2000) been used in research and are there any research studies available for review?” According to Dr. Donahue (W.E. Donahue, personal communication, October 25, 2016) “the profile was not used in any research studies however, it has been used thousands of times in classes with students and would be appropriate for use in this exploratory research study.” The face and content validity, as well as clarity for this instrumentation has been evaluated by a panel of experts on pages 38-39.

**Learning-Style Inventory (LSI).** Experiential Learning relates back to scholarly work most notably by John Dewey and many others. Kolb and Kolb (2005), define experiential learning theory as "the process whereby knowledge is created through the transformation of experience" (p. 194). Kolb's work regarding the ELT has become very well known in the educational community. It was also selected for this study because it mirrors the same process used by the Interpersonal Style Profile.

The Learning-Style Inventory (LSI) is a self-administered, self-scored and an interpreted assessment. Utilizing the Kolb Learning-Style Inventory (LSI) (3.1 Version) the objective was to measure learning preference by rank ordering four different words from 12 different sets describing different abilities (Kolb, 2007). This inventory was designed to evaluate the teacher's learning-style (see Appendix D).
Validity and Reliability for LSI. Learning is made up of four basic phases. The purpose of the LSI is to take a person through those phases and help them determine how they learn (Kolb, 2007). The LSI model is designed to be simple, interesting and valuable information for an individual to understand how they learn best (Kolb & Kolb, 2005). According to Kolb and Kolb (2005), seven different studies have been conducted using the LSI 3.1 instrument showing good internal consistency using Cronbach's alpha coefficients and reliability to range from .56 to .84 throughout the different populations. Kolb and Kolb (2005), also had two additional studies conducted using test-retest reliability using the LSI 3.1 instrument. Veres et al. (1991), administered the LSI three times at 8 weeks apart to business students and then replicated the process. Test results found the test-retest correlations above .9 in all instances. Kappa coefficients identified very few students changed their learning-style type from first test to second test. However, Ruble and Stout (1991) gave the LSI twice to undergraduate and graduate business students and found test-retest reliabilities averaging from .54 on the LSI scales. A Kappa coefficient for this study was only .36 revealing that 47 percent of students changed their learning-style when retested. Ruble and Stout (1991), suggest there is no easy explanation to the difference in the studies, but the Kolb LSI model has stood the test of time as a valid and reliable instrument. As a result, the Kolb Experiential Learning Theory and Learning-Styles Inventory has been used by different academic areas including education, management, computer science, psychology, medicine, nursing, accounting and law. Education is the largest recipient of Kolb's work and has contributed to over 430 different studies (Kolb, 2005, Table 6, pg. 17).
Review of Procedure

The following panel of experts reviewed the framework of the research study and instrumentation for face and content validity and clarity and regarded it as appropriate for use in this exploratory study. The panel included the following:

- Dr. Mark D. Threeton: Associate Professor of Education in the Workforce Education and Development Program and the Associate Director of the Professional Personnel Development Center for Career and Technical Education at the Pennsylvania State University;
- Dr. Wesley E. Donahue: Professor of Education in the Workforce Education and Development Program at the Pennsylvania State University;
- Dr. Rose Baker: Assistant Professor in the Department of Learning Technologies at the University of North Texas; and
- Dr. Edgar Yoder: Professor Emeritus of Agriculture and Extension Education at the Pennsylvania State University.

Data Collection

The primary investigator collected the data during the spring of 2018 at 27 secondary career and technology centers, one out of three large public school districts that offer CTE programs responded to the questionnaires, the comprehensive special education school offering CTE programs did not participate and the two secondary adjudicated youth schools in western Pennsylvania did not participate. Therefore, a total of 28 CTE entities contributed to the study. The proper clearances were acquired from the Pennsylvania State University Office for Research Protections regarding the use of human subjects in this study (see Appendix E).

Starting in the spring of 2018, emails were sent from the primary investigator to each CTE Director within the Indiana University of Pennsylvania Center for Career and Technical
Personnel Preparation service area requesting their participation in the research study and informing them that research materials were mailed to their schools, marked to their attention.

The packets of information were mailed to 28 of the 35 career and technical education entities in the research project. Included in the packets were: (1) directions for the Career and Technology Center Director or his/her designee explaining how to conduct the questionnaires; (2) a teacher demographic questionnaire; (3) the Interpersonal Style Profile questionnaire; and (4) the Learning-Style Inventory Profile questionnaire.

Upon receipt of the research materials, the instructions for the Director were as follows. Enclosed are sealed pre-labeled program packets. It is the school Administrations prerogative to decide or select who will distribute and collect the packets. Once that decision has been completed, please follow the steps below:

1. Select a date one week from the time packets were delivered to the program;
2. Please let the participant know to return their sealed packet back to Administration by the predetermined date;
3. Deliver the sealed packet of information to the program listed;
4. Once the faculty member is finished with their research study packet, they will be instructed to return the sealed packet back to the administration; and
5. When all packets are received, please check that all were returned. Enclosed is a checklist for your convenience. Place them in the prepaid envelope or box and return to the researcher.

After receiving all the data from the career and technical education entities, the primary investigator contacted all the participants and the Directors thanking them for their time and contribution to Career and Technical Education.
Analysis of Data

The data collected from the secondary CTE teacher demographic questionnaire were analyzed using measures of central tendency, frequency, percentages and variability. This information allows better understanding of gender, age, ethnicity, level of education, level of certification, career cluster area, years teaching, program area, years of work/trade experience, the percentage of students with disabilities in the program and if any comparisons can be determined related to interpersonal style and learning-style.

The first research question was answered by determining the interpersonal styles profiles of the secondary CTE teachers in western Pennsylvania. The data were analyzed from the Interpersonal Style Profile (Management Development Program Services, 2000) Inventory. Calculating the scores from the inventory and then plotting the data in the Interpersonal Style Profile grid determines the individual's interpersonal style. Using measures of central tendency, frequency, percentages and variability, as well as additional information can be extrapolated to determine the number and frequency of secondary CTE teacher interpersonal styles, the percentages of interpersonal styles and determine which interpersonal style from these participants appears to be most common.

The second research question was answered by determining the learning-style of the secondary CTE teachers in western Pennsylvania. The data were analyzed from the Kolb (2007) Learning-Style Inventory collect from the paper inventory. Calculating the scores from the inventory and then plotting the data in the LSI grid determines the individual's learning-style. Using measures of central tendency, frequency, percentages and variability, as well as additional information can be extrapolated to determine the number and frequency of secondary CTE teacher learning-styles, the percentages of learning-styles and determine which learning-style from these participants appears to be most common.
The third research question was to identify the distribution (profiles) between secondary CTE teachers in western Pennsylvania and their interpersonal style and learning-style profiles. The primary investigator reviewed and used basic descriptive statistics to analyze the Interpersonal Style Profile and the Learning-Style Inventory data results.

The fourth research question was to identify the distribution (profiles) between secondary CTE teachers in western Pennsylvania, their Interpersonal Style Profile and the program CIP code. This question was answered by analyzing the Interpersonal Style Profile by each individual program CIP code. The Statistical Package for the Social Sciences (SPSS) was used to analyze the data. The results are reported in chapter four.

**Chapter Summary**

The target participants for this study were secondary CTE teachers from the Center for Career and Technical Personnel Preparation program located at Indiana University of Pennsylvania. CTE teachers in Pennsylvania are educated by three preparation programs located in the western, central and eastern regions of the state. Indiana University of Pennsylvania (IUP), the Pennsylvania State University (PSU) and the Temple University (TU) are charged with educating personnel who are hired at Career and Technology Centers from those regional areas respectively.

Therefore, as outlined in chapters 1, 2 and 3, this study was conducted demographically in the western region of Pennsylvania and focused on interpersonal styles and learning-styles of teachers. The aspiration from this research is to help secondary CTE teachers; along with, the education preparation programs position an exemplary teacher in every classroom (Thorton, Peltier & Hill, 2005).
Chapter 4

Analysis of Data

The purpose of this quantitative research study was to explore the distribution (profiles) of interpersonal styles and learning-styles of secondary Career and Technical Education (CTE) teachers from western Pennsylvania. The following questions were developed to address the research:

1. What are the interpersonal style profiles of secondary western Pennsylvania Career and Technical Education Teachers as determined by the Penn State Interpersonal Style Profile assessment?
2. What are the learning-style inventory profiles of secondary western Pennsylvania Career and Technical Education Teachers as determined by the Kolb Learning-Style Inventory Profile assessment?
3. What is the distribution (profiles) of secondary western Pennsylvania Career and Technical Education Teacher’s Interpersonal Style Profile and their Learning-Style Inventory Profile?
4. What is the distribution (profiles) between the secondary western Pennsylvania Career and Technical Education Teachers Interpersonal Style Profile and the program CIP code?

Three questionnaires were distributed which provided data to address the questions proposed by the study which included: (1) a participant demographic questionnaire; (2) the Interpersonal Style Profile (Management Development Program Services, 2000); and (3) the Kolb Learning-Style Inventory (2007). The data in this chapter is presented in eight sections. The sections include: (1) the demographic data of the participants; (2) the Interpersonal Style Profile results; (3) the Kolb Learning-Style Inventory results; (4) the distribution (profiles)
between the Interpersonal Style Profile and the Kolb Learning-Style Inventory; (5) the Interpersonal Style Profiles of secondary western Pennsylvania Career and Technical Education teachers; (6) the Learning-Style Inventory Profiles of secondary western Pennsylvania Career and Technical Education teachers; (7) the distribution (profiles) between the secondary western Pennsylvania Career and Technical Education teacher’s Interpersonal Style Profile and their Learning-Style Inventory Profile; and (8) the distribution (profiles) between the secondary western Pennsylvania Career and Technical Education teachers Interpersonal Style Profile and the program CIP codes. The Statistical Package for the Social Sciences (SPSS) was used to analyze the data.

Demographic Data

Rate of return. In western Pennsylvania, during the spring semester of 2018, there were a total of 513 CTE teachers from 35 school entities involved in this study. Of the 35 school entities involved 28 school entities responded by having faculty take part in the questionnaires for an institutional response rate of 80%. Therefore, from the data collected at the 28 school entities a total of 453 teachers responded out of a possible 513 participants for a participants’ response rate of 88%; however, a small minority of participants did not respond to all items in each questionnaire. Approximately 129 participants did not respond, to all or part of, the demographic questionnaire; approximately 155 participants did not respond, to all or part of, the Interpersonal Style Profile questionnaire; and approximately 154 participants did not respond, to all or part of, the Learning-Style Inventory Profile questionnaire establishing a usable response rate of 66%.

In the State of Pennsylvania, Career and Technical Education (CTE) programs of study (POS) are categorized by using the Classification of Instructional Programs (CIP) code. The National Center for Educational Statistics (NCES, 2018) explains the Classification of Instructional Programs as:
The purpose of the Classification of Instructional Programs (CIP) is to provide a taxonomic scheme that will support the accurate tracking, assessment and reporting of fields of study and program completion activity. CIP was originally developed by the U.S. Department of Education’s National Center for Education Statistics (NCES) in 1980, with revisions occurring in 1985 and 1990. The 2000 edition (CIP-2000) is the third revision of the taxonomy and presents an updated taxonomy of instructional program classifications and descriptions. (NCES, 2018, p.1)

Programs of study can be titled differently depending upon the school but must follow the CIP code regulation for consistency of data and certification. Therefore, CIP codes will be used to express program data throughout this chapter.

The Pennsylvania Department of Education (2018) has a total of 81 CIP codes currently available to identify CTE programs of study. Of the 81 CIP codes available in Pennsylvania, for this study, the school entities in western Pennsylvania recognized and use 55 or 68% of the CIP codes.

**Total CIP codes and programs.** Data collected from the 28 school entities determined that a total of 406 CIP codes are being used to identify CTE programs in western Pennsylvania. Of those CIP Codes 286 or 70% are taught by male teachers and 120 or 30% are taught by female teachers. Some school entities have multiple programs of study that use the same CIP code. An example would be a school has three automotive programs of study with the same CIP code of 47.0604. This program of study would be counted once for the CIP code and three times for the number of programs. Consequently, there are a total of 450 programs of study in western Pennsylvania being taught by 306 or 68% of male teachers and 144 or 32% being taught by female teachers (see Table 1).
Table 1

<table>
<thead>
<tr>
<th>Category</th>
<th>Male Teachers (%)</th>
<th>Female Teachers (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIP Codes</td>
<td>286 (70)</td>
<td>120 (30)</td>
<td>406 (100)</td>
</tr>
<tr>
<td>Programs</td>
<td>306 (68)</td>
<td>144 (32)</td>
<td>450 (100)</td>
</tr>
</tbody>
</table>

**Gender of participants.** In the first demographic question, participants were asked to identify their gender. Of the 313 participants, two hundred six or 66% were male while 107 or 34% were female (see Table 2).

Table 2

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>206</td>
<td>66</td>
</tr>
<tr>
<td>Female</td>
<td>107</td>
<td>34</td>
</tr>
</tbody>
</table>

**Age of participants.** In the second demographic question, participants were asked to identify their age. Of the participants responding: (a) four percent reported being between 18 and 28 years of age; (b) twenty-three percent reported being between 29 and 39 years of age; (c) thirty-seven percent reported being between 40 and 50 years of age; (d) thirty percent reported being between 51 and 61 years of age; and (e) six percent reported being between 62 and 72 years of age (see Table 3).

Table 3

<table>
<thead>
<tr>
<th>Age</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 – 28 yrs.</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>29 – 39 yrs.</td>
<td>71</td>
<td>23</td>
</tr>
<tr>
<td>40 – 50 yrs.</td>
<td>117</td>
<td>37</td>
</tr>
<tr>
<td>51 – 61 yrs.</td>
<td>94</td>
<td>30</td>
</tr>
<tr>
<td>62 – 72 yrs.</td>
<td>20</td>
<td>6</td>
</tr>
</tbody>
</table>
Ethnicity of participants. In the third demographic question, participants were asked to identify their ethnicity. Of the 329 participants responding 325 or 99.9% were white while 3 or <.1% were Black or African American and 1 or <.1% were Hispanic or Latino (see Table 4).

Table 4
Ethnicity of Participants (N=329)

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Indian / Alaska Native</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Asian</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Black / African American</td>
<td>3</td>
<td>&lt; 0.1</td>
</tr>
<tr>
<td>Hispanic / Latino</td>
<td>1</td>
<td>&lt; 0.1</td>
</tr>
<tr>
<td>Native Hawaiian / Pacific Islander</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>White</td>
<td>325</td>
<td>99.9</td>
</tr>
</tbody>
</table>

Highest level of education. In the fourth demographic question, participants were asked to identify their highest level of education. Of the participants responding: (a) forty-four or 14% completed high school; (b) seventeen or 5% completed a 2-year trade school; (c) seventy-seven or 24% completed an associate degree; (d) twenty-three or 7% completed a 4-year apprenticeship program; (e) one hundred eight or 33% completed a bachelor degree; (f) fifty-five or 17% completed a master degree; and (g) two or <.1% completed a doctoral degree (see Table 5).

Table 5
Participants Highest Level of Education (N=326)

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>44</td>
<td>14</td>
</tr>
<tr>
<td>2-Year Trade School</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>77</td>
<td>24</td>
</tr>
<tr>
<td>4-Year Apprenticeship Program</td>
<td>23</td>
<td>7</td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>108</td>
<td>33</td>
</tr>
<tr>
<td>Master Degree</td>
<td>55</td>
<td>17</td>
</tr>
<tr>
<td>Doctorate Degree</td>
<td>2</td>
<td>&lt;0.1</td>
</tr>
</tbody>
</table>
**Level of certification.** In the fifth demographic question, participants were asked to identify their level of certification. Of the participants responding: (a) thirty-two or 10% were on an emergency certificate; (b) one hundred twenty-four or 38% were on a Vocational I / Instructional I certificate; and (c) one hundred seventy-two or 52% were on a Vocational II / Instructional II or permanent certification (see Table 6).

<table>
<thead>
<tr>
<th>Certification</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>32</td>
<td>10</td>
</tr>
<tr>
<td>Vocational I / Instructional I</td>
<td>124</td>
<td>38</td>
</tr>
<tr>
<td>Vocational II / Instructional II</td>
<td>172</td>
<td>52</td>
</tr>
</tbody>
</table>

**Career (pathway) cluster.** In the sixth demographic question, participants were asked to identify their career (pathway) cluster. Of the participants responding: (a) seven or 2% represent the Agriculture, Food and Natural Resources career cluster; (b) fifty-five or 17% represent the Architecture and Construction career cluster; (c) seventeen or 5% represent the Arts, A/V, Technology and Communication career cluster; (d) three or <0.1% represent the Business Management and Administration career cluster; (e) forty-two or 13% represent the Health Science career cluster; (f) twenty-seven or 8% represent the Hospitality and Tourism career cluster; (g) thirty-five or 11% represent the Human Service career cluster; (h) twenty-six or 8% represent the Information Technology career cluster; (i) thirteen or 4% represent the Law, Public Safety and Security career cluster; (j) fifty or 15% represent the Manufacturing career cluster; (k) two or <0.1 represent the Marketing, Sales and Service career cluster; (l) four or 1% represent the Science, Technology, Engineering and Mathematics; and (m) forty-nine or 15% represent the Transportation, Distribution and Logistics career cluster (see Table 7).
Table 7
Career (Pathway) Cluster of Participants (N=330)

<table>
<thead>
<tr>
<th>Career (Pathway)</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, Food, Natural Resources</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Architecture and Construction</td>
<td>55</td>
<td>17</td>
</tr>
<tr>
<td>Arts, A/V, Technology and Communication</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>Business Management and Administration</td>
<td>3</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Health Science</td>
<td>42</td>
<td>13</td>
</tr>
<tr>
<td>Hospitality and Tourism</td>
<td>27</td>
<td>8</td>
</tr>
<tr>
<td>Human Services</td>
<td>35</td>
<td>11</td>
</tr>
<tr>
<td>Information Technology</td>
<td>26</td>
<td>8</td>
</tr>
<tr>
<td>Law, Public Safety and Security</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>50</td>
<td>15</td>
</tr>
<tr>
<td>Marketing, Sales and Service</td>
<td>2</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Science, Technology, Engineering and Mathematics</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Transportation, Distribution and Logistics</td>
<td>49</td>
<td>15</td>
</tr>
</tbody>
</table>

*Years of teaching.* In the seventh demographic question, participants were asked to identify how many years they have taught. Of the participants responding: (a) sixty-three or 19% had 0-3 years of teaching experience; (b) ninety-eight or 30% had 4-10 years of teaching experience; (c) one hundred four or 32% had 11-20 years of teaching experience; (d) fifty or 15% had 21-30 years of teaching experience; and (e) eleven or 4% had 31-40 years of teaching experience (see Table 8).

Table 8
Years of Teaching by Participants (N=326)

<table>
<thead>
<tr>
<th>Years of Teaching</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3</td>
<td>63</td>
<td>19</td>
</tr>
<tr>
<td>4-10</td>
<td>98</td>
<td>30</td>
</tr>
<tr>
<td>11-20</td>
<td>104</td>
<td>32</td>
</tr>
<tr>
<td>21-30</td>
<td>50</td>
<td>15</td>
</tr>
<tr>
<td>31-40</td>
<td>11</td>
<td>4</td>
</tr>
</tbody>
</table>
Program area. In the eighth demographic question, participants were asked to identify their program area. Of the participants responding: (a) two hundred eighteen or 66% were male while 112 or 34% were female (see Table 9).

Table 9
Program Area by CIP Code by Participants (N=330)

<table>
<thead>
<tr>
<th>Program CIP Code and Title</th>
<th>Male Participant</th>
<th>Female Participant</th>
<th>Total CIP Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.0301 Agricultural Production Operations</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>01.0601 Applied Horticulture/Horticulture Operations</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>03.0511 Forestry Technology/Technician</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>09.0702 Digital Communications and Media/Multimedia</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>10.0399 Graphic Communications</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>10.9999 Communications Techs and Support Service</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>11.0201 Computer Programming/Programmer</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>11.0801 Web Page, Digital/Multimedia and Information Resources</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>11.0901 Computer Systems Networking and Telecommunications</td>
<td>10</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>12.0401 Cosmetology/Cosmetologist</td>
<td>1</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>12.0501 Baking and Pastry Arts/Baker/Pastry Chef</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12.0508 Institutional Food Workers</td>
<td>14</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>15.0303 Electrical, Electronic and Communication Engineering Tech</td>
<td>6</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>15.0399 Electrical and Electronic Engineering Technologies</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>15.1202 Computer Technology/Computer Systems Technology</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>15.1301 Drafting and Design Technology/Technician</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>15.9999 Engineering Technologies/Technicians</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>19.0708 Child Care and Support Services Management</td>
<td>7</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>26.1201 Biotechnology</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>32.0105 Job Seeking/Changing Skills (Diversified Occupations)</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>43.0107 Criminal Justice/Police Science</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>43.9999 Protective Services, Law Enforcement and Firefighting</td>
<td>10</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Sub Total</td>
<td>66</td>
<td>59</td>
<td>125</td>
</tr>
<tr>
<td>Program CIP Code and Title</td>
<td>Male Participant</td>
<td>Female Participant</td>
<td>Total CIP Code</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>------------------</td>
<td>--------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>46.0101 Mason/Masonry</td>
<td>9</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>46.0201 Carpentry/Carpenter</td>
<td>12</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>46.0303 Linework</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>46.0399 Electrical Power and Transmission Installers</td>
<td>8</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>46.0401 Building/Property Maintenance and Manager</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>46.0408 Painting/Painter and Wall Coverer</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>46.0503 Plumbing Technology/Plumber</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>46.0504 Well Drilling/Driller</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>46.9999 Construction Trades</td>
<td>11</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>47.0201 HVACR Technology/Technician</td>
<td>7</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>47.0603 Autobody/Collision and Repair</td>
<td>15</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>47.0604 Automobile/Automotive Mechanics Technology/Technician</td>
<td>24</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>47.0613 Medium/Heavy Vehicle and Truck Technician</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>47.0699 Vehicle Maintenance and Repair Technologies</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>48.0501 Machine Tool Technology/Machinist</td>
<td>16</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>48.0508 Welding Technology/Welder</td>
<td>18</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>48.0599 Precision Metal Working</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>48.0703 Cabinetmaking and Millwork/Millwright</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>48.9999 Precision Production</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>49.0202 Construction/Heavy Equipment/Earthmoving Equipment</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>50.0402 Commercial and Advertising Art</td>
<td>4</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>51.0601 Dental Assisting/Assistant</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>51.0808 Veterinary/Animal Health Technology/Veterinary Assistant</td>
<td>5</td>
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<td></td>
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<tr>
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<td>23</td>
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<td>51.2604 Rehabilitation Aide</td>
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<tr>
<td>51.9999 Health Professions and Related Clinical Sciences</td>
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<td>1</td>
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<tr>
<td>52.0302 Accounting Technology/Technician and Bookkeeping</td>
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<td>1</td>
<td></td>
</tr>
<tr>
<td>52.0401 Administrative Assistant and Secretarial Science</td>
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<td>1</td>
<td></td>
</tr>
<tr>
<td>52.0701 Entrepreneurship/Entrepreneurial Studies</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>52.1201 Management Information Systems</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>52.1801 Sales, Distribution and Marketing Operations</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

| Sub Total                                                     | 152              | 53                 | 205            |
| Total (%)                                                     | 218 (66)         | 112 (34)           | 330            |

**Years of work or trade experience.** In the ninth demographic question, participants were asked to identify their years of work or trade experience they had before entering Career and
Technical Education (CTE). Of the participants responding: (a) forty-three or 13% had 0-5 years’ work or trade experience; (b) eighty-seven or 27% had 6-10 years’ work or trade experience; (c) seventy-seven or 23% had 11-15 years’ work or trade experience; (d) fifty-two or 16% had 16-20 years’ work or trade experience; and (e) sixty-nine or 21% had 21-30 years’ work or trade experience (see Table 10).

Table 10

<table>
<thead>
<tr>
<th>Years of Work/Trade Experience</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>43</td>
<td>13</td>
</tr>
<tr>
<td>6-10</td>
<td>87</td>
<td>27</td>
</tr>
<tr>
<td>11-15</td>
<td>77</td>
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</tr>
<tr>
<td>21-30</td>
<td>69</td>
<td>21</td>
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</tbody>
</table>

Interpersonal Style Profile

According to the Pennsylvania State University (PSU) publication called the Interpersonal Style Profile (Management Development Program Services, 2000) discusses the theory of Interpersonal Style.

Interpersonal Style is a behavior model that helps people better understand themselves and others. It refers to the consistent pattern of actions that a person uses when interacting with others and is a relatively stable behavior pattern in most people. There is no doubt that how people interact with others is influenced by personality, motives, and values. When looking at interpersonal style, however, the focus is on the behaviors and not underlying dynamics that predispose people to behave in one way as opposed to another. (Management Development Program Services, 2000, p.6)

Teachers who understand their interpersonal style may better relate to different individuals personally and professionally in the classroom, as well as relationships with administration,
colleagues, parents and the community (Management Development Program Services, 2000).

This section will review the data collected from secondary CTE teachers in western Pennsylvania who participated in the Interpersonal Style Profile questionnaire during the spring of 2018. The data will be disaggregated by male teachers, female teachers and then total teachers.

**Participants.** From the data collected at 28 school entities, a total of 453 participants responded to the questionnaires. The Interpersonal Style Profile collected 298 responses from the 453 participants for a total response rate of 66%. Of those 298 responses 194 (65%) were male participants and 104 (35%) were female participants.

**Male participants.** Of the 194 male participants responding to the Interpersonal Style Profile questionnaire the following data were collected: (1) forty-three or 22% of male participants have a Analyzer Interpersonal Style; (2) fifty-five or 29% of male participants have a Driver Interpersonal Style; (3) forty-seven or 24% of male participants have a Energizer Interpersonal Style; and (4) forty-nine or 25% of male participants have a Harmonizer Interpersonal Style (see Figure 2).

![Figure 2. Summary of Interpersonal Style Profiles of male participants.](image)
**Female participants.** Of the 104 female participants responding to the Interpersonal Style Profile questionnaire the following data were collected: (1) eighteen or 17% of female participants have a Analyzer Interpersonal Style; (2) sixteen or 15% of female participants have a Driver Interpersonal Style Profile; (3) thirty-three or 32% of female participants have a Energizer Interpersonal Style Profile; and (4) thirty-seven or 36% of female participants have a Harmonizer Interpersonal Style Profile (see Figure 3).

![Interpersonal Style Profile of Female Participants](image)

*Figure 3.* Summary of Interpersonal Style Profile of female participants.

**Total participants.** Of the 298 total participants responding to the Interpersonal Style Profile questionnaire the following data were collected: (1) sixty-one or 20% of total participants have an Analyzer Interpersonal Style Profile; (2) seventy-one or 24% of total participants have a Driver Interpersonal Style Profile; (3) eighty or 27% of total participants have an Energizer Interpersonal Style Profile; and (4) eighty-six or 29% of total participants have a Harmonizer Interpersonal Style Profile (see Figure 4).
Learning-Style Inventory

Utilizing the Kolb Learning-Style Inventory (LSI) the objective was to measure strengths and weaknesses by rank ordering four different words from 12 different sets describing different abilities (Kolb, 2007). This inventory was designed to evaluate the teacher's learning-style.

Each teacher was sent the LSI 3.1 assessment to complete. Permission was granted by the Korn Ferry Hay Group to use the LSI 3.1 printed or paper version. It was the decision of the researcher to use the LSI 3.1 paper version and not the LSI 4.0 electronic version. Not knowing the level of the research study group’s computer skills and to obtain better survey results from the population, the surveys were mailed to each school. Directions were included and the results were collected and sent back to the researcher.

This section will review the data collected from secondary CTE teachers in western Pennsylvania who participated in the Learning-Style Inventory questionnaire in the spring of 2018. The data will be disaggregated by male teachers, female teachers and then total teachers.

Participants. From the data collected at 28 school entities, a total of 453 participants responded to the questionnaires. The Learning-Style Inventory collected 299 responses from...
the 453 participants for a total response rate of 66%. Of those 299 responses 197 (66%) were male participants and 102 (34%) were female participants.

**Male participants.** Of the 197 male participants responding to the Learning-Style Inventory questionnaire the following data were collected: (1) sixty or 30% of male participants have an Assimilating Learning-Style Inventory; (2) sixty-two or 32% of male participants have a Converging Learning-Style Inventory; (3) forty-seven or 24% of male participants have an Accommodating Learning-Style Inventory; and (4) twenty-eight or 14% of male participants have a Diverging Learning-Style Inventory (see Figure 5).

![Bar chart](image)

**Figure 5.** Summary of the Learning-Style Inventory of male participants.

**Female participants.** Of the 102 female participants responding to the Learning-Style Inventory questionnaire the following data were collected: (1) thirty-four or 33% of female participants have an Assimilating Learning-Style Inventory; (2) eighteen or 18% of female participants have a Converging Learning-Style Inventory; (3) thirty-two or 31% of female participants have an Accommodating Learning-Style Inventory; and (4) eighteen or 18% of female participants have a Diverging Learning-Style Inventory (see Figure 6).
Total participants. Of the 299 total participants responding to the Learning-Style Inventory questionnaire the following data were collected: (1) ninety-four or 31% of total participants have an Assimilating Learning-Style Inventory; (2) eighty or 27% of total participants have a Converging Learning-Style Inventory; (3) seventy-nine or 26% of total participants have an Accommodating Learning-Style Inventory; and (4) forty-six or 16% of total participants have a Diverging Learning-Style Inventory (see Figure 7).
Summary of All Participants by Interpersonal Style Profile and Learning-Style Inventory

Summarizing the total males (see Figure 2) and females (see Figure 3) Interpersonal Style Profile participants by each category and the total males (see Figure 5) and females (see Figure 6) Learning-Style Inventory Profile participants by each category represents the following conclusions: (1) sixty-one or 20% have an Analyzer Interpersonal Style Profile and ninety-four or 31% have an Assimilating Learning-Style Inventory; (2) seventy-one or 24% have a Driver Interpersonal Style Profile and seventy-nine or 26% have a Converging Learning-Style Inventory; (3) eighty or 27% have a Energizer Interpersonal Style Profile and seventy-nine or 26% have an Accommodating Learning-Style Inventory; and (4) eighty-six or 29% have a Harmonizer Interpersonal Style Profile and forty-six or 16% have a Diverging Learning-Style Inventory (see Figure 8).

Figure 8. Summary of all Interpersonal Style Profile and Learning-Style Inventory participants.
Interpersonal Style Profiles of Secondary Western Pennsylvania Career and Technical Education Teachers

Research question 1. What were the Interpersonal Style Profiles of secondary western Pennsylvania Career and Technical Education Teachers as determined by the Interpersonal Style Profile assessment? The first research question was answered by calculating the percentages collected from the Interpersonal Style Profile questionnaire. After calculating the results, the following data were determined: (1) sixty-one or 20% of total participants have an Analyzer Interpersonal Style Profile; (2) seventy-one or 24% of total participants have a Driver Interpersonal Style Profile; (3) eighty or 27% of total participants have an Energizer Interpersonal Style Profile; and (4) eighty-six or 29% of total participants have a Harmonizer Interpersonal Style Profile. Therefore, the Harmonizer category was the most predominant Interpersonal Style Profile, while the Energizer category was the second most predominant Interpersonal Style Profile and the Driver category was the third most predominant Interpersonal Style Profile. Finally, the Analyzer category was the least predominant Interpersonal Style Profile of the secondary western Pennsylvania Career and Technical Education teachers who participated in the research study.

Learning-Style Inventory Profiles of Secondary Western Pennsylvania Career and Technical Education Teachers

Research question 2. What were the Learning-Style Inventory Profiles of secondary western Pennsylvania Career and Technical Education teachers as determined by the Kolb Learning-Style Inventory Profile assessment? The second research question was answered by calculating the percentages collected from the Learning-Style Inventory questionnaire. After calculating the results, the following were determined: (1) ninety-four or 31% of total participants have an Assimilating Learning-Style Inventory; (2) eighty or 27% of total participants have a Converging Learning-Style Inventory; (3) seventy-nine or 26% of total
participants have an Accommodating Learning-Style Inventory; and (4) forty-six or 16% of total participants have a Diverging Learning-Style Inventory. Therefore, the Assimilating category was the most predominant Learning-Style Inventory Profile, while the Converging category was the second most predominant Learning-Style Inventory Profile and the Accommodating category was the third most predominant Learning-Style Inventory Profile. Finally, the Diverging category was the least predominant Learning-Style Inventory Profile of the secondary western Pennsylvania Career and Technical Education teachers who participated in the research study.

What is the Distribution (Profiles) of Secondary Western Pennsylvania Career and Technical Education Teacher’s Interpersonal Style and Learning-Style Inventory Profiles?

Research question 3. What is the distribution (profiles) between the secondary western Pennsylvania Career and Technical Education Teacher’s Interpersonal Style Profile and their Learning-Style Inventory Profile? The third research question sought to determine if there was a distribution (profiles) between the Interpersonal Style (IPS) Profile and the Learning-Style Inventory (LSI) Profile. The (IPS) and the (LSI) Profile identified that a distribution (profiles) does exist for secondary western Pennsylvania Career and Technical Education teachers. The most closely connected distribution (profiles) exists between the 80 (27%) of IPS Energizers and 79 (26%) of LSI Accommodating participants signifying an informal connection, with only a difference of 1%, between the two profiles. The second most closely connected distribution (profiles) exists between the 71 (24%) of IPS Drivers and 79 (26%) of LSI Converging participants signifying an informal connection, with only a difference of 2%, between the two profiles. The third distribution (profiles) between the 61 (20%) of IPS Analyzers and 94 (31%) of LSI Assimilating participants does not signify a connection, with a difference of 11%, between the two profiles. Finally, the fourth
distribution (profiles) between the 86 (29%) of IPS Harmonizers and 46 (16%) of LSI Diverging participants does not signify a connection, with a difference of 13%, between the two profiles (see Figure 7). Therefore, the most closely connected distribution (profiles) does exist between the Energizer Interpersonal Style and the Accommodating Learning-Style Inventory, as well as the Driver Interpersonal Style and the Converging Learning-Style Inventory for secondary western Pennsylvania Career and Technical Education teachers in western Pennsylvania during the spring of 2018.

**What is the Distribution (Profiles) Between the Secondary Western Pennsylvania Career and Technical Education Teachers Interpersonal Style Profile and the Program CIP code?**

**Research question 4.** What is the distribution (profiles) between the secondary western Pennsylvania Career and Technical Education Teachers Interpersonal Style Profile and the program CIP code? The fourth question sought to determine if there was a distribution (profiles) between the secondary western Pennsylvania Career and Technical Educations Teachers Interpersonal Style Profile (ISP) and the program CIP code.

In the State of Pennsylvania, Career and Technical Education (CTE) programs of study (POS) are categorized by using the Classification of Instructional Program (CIP) codes. Programs of study can be title differently depending upon the school but must follow the CIP code regulation for consistency of data and certification. Therefore, CIP codes will be used to express program data throughout this chapter.

Data collected from the 28 school entities determined that a total of 406 CIP codes are being used to identify CTE programs in western Pennsylvania. Of those CIP Codes 286 or 70% are taught by male teachers and 120 or 30% are taught by female teachers. Some school entities have multiple programs of study that use the same CIP code. An example would be a school has three automotive programs of study with the same CIP code of 47.0604. This program of study
would be counted once for the CIP code and three times for the number of programs. Consequently, there are a total of 450 programs of study in western Pennsylvania being taught by 306 or 68% of male teachers and 144 or 32% being taught by female teachers.

In western Pennsylvania during the spring of 2018 the following male Interpersonal Style Profiles (ISP) that specifically established a distribution (profiles) between the teacher’s Interpersonal Style and program CIP code were: (1) from the Architecture and Construction Cluster; (a) 46.0101, Mason/Masonry; (b) 46.9999, Construction Trades, Other; (c) 47.0201, Heating, Air-Conditioning, Ventilation and Refrigeration Maintenance Technology/ Technician; (2) from the Hospitality and Tourism Cluster; (d) 12.0508, Institutional Food Workers; (3) from the Law, Public Safety and Security Cluster; (e) 43.9999, Homeland Security, Law Enforcement, Firefighting and Protective Services; and (4) finally from the Manufacturing Cluster; (f) 48.0501, Machine Tool Technology/Machinist; and (g) 48.0508, Welding Technology/Welder.

*Architecture and construction cluster male participants.* The Mason/Masonry, CIP Code 46.0101, had a total of nine male participants: (1) four or 44% of Mason/Masonry participants had an Analyzer Interpersonal Style Profile; (2) two or 22% of Mason/Masonry participants had a Driver Interpersonal Style Profile; (3) two or 22% of Mason/Masonry participants had a Harmonizer Interpersonal Style Profile; and (4) one or 12% of Mason/Masonry participants had an Energizer Interpersonal Style Profile.

The Construction Trades, Other, CIP Code 46.9999, had a total of ten male participants: (1) five or 50% of Construction Trades, Other participants had a Driver Interpersonal Style Profile; (2) four or 40% Construction Trades, Other participants had a Harmonizer Interpersonal Style; and (3) one or 10% of Construction Trades, Other participants had an Analyzer Interpersonal Style Profile.

The Heating, Air-Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician, (HVAC Technology/Technician), CIP Code 47.0201, had a total of
seven male participants: (1) five or 72% of HVAC Technology/Technician participants had a Driver Interpersonal Style Profile; (2) one or 14% of HVAC Technology/Technician participants had an Analyzer Interpersonal Style Profile; and (3) one or 14% of HVAC Technology/Technician had a Harmonizer Interpersonal Style Profile.

Hospitality and tourism cluster male participants. The Institutional Food Workers, CIP Code 12.0508, had a total of 11 male participants: (1) six or 55% of Institutional Food Worker participants had an Energizer Interpersonal Style Profile; (2) three or 27% of Institutional Food Worker participants had an Analyzer Interpersonal Style Profile; and (3) two or 18% of Institutional Food Worker participants had a Harmonizer Interpersonal Style Profile.

Law, public safety and security cluster male participants. The Homeland Security, Law Enforcement, Firefighting and Protective Services, CIP Code 43.9999, had a total of eight male participants: (1) four or 50% of Homeland Security, Law Enforcement, Firefighting and Protective Service participants had an Energizer Interpersonal Style Profile; (2) three or 38% of Homeland Security, Law Enforcement, Firefighting and Protective Service participants had a Driver Interpersonal Style Profile; and one or 12% of Homeland Security, Law Enforcement, Firefighting and Protective Service Participants had a Harmonizer Interpersonal Style Profile.

Manufacturing cluster male participants. The Machine Tool Technology/Machinist, CIP Code 48.0501, had a total of 15 male participants: (1) eight or 53% of Machine Tool Technology/Machinist participants had an Analyzer Interpersonal Style Profile; (2) four or 27% of Machine Tool Technology/Machinist participants had a Driver Interpersonal Style Profile; (3) two or 13% of Machine Tool Technology/Machinist participants had a Harmonizer Interpersonal Style Profile; and (4) one or 7% of Machine Tool Technology/Machinist participants had an Energizer Interpersonal Style Profile.

The Welding Technology/Welder, CIP Code 48.0508, had a total of 14 male participants: (1) six or 43% of Welding Technology/Welder participants had a Driver Interpersonal Style
Profile; (2) four or 29% of Welding Technology/Welder participants had an Energizer Interpersonal Style Profile; (3) three or 21% of Welding Technology/Welder participants had an Analyzer Interpersonal Style Profile; and (4) one or 7% of Welding Technology/Welder participants had a Harmonizer Interpersonal Style Profile.

Therefore, the data appears to reveal that a distribution (profiles) between the Interpersonal Styles Profiles of male secondary western Pennsylvania Career and Technical Education teachers and their program CIP code may exist (see Table 11).

Table 11
Program CIP Code of Male Secondary Western PA CTE Teachers and Interpersonal Style Profile

<table>
<thead>
<tr>
<th>CIP Code</th>
<th>Program</th>
<th>Analyzer %</th>
<th>Driver %</th>
<th>Energizer %</th>
<th>Harmonizer %</th>
</tr>
</thead>
<tbody>
<tr>
<td>46.0101</td>
<td>Mason/Masonry</td>
<td>44</td>
<td>22</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>46.9999</td>
<td>Construction Trades, Other</td>
<td>10</td>
<td>50</td>
<td></td>
<td>40</td>
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<tr>
<td>47.0201</td>
<td>HVAC Maintenance Technology/Technician</td>
<td>14</td>
<td>72</td>
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<td>14</td>
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</table>

<table>
<thead>
<tr>
<th>CIP Code</th>
<th>Program</th>
<th>Analyzer %</th>
<th>Driver %</th>
<th>Energizer %</th>
<th>Harmonizer %</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.0508</td>
<td>Institutional Food Worker</td>
<td>27</td>
<td>55</td>
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<td>18</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CIP Code</th>
<th>Program</th>
<th>Analyzer %</th>
<th>Driver %</th>
<th>Energizer %</th>
<th>Harmonizer %</th>
</tr>
</thead>
<tbody>
<tr>
<td>43.9999</td>
<td>Homeland Security, Law Enforcement, Firefighting and Protective Services</td>
<td>38</td>
<td>50</td>
<td></td>
<td>12</td>
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</table>

<table>
<thead>
<tr>
<th>CIP Code</th>
<th>Program</th>
<th>Analyzer %</th>
<th>Driver %</th>
<th>Energizer %</th>
<th>Harmonizer %</th>
</tr>
</thead>
<tbody>
<tr>
<td>48.0501</td>
<td>Machine Tool Technology/Machinist</td>
<td>53</td>
<td>27</td>
<td>7</td>
<td>13</td>
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<tr>
<td>48.0508</td>
<td>Welding Technology/Welder</td>
<td>21</td>
<td>43</td>
<td>29</td>
<td>7</td>
</tr>
</tbody>
</table>

In western Pennsylvania during the spring of 2018 the following female Interpersonal Style Profile (ISP) CIP Codes that specifically established a distribution (profiles) between the
teacher’s Interpersonal Style and demographic style were: (1) from the Health Science Cluster; (a) 51.0601, Dental Assisting/Assistant; and (b) 51.0808, Veterinary/Animal Health Technology/Technician and Veterinary Assistant; (2) from the Hospitality and Tourism Cluster; (c) 12.0508, Institutional Food Workers; (3) from the Human Services Cluster; (d) 12.0401, Cosmetology/Cosmetologist, General; and (e) 19.0708, Child Care and support Services Management; (4) from the Information Technology Cluster; (f) 52.1201, Management Information Systems, General; and (5) from the Marketing, Sales and Service; (g) 52.1801, Sales, Distribution and Marketing Operations, General.

**Health science cluster female participants.** The Dental Assisting/Assistant, CIP Code 51.0601, had a total of three female participants: (1) three or 100% of Dental Assisting/Assistant participants had a Harmonizer Interpersonal Style Profile.

The Veterinary/Animal Health Technology/Technician and Veterinary Assistant, CIP Code 51.0808, had a total of four female participants: (1) three or 75% of Veterinary/Animal Health Technology/Technician and Veterinary Assistant participants had a Harmonizer Interpersonal Style Profile; and (2) one or 25% of Veterinary/Animal Health Technology/Technician and Veterinary Assistant participants had a Driver Interpersonal Style Profile.

**Hospitality and tourism cluster female participants.** The Institutional Food Workers, CIP Code 12.0508, had a total of 10 female participants: (1) five or 50% of Institutional Food Worker participants had an Energizer Interpersonal Style Profile; (2) four or 40% of Institutional Food Worker participants had a Harmonizer Interpersonal Style Profile; and (3) one or 10% of Institutional Food Worker participants had an Analyzer Interpersonal Style Profile.

**Human services cluster female participants.** The Cosmetology/Cosmetologist, General, CIP Code 12.0401, had a total of twenty three female participants: (1) eight or 35% of Cosmetology/Cosmetologist, General participants had an Energizer Interpersonal Style Profile;
(2) seven or 30% of Cosmetology/Cosmetologist, General participants had a Driver Interpersonal Style Profile; (3) five or 22% of Cosmetology/Cosmetologist, General participants had an Analyzer Interpersonal Style Profile; and (4) three or 13% of Cosmetology/Cosmetologist, General participants had an Harmonizer Interpersonal Style Profile.

The Child Care and Support Services Management, CIP Code 19.0708, had a total of seven female participants: (1) three or 43% of Child Care and Support Services Management participants had an Energizer Interpersonal Style Profile; (2) two or 29% of Child Care and Support Services Management participants had a Harmonizer Interpersonal Style Profile; (3) one or 14% of Child Care and Support Service Management participants had an Analyzer Interpersonal Style Profile; and (4) one or 14% of Child Care and Support Services Management participants had a Driver Interpersonal Style Profile.

**Information technology cluster female participants.** The Management Information Systems, General, CIP Code 52.1201, had a total of three female participants: (1) three or 100% of Management Information Systems, General participants had a Harmonizer Interpersonal Style Profile.

**Marketing, sales and service.** The Sales, Distribution and Marketing Operations, CIP Code 52.1801, had a total of two female participants: (1) two or 100% of Sale, Distribution and Marketing Operations, General participants had a Harmonizer Interpersonal Style Profile.

Therefore, the data appears to reveal that a distribution (profiles) between the Interpersonal Style Profiles of female secondary western Pennsylvania Career and Technical Education teachers and their program CIP code may exist (see Table 12).
Table 12
*Program CIP Code of Female Secondary Western PA CTE Teachers and Interpersonal Style Profile*

<table>
<thead>
<tr>
<th>Cluster</th>
<th>CIP Code</th>
<th>Program</th>
<th>Analyzer (%)</th>
<th>Driver (%)</th>
<th>Energizer (%)</th>
<th>Harmonizer (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health Science Cluster</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female Participants</td>
<td>51.0601</td>
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<td>100</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>51.0808</td>
<td>Veterinary/Animal Health Technology/Technician</td>
<td>75</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hospitality and Tourism Cluster</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female Participants</td>
<td>12.0508</td>
<td>Institutional Food Worker</td>
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<td>50</td>
<td>40</td>
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<tr>
<td><strong>Human Services: Female Participants</strong></td>
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</tr>
<tr>
<td>CIP Code</td>
<td>Program</td>
<td>% Analyzer</td>
<td>% Driver</td>
<td>% Energizer</td>
<td>% Harmonizer</td>
<td></td>
</tr>
<tr>
<td>12.0401</td>
<td>Cosmetology/Cosmetologist</td>
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<td>30</td>
<td>35</td>
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</tr>
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<td>19.0708</td>
<td>Child Care/Support Services Mgmt.</td>
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<td>14</td>
<td>43</td>
<td>29</td>
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<tr>
<td><strong>Information Technology: Female Participants</strong></td>
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</tr>
<tr>
<td>CIP Code</td>
<td>Program</td>
<td>% Analyzer</td>
<td>% Driver</td>
<td>% Energizer</td>
<td>% Harmonizer</td>
<td></td>
</tr>
<tr>
<td>52.1201</td>
<td>Management Information Systems</td>
<td></td>
<td></td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Marketing, Sales and Service: Female Participants</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>CIP Code</td>
<td>Program</td>
<td>% Analyzer</td>
<td>% Driver</td>
<td>% Energizer</td>
<td>% Harmonizer</td>
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<tr>
<td>52.1801</td>
<td>Sales, Distribution and Marketing</td>
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<td></td>
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</tbody>
</table>

Finally, was there a distribution (profiles) between the secondary western Pennsylvania Career and Technical Education Teachers Interpersonal Style Profile and program CIP code? According to the data collected a distribution (profiles) does exist between secondary western Pennsylvania Career and Technical Education Teachers Interpersonal Style Profile and the program CIP codes they teach.

Referring to Table 11, the Mason/Masonry program, CIP code 46.0101, had 44% of the male participants were classified as Analyzers, as well as 53% of the Machine Tool
Technology/Machinist program, CIP code 48.0501, male participants were classified as Analyzers. The Construction Trades, Other, CIP code 46.9999; the HVAC Maintenance Technology/Technician, CIP code 47.0201; and the Welding Technology/Welder, CIP code 48.0508, had 50%, 72% and 43% respectively of male participants were classified as Drivers. Finally, the male participants of Institutional Food Worker, CIP code 12.0508, were classified as Energizers, as well as 50% of the Homeland Security, Law Enforcement, Firefighting and Protective Services, CIP code 43.9999, male participants were classified as Energizers.

Table 12 depicts the Dental Assisting/Assistant, CIP code 51.0601; the Veterinary/Animal Health Technology/Technician, CIP code 51.0808; the Management Information Systems, CIP code 52.1201; and the Sales, Distribution and Marketing, CIP code 52.1801, had 100%, 75%, 100%, and 100% respectively of female participants were classified as Harmonizers. Finally, the Institutional Food Worker, CIP code 12.0508; the Cosmetology/Cosmetologist, CIP code 12.0401; and the Child Care and Support Services Management, CIP code 19.0708, had 50%, 35% and 43% respectively of female participants were classified as Energizers.

Chapter Summary

The purpose of this research study was to determine: (1) the demographic data of the participants; (2) the interpersonal style profiles of secondary western Pennsylvania Career and Technical Education teachers; (3) the learning-style inventory profiles of secondary western Pennsylvania Career and Technical Education teachers; (4) a distribution (profiles) between the interpersonal style profile and the learning-style inventory profile of secondary western Pennsylvania Career and Technical Education teachers; and (5) a distribution (profiles) between the interpersonal style profile and the program CIP code of secondary western Pennsylvania Career and Technical Education teachers.
The demographic data analysis results from the participants revealed, of the 406 recognized CIP codes being taught in western Pennsylvania 70% are taught by male teachers and 30% are taught by female teachers. Reviewing the gender of those participants responding, 66% were male and 34% were female. Of the participants replying to age 67% were between the age of 40 to 61 leaving 27% younger and 6% older. Secondary western Pennsylvania CTE teachers are 99.9% white and 74% have post-secondary degrees.

Regarding teacher licensure 52% of secondary western Pennsylvania CTE teachers hold the Vocational II/Instructional II permanent certification and 38% hold the Vocational I/Instructional I and are working towards permanent certification. Of the 13 Career Clusters or Pathways offered in the 28 schools responding to this research study: Architecture and Construction; Manufacturing; and Transportation, Distribution and Logistics comprise 47% of the programs, while Health Science and Human Services encompass 24%.

Finally, eighty-one percent of secondary western Pennsylvania Career and Technical Education teachers have 20-years of teaching experience or less, as well as 79% have 20-years or less of work or trade experience in their respective skilled area.

**Interpersonal Style Profile of Secondary Western Pennsylvania Career and Technical Education Teachers**

From the data collected at 28 school entities, a total of 453 participants responded to the questionnaires. The Interpersonal Style Profile questionnaire collected 298 responses for a total usable response rate of 66%. The results of the data analysis presented within this chapter determined that the Interpersonal Style of secondary western Pennsylvania Career and Technical Education teachers participating in the study were predominantly the Harmonizer Interpersonal Style Profile.

**Learning-Style Inventory Profile of Secondary Western Pennsylvania Career and Technical Education Teachers**
From the data collected at 28 school entities, a total of 453 participants responded to the questionnaires. The Learning-Style Inventory Profile questionnaire collected 299 responses for a total usable response rate of 66%. The results of the data analysis presented within this chapter determined that the Learning-Style Inventory of secondary western Pennsylvania Career and Technical Education Teachers participating in the study were predominantly the Assimilating Learning-Style Inventory Profile.

**What is the Distribution (Profiles) Between the Interpersonal Style Profile and the Learning-Style Inventory Profile of Secondary Western Pennsylvania Career and Technical Education Teacher**

From the data collected at 28 school entities, a total of 298 participants responded to the Interpersonal Style Profile and a total of 299 participants responded to the Learning-Style Inventory Profile. The results of the data analysis presented in this chapter revealed that a connection of distribution (profiles) exists between the 80 (27%) of IPS Energizers and 79 (26%) of LSI Accommodating participants suggesting a close connection of 1% between the two profiles. Likewise, a second close connection of distribution (profiles) exists between the 71 (24%) of IPS Drivers and 79 (26%) of LSI Converging participants indicating a close connection of 2% between the two profiles.

**What is the Distribution (Profiles) Between the Secondary Western Pennsylvania Career and Technical Education Teachers Interpersonal Style Profile and Program CIP Code**

Finally, from the data collected at 28 school entities during the spring of 2018 the following Interpersonal Style Profiles (ISP) that specifically establish a distribution (profiles) between the teacher’s Interpersonal Style Profile and the program CIP code were: (1) the Heating, Air-Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician, CIP Code 47.0201, had 72% of the HVAC Technology/Technician participants had a Driver Interpersonal Style Profile; (2) the Institutional Food Workers, CIP Code 12.0508 had 55% of male participants
and 50% of female participants had an Energizer Interpersonal Style Profile; (3) the Machine Tool Technology/Machinist, CIP Code 48.0501, had 53% of participants having an Analyzer Interpersonal Style Profile; (4) the Dental Assisting/Assistant, CIP Code 51.0601, had 100% of participants having a Harmonizer Interpersonal Style Profile; and (5) the Sales, Distribution and Marketing Operations, CIP Code 52.1801, had 100% of participants having a Harmonizer Interpersonal Style Profile.
Chapter 5

Conclusions, Limitations and Recommendations

This quantitative research study was conducted to explore the distribution (profiles) of interpersonal styles and learning-styles of secondary Career and Technical Education (CTE) teachers in western Pennsylvania.

Introduction

According to the literature, Zirkle, Martin and McCaslin (2007), CTE teachers have not always taken the same educational pathway to certification as their academic counterparts have; therefore, most CTE teachers are trained through alternative educational programs. Also noted by Zirkle et al. (2007), another reason for CTE teachers being trained differently is the requirement of having documented occupational experience if the field of study before being permitted to teach according to the Smith-Hughes Act of 1917. Therefore, the CTE teacher’s pathway to the classroom is different.

In agreement with CTE teachers traveling a different highway to the classroom, Thorton, Peltier, and Hill (2005), state that the teaching profession is more stressful for a CTE teacher without pedagogical skills becoming the teacher of record. Thorton et al. (2005), and his colleagues also emphasize colleges of education could improve the quality of new teachers by developing preservice education around personality. In a study conducted by Wubbels and Levy (1993), there is a link between teacher behavior and student behavior suggesting that teachers benefit directly from understanding their own interpersonal style. In a study conducted by Tessier, Sarrazin and Ntoumanis (2010), they examined if the teacher understood their interpersonal style would they be more supportive to their students? The results showed that the
teacher’s participation in the information sessions and positive critique during the individualized
guidance plan promoted positive change in the educator’s interpersonal style.

In an article by Dunn, Honigsfield, Doolan, Bostrom, Russo, Schiering, Suh, and
Tenedero (2009), found that teacher training must include instruction related to learning-style and
knowing that everyone learns differently means course content will need to be differentiated so
individuals are taught effectively related to their learning style.

Based on the literature cited throughout this research study not many of the articles
actually align to Career and Technical Education (CTE). However, the common thread that does
align with this study is recognizing a distribution (profiles) does exist between interpersonal style
and learning-style profiles among secondary CTE teachers in western Pennsylvania. The
literature also supports that developing course work within the CTE instructional training centers
would be advantageous for the teachers and ultimately the students (Thorton, Peltier & Hill,
2005). Gardner (1999) said, “intelligence is inborn and that a person can do little to alter his or
her quantitative intellectual birthright” (p. 15); thus, understanding a person’s interpersonal style
will benefit how profiles aligning to teacher learning can be cultivated.

Throughout our educational careers, as students, most of us at some point in time have
experienced a teacher that did not complement our interpersonal style or learning-style.
Today's educators need to be exceptional for the students they teach. In Career and
Technical Education (CTE), teachers come into the profession older, confused regarding
management techniques, where to start and lacking teaching pedagogy (Wubbels, Cretan &
Hermans, 1993). This state of confusion creates an environment of high stress and possible
failure for the teachers, as well as the students. The transition CTE teachers face from
industry to the classroom is challenging; however, it would be beneficial for the teachers to
understand how they learn, as well as insights into their personality which will strengthen and
improve student engagement (Mehta, 2012). According to Threeton, Walter and Evanoski
the "relationship between personality and learning style within an educational setting...could yield valuable data regarding how to better meet the educational needs of students" (p. 41)

Thus, reflecting upon the alternative education model for training secondary CTE teachers, as part of the program and after enrollment, each enrollee should be given the interpersonal style assessment (Management Development Program Services, 2000) and the learning-style inventory (Kolb, 2007) allowing them to understand how they learn.

Even as past research studies have examined the distribution (profiles) between interpersonal style and learning-style, not many have examined the 13 career clusters offered in the 406 Classification of Instructional Program (CIP) codes in the career and technology centers located in western Pennsylvania. In order to provide quality Career and Technical Education (CTE) instruction, this study worked towards answering the following questions by making use of the Pennsylvania State University Interpersonal Style Profile (Management Development Program Services, 2000) and the Kolb Experiential Learning Theory (ELT) as groundwork to answer:

1. What are the interpersonal style profiles of secondary western Pennsylvania Career and Technical Education teachers as determined by the Penn State Interpersonal Style Profile assessment?

2. What are the learning-style inventory profiles of secondary western Pennsylvania Career and Technical Education teachers as determined by the Kolb Learning-Style Inventory Profile assessment?

3. What is the distribution (profiles) of secondary western Pennsylvania Career and Technical Education Teachers Interpersonal Style Profile and their Learning-Style Inventory Profile assessment?
4. What is the distribution (profiles) between the secondary western Pennsylvania Career and Technical Education Teachers Interpersonal Style Profile and the program CIP code?

In western Pennsylvania, during the spring semester of 2018, there were a total of 513 CTE teachers from 35 school entities involved in this study. Of the 35 school entities involved, 28 school entities responded by having faculty take part in three questionnaires: (1) a participant demographic questionnaire; (2) the Interpersonal Style Profile (Management Development Program Services, 2000); and (3) the Kolb Learning-Style Inventory (2007) for an institutional response rate of 80%. From the data collected at 28 school entities, a total of 453 teachers responded out of a possible 513 for a participants’ response rate of 88%.

Conclusions

**Interpersonal Style Profiles of Secondary Western Pennsylvania Career and Technical Education Teachers**

The first research question was to determine the interpersonal style of secondary western Pennsylvania Career and Technical Education teachers. All four categories of the Interpersonal Style Profile (Management Development Program Services, 2000) were represented and the following interpersonal styles were determined: (1) sixty-one or 20% of the total participants had a Analyzer Interpersonal Style Profile; (2) seventy-one or 24% of the total participants had a Driver Interpersonal Style Profile; (3) eighty or 27% of the total participants had a Energizer Interpersonal Style Profile; and (4) eighty-six or 29% of the total participants had a Harmonizer Interpersonal Style Profile.

**Learning-Style Inventory Profiles of Secondary Western Pennsylvania Career and Technical Education Teachers**

The second research question was to determine the learning-style inventory of secondary western Pennsylvania Career and Technical Education teachers. All four categories
of the Learning-Style Inventory Profile (Kolb, 2007) were represented and the following learning-styles were determined: (1) ninety-four or 31% of total participants have an Assimilating Learning-Style Inventory; (2) eighty or 27% of total participants have a Converging Learning-Style Inventory; (3) seventy-nine or 26% of total participants have an Accommodating Learning-Style Inventory; and (4) forty-six or 16% of total participants have a Diverging Learning-Style Inventory.

What is the Distribution (Profiles) of Secondary Western Pennsylvania Career and Technical Education Teacher’s Interpersonal Style and Learning-Style Inventory Profiles

The third research question was to determine if a distribution (profiles) between the interpersonal style and learning-style inventory of secondary western Pennsylvania Career and Technical Education teachers exists? The answer to this research question is yes, a distribution (profiles) does exist. The most closely connected profile exists between the 80 (27%) of IPS Energizers and 79 (26%) of LSI Accommodating participants signifying a connection, with only a difference of 1%, between the two profiles. The second most closely connected profile exists between the 71 (24%) of IPS Drivers and 79 (26%) of LSI Converging participants signifying a connection, with only a difference of 2%, between the two profiles. The third profile between the 61 (20%) of IPS Analyzers and 94 (31%) of LSI Assimilating participants does not signify a connection, with a difference of 11%, between the two profiles. Finally, the fourth profile between the 86 (29%) of IPS Harmonizers and 46 (16%) of LSI Diverging participants does not signify a connection, with a difference of 13%, between the two profiles (see Figure 7).

Therefore, the most closely connected distribution (profiles) does exist between the Energizer Interpersonal Style and the Accommodating Learning-Style Inventory, as well as the Driver Interpersonal Style and the Converging Learning-Style Inventory for secondary Pennsylvania Career and Technical Education teachers in western Pennsylvania during the spring of 2018.
What is the Distribution (Profiles) Between the Secondary Western Pennsylvania Career and Technical Education Teachers Interpersonal Style Profile and the Program CIP Code

The fourth research question was to determine if a distribution (profiles) between the interpersonal style and the program CIP code of secondary western Pennsylvania Career and Technical Education teachers exist? The answer to this research question is yes, a distribution (profiles) does exist.

Referring to Table 11, the Mason/Masonry program, CIP code 46.0101, had 44% of the male participants were classified as Analyzers, as well as 53% of the Machine Tool Technology/Machinist program, CIP code 48.0501, male participants were classified as Analyzers. The Construction Trades, Other, CIP code 46.9999; the HVAC Maintenance Technology/Technician, CIP code 47.0201; and the Welding Technology/Welder, CIP code 48.0508, had 50%, 72% and 43% respectively of the male participants were classified as Drivers. Finally, fifty-five percent of the male participants from Institutional Food Worker, CIP code 12.0508, were classified as Energizers, as well as 50% of the Homeland Security, Law Enforcement, Firefighting and Protective Services, CIP code 43.9999, male participants were classified as Energizers.

Table 12 depicts the Dental Assisting/Assistant, CIP code 51.0601; the Veterinary/Animal Health Technology/Technician, CIP code 51.0808; the Management Information Systems, CIP code 52.1201; and the Sales, Distribution and Marketing, CIP code 52.1801, had 100%, 75%, 100%, and 100% respectively of female participants were classified as Harmonizers. Finally, the Institutional Food Worker, CIP code 12.0508; the Cosmetology/Cosmetologist, CIP code 12.0401; and the Child Care and Support Services Management, CIP code 19.0708, had 50%, 35% and 43% respectively of female participants were classified as Energizers.
Reviewing the overall results in Figure 2 determined that twenty-nine percent of secondary western Pennsylvania Career and Technical Education male participants were classified as having the Driver interpersonal style and twenty-five percent were classified as Harmonizers.

Also, intriguing, were the overall results in Figure 3 determining that thirty-six percent of secondary western Pennsylvania Career and Technical Education female participants were classified as having the Harmonizer interpersonal style and thirty-two percent were classified as Energizers.

Therefore, this research study was able to determine the majority of secondary Career and Technical Education teachers in western Pennsylvania had a Harmonizer Interpersonal Style Profile based on the Interpersonal Style Profile (Management Development Program Services, 2000). Harmonizers tend to think things through carefully before acting and prefer not to be highly assertive in expressing their ideas and preferences. They generally do not direct others, or impose their opinions on them, and may ask rather than tell when interacting with others. They are expressive and tend to focus on people and working in harmony more so than on tasks and results. They are dependable, and generally agreeable, willing contributors to a team effort.

Investigating the overall results in Figure 5 determined that thirty-two percent of secondary western Pennsylvania Career and Technical Education male participants were classified as having the Converging learning-style and thirty percent were classified as Assimilating.

Also, fascinating, were the overall results in Figure 6 determining that thirty-three percent of secondary western Pennsylvania Career and Technical Education female participants were classified as having the Assimilating learning-style and thirty-one percent were classified as Accommodating.
Consequently, the majority of secondary western Pennsylvania Career and Technical Education teachers who participated in this research study had an Assimilating Learning-Style Inventory based on the Kolb Learning-Style Inventory (Kolb, 2007). The Assimilating learner is very logical and concise regarding information. The person with this learning-style would rather work with ideas and concepts than people. They tend to like lectures, reading technical manuals, analyzing items and taking time to think things through before making a decision (Kolb & Kolb, 2005).

Interestingly, when comparing interpersonal style (IPS) and learning-style inventory (LSI) the most closely connected distribution (profiles) exists between the IPS Energizers, 27% and the LSI Accommodating, 26% participants signifying a connection with only a difference of 1% between the two profiles. These two profiles match well together. The Energizer tends to be highly assertive and action oriented. Energizers are expressive and tend to focus on people and idea-generating more so than tasks and results. They trust and use intuition more than facts and data and may concentrate more time developing relationships than on seeing the job gets done. They enjoy situations where there is a creative challenge, and prefer jumping into things quickly over planning and analysis. Energizers can operate quite comfortably on the basis of emotions or intuitions and prefer remaining open to possibilities over locking in on one result or course of action (Management Development Program Services, 2000). The Accommodating learner is impulsive, hands-on and intuitive. This learning style needs to get things done, set goals, accomplish tasks and have deadlines. A tendency to act on intuition rather than logical analysis, prefer to work with others and learn primarily from hands-on experiences (Kolb & Kolb, 2005).
Therefore, recognizing that certain CIP codes may align with particular interpersonal styles could prove to be useful when preparing newly hired CTE teachers for classroom success. Since, Career and Technical Education teachers come into the profession older, confused regarding management techniques used in the classroom, do not understand where to start and lack teaching pedagogy (Wubbells, Cretan & Hermans, 1993), understanding this data may help industry professionals transition from the workforce to the classroom reducing teacher stress and possible failure resulting in leaving the profession.

According to Gardner (1999), he suggests it is important that secondary western Pennsylvania Career and Technical Education teachers be cognizant to differentiate instructional strategies to align with all interpersonal styles since educators tend to teach the way they were taught (Gardner, 1999); but perhaps, by aligning the different teacher interpersonal styles and recognizing the relationship to CIP code, CTE teacher preparation programs may want to consider changing the direction of how teachers are taught.

Finally, while reviewing the data collected from the demographic questionnaire some interesting facts were revealed. Sixty-seven percent of secondary western Pennsylvania Career and Technical Education teachers are between 40 to 61 years of age. Within the same age demographic 30% are 51 years of age or older (see Table 3). Thus, the secondary CTE teachers in western Pennsylvania are older and closer to retirement.

As a final point, not all schools responded to the questionnaires but from the data collected a staggering 99.9% of secondary CTE teachers in western Pennsylvania are White (see Table 4). These same CTE teachers are well educated with 57% completing an Associate or Bachelor’s degree and 17% receiving a Master’s degree for a total of 74% earning degrees beyond secondary education (see Table 5). Secondary CTE teachers in
western Pennsylvania average 20 years of teaching experience, as well as 20 years of industry or trade experience.

Limitations

As a cautionary comment regarding the interpersonal style and learning-style inventory profile results from this study; please note there are no correct or incorrect profiles and participants used portions of each interpersonal style and learning-style to some extent allowing a better understanding of themselves and others. Even though the results represent the population of 453 participants out of a possible 513 for a participants’ rate of 88% the findings of this study are limited because: (a) the participants were certificated secondary CTE teachers; (b) the participants were teaching in career and technical education programs in western Pennsylvania during the spring of 2018; (c) the participants used a self-reporting questionnaire format and data could have been recorded incorrectly; and (d) the participants need to be prepared to work with all interpersonal styles and learning-styles.

The primary investigator limited this study by not developing a coding structure whereby each secondary institution had a unique identifier developed. By not designing a unique identifier for the institution, the program by CIP code and the faculty members, a better quantitative analysis may have been performed to suggest statistical significance between the interpersonal style, the learning-style and the program CIP code of secondary western Pennsylvania CTE teachers. Future researchers may want to consider developing a unique identifier allowing individual institutions and their participants to be linked to program CIP codes.

Therefore, the limitations should be viewed as an instrument to better assist in understanding the population of secondary Career and Technical Education teachers in western Pennsylvania.
Recommendations

Based on the knowledge gained from this research study there are reasonable conclusions for Career and Technical Education (CTE) teachers to prepare students for the real-world directly related to traits of interpersonal style and learning-style within the career clusters in CTE. From the conclusions of the research study, the following recommendations are provided:

1. According to Thorton, Peltier and Hill (2005), “colleges of education could improve the quality of new teachers by developing better selection processes for pre-service teachers. Personality type may be an important factor to consider…” (Thorton, Peltier, & Hill, 2005, p. 490). Interpersonal style is the ability to understand yourself and others. According to Gardner (1999) teachers tend to teach the way they were taught; however, students do not necessarily learn from instructional methods used in the past.

   After acceptance into the CTE teacher preparation program, all new teachers in western Pennsylvania would benefit by completing the interpersonal style and learning-style assessments allowing them better insight and understanding of who they are, how they learn, as well as how their delivery of content knowledge will affect instruction. Therefore, new teachers who have been assessed using the Interpersonal Style Profile and Learning-Style Inventory Profile, after receiving training, should be able to relate to different individuals, personally, professionally and possibly in the classroom to improve learning (Threeton, Walter, & Evanoski, 2013);

2. Faculty members from the Indiana University of Pennsylvania, Center for Career and Technical Personnel Preparation should complete the interpersonal style and
learning-style inventory themselves; thus, allowing them to better understand their role in the teacher learning process. According to Gardner (1999) teachers tend to teach the way they were taught; however, students do not necessarily learn from instructional methods used in the past. This is important because “colleges of education could improve the quality of new teachers by developing better selection processes for pre-service teachers. Personality type may be an important factor to consider…” (Thorton, Peltier; & Hill, 2005, p. 490). Therefore, faculty members who have been assessed may better understand their interpersonal style and learning-style profiles with the hope of being able to help CTE teachers; along with, their education preparation programs to leave an impression by placing a quality teacher in every classroom (Thorton, Peltier, & Hill, 2005); and

3. Faculty members from the Indiana University of Pennsylvania, Center for Career and Technical Personnel Preparation should implement instructional strategies and activities through small group sessions to align with their CTE teacher student’s interpersonal style and learning-style profiles. One example of why this information would be useful to a faculty member would be after assessing the new CTE teacher’s interpersonal styles and learning-styles profiles the information could be used to form cooperative groups of teachers. Each group would consist of one Harmonizer/Diverging, one Energizer/Accommodating, one Driver/Converging and one Analyzer/Assimilating participant. Using an instructional strategy to complete a group activity the faculty member should observe each interpersonal style/learning-style assume their role within the group. Therefore, (a) the Harmonizer/Diverging styles will probably be the organizing participant; (b) the Energizers/Accommodating styles will probably be the
entertaining, upbeat, creative and fun-loving participant; (c) the
Driver/Converging styles will probably be the group leader participant; and (d)
the Analyzer/Assimilating styles will probably be the data analyzer, detail-
oriented and methodical participant. Thus, this activity may demonstrate how
knowing the interpersonal style and learning-style profiles of different individuals,
personally and professionally, may be used in the classroom, as well as other
relationships to improve learning.

Recommendations for Future Studies

1. Subsequently the deficiency of the interpersonal style and learning-style research
   studies, within the career clusters of CTE, should consider being replicated across the
   state of Pennsylvania. The reason why replicating the interpersonal style and
   learning-style profiles of new CTE teachers, across the State, would be to explore if
certain career clusters attract certain interpersonal and learning-style profiles.
   Knowing that information would be very helpful in developing educational course
   work for the future CTE teacher;

2. Faculty members from the Pennsylvania State University, Department of Learning
   and Performance Systems, Workforce Education and Development; as well as,
   Temple University, Career and Technical Education Department should consider
   completing the interpersonal style profile and learning-style inventory profile
   themselves allowing them to better understand their role in the learning process of
   new CTE teacher students and compare the data to see if instruction improves.
   According to Gardner (1999) teachers tend to teach the way they were taught;
   however, today’s students do not necessarily learn from instructional methods used in
   the past. This is important because “colleges of education could improve the quality
of new teachers by developing better selection processes for pre-service teachers. 

Personality type may be an important factor to consider…” (Thorton, Peltier; & Hill, 2005, p. 490). Therefore, faculty members who have been assessed will better understand their interpersonal style and learning-style profiles with the hope of being able to help CTE teachers; along with, their education preparation programs to leave an impression by placing a quality teacher in every classroom (Thorton, Peltier, & Hill, 2005); 

3. Since the distribution (profiles) of secondary western Pennsylvania Career and Technical Education Teachers responding to the Interpersonal Style Profile (Management Development Program Services, 2000), discovered that 29% of male participants had a Driver Interpersonal Style, as well as 25% of male participants had a Harmonizer Interpersonal Style Profile; and 36% of female participants had a Harmonizer Interpersonal Style, as well as 32% of female participants had an Energizer Interpersonal Style revealing that a greater portion of female participants were in the Energizer and Harmonizer Profiles compared to the male participants. Thus, future studies should be conducted in Pennsylvania, as well as other States to determine similarities between male and female secondary Career and Technical Education Teachers and the Interpersonal Style Profile (Management Development Program Services, 2000); 

4. Additional exploration should be considered through the use of the Interpersonal Style Profile (Management Development Program Services, 2000) and the Kolb Learning-Style Inventory (2007) to better understand secondary Career and Technical Education teachers across Pennsylvania with regard to the Classification of Instructional Program (CIP) course offerings. Continuing this exploration would
allow CTE to better understand the interpersonal style and learning-style of secondary CTE teachers in Pennsylvania by CIP code; consequently, helping post-secondary teacher education programs better prepare CTE teachers for the future; and

5. Finally, further research should be considered regarding the use of the Interpersonal Style Profile (Management Development Program Services, 2000) and the Kolb Learning-Style Inventory (2007) to better understand traditional secondary academic teachers across Pennsylvania by content area. Continuing this research would allow traditional teacher education programs to study new teachers regarding their learning-styles and interpersonal styles as they prepare to become the teacher of record in their content area.
References


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doi:http://dx.doi.org.ezaccess.libraries.psu.edu/10.1037/0003-066X.51.4.397


Appendix A

Permission Granted by Korn Ferry Hay Group to Use Kolb LSI 3.1
Dear Mr. Elwood,

Congratulations! Your LSI research has been approved! Attached you will find the following documents:

- MCB200C - This is a copy of the LSI 3.1 test. You may print this as needed for your research.
- MCB200D - The profile sheet contains the answer key for the test as well as the profiling graphs for plotting scores. This document may be produced as necessary for your research. The AC-CE score on the learning Style Type Grid is obtained by subtracting the CE score from the AC score. Similarly, the AE-HO score is AE minus HO.

These files are for your data collection only. This permission does not extend to include a copy of the files in your research paper. It should be sufficient to source it.

***N. Alice Kolb recommends using the 4.0 Online version of the KLSI because it contains the most current and accurate measurements.

We wish you luck with your research and look forward to hearing about your findings. Please send a completed copy of your research to Joe.McDonald@kornferry.com or you can mail a hardcopy to:

LSI Research Contracts
c/o Joe McDonald
Korn Ferry Hay Group, Inc.
One International Place
10th Floor, Suite 1022
Boston, MA 02110

Please let me know if you have any questions.

Kind regards,

Joe

From: Elwood, Bradley [mailto:oblwood@uwyo.edu]
Sent: Monday, November 28, 2016 1:08 PM
Appendix B

Participant Questionnaire
Directions: The following demographical information is needed for statistical purposes related to the research study. Please print the letter that best represents your response in the space provided. Thank you.

1. ____ What is your gender? (M for Male; F for Female)

2. ____ What is your age?
   a. 18 to 28
   b. 29 to 39
   c. 40 to 50
   d. 51 to 61
   e. 62 to 72

3. ____ What is your ethnicity?
   a. American Indian or Alaska Native
   b. Asian
   c. Black or African American
   d. Hispanic or Latino
   e. Native Hawaiian or Other Pacific Islander
   f. White or Caucasian

4. ____ What is your highest level of education?
   a. High School Graduate
   b. 2-year trade school
   c. Associate Degree
   d. 4-year Apprenticeship program
   e. Bachelor’s degree
   f. Master’s degree
   g. Doctorate degree

5. ____ What is your current level of certification?
   a. Emergency certificate
   b. Intern I or Vocational I
   c. Intern II or Vocational II (Permanent Certification)

6. ____ In what Career Cluster does your program belong?
   a. Agriculture, Food and Natural Resources
   b. Architecture and Construction
   c. Arts, A/V Technology and Communications
   d. Business Management and Administration
   e. Health Science
   f. Hospitality and Tourism
   g. Human Services
   h. Information Technology
   i. Law, Public Safety and Security
   j. Manufacturing
   k. Marketing, Sales and Service
   l. Science, Technology, Engineering and Mathematics
   m. Transportation, Distribution and Logistics
7. _____ How many years have you been teaching?
   a. 0 to 3
   b. 4 to 10
   c. 11 to 20
   d. 21 to 30
   e. 31 to 40

8. __________ What is your program area’s CIP code? (Please refer to the attached sheet and then print your CIP Code in the space provided.)

9. _____ How many years of work or trade experience did you have before entering education?
   a. 0 to 5
   b. 6 to 10
   c. 11 to 15
   d. 16 to 20
   e. 21 to 30

10. _____ What is your program’s percentage of students with disabilities (IEPs)?
    a. 0 to 10%
    b. 11% to 20%
    c. 21% to 30%
    d. 31% to 40%
    e. 41% to 50%
    f. 51% to 60%
    g. 60% plus
Directions: Please refer to this information sheet for question #8. Find your Career Cluster and then your program CIP code. Please print the CIP code number for your program area in the blank space of question #8.

Thank you.

Career Cluster: Agriculture, Food and Natural Resources:

CIP Codes

01.0301 Agricultural Production Operations, General
01.0601 Applied Horticulture/Horticulture Operations, General
03.0511 Forestry Technology/Technician

Career Cluster: Architecture and Construction

CIP Codes

46.0101 Mason/Masonry
46.0201 Carpentry/Carpenter
46.0303 Lineworker
46.0399 Electrical and Power Transmission Installers, Other
46.0401 Building/Property Maintenance and Manager
46.0408 Painting/Painter and Wall Coverer
46.0503 Plumbing Technology/Plumber
46.0504 Well Drilling/Driller
46.9999 Construction Trades, Other

47.0201 Heating, Air-Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician

Career Cluster: Arts, Audio/Visual Technology and Communications

CIP Codes

10.0399 Graphic Communications, Other
10.9999 Communication Techs and Support Service, Other
50.0402 Commercial and Advertising Art
Career Cluster: Business, Management and Administration

CIP Codes
52.0302 Accounting Technology/Technician and Bookkeeping
52.0401 Administrative Assistant and Secretarial Science, General
52.0701 Entrepreneurship/Entrepreneurial Studies

Career Cluster: Health Science

CIP Codes
51.0601 Dental Assisting/Assistant
51.0801 Medical/Clinical Assistant
51.0808 Veterinary/Animal Health Technology/Technician and Veterinary Assistant
51.0899 Health/Medical Assisting Services, Other
51.9999 Health Professions and Related Clinical Sciences, Other
51.2604 Rehabilitation Aide

Career Cluster: Hospitality and Tourism

CIP Codes
12.0501 Baking and Pastry Arts/Baker/Pastry Chef
12.0508 Institutional Food Workers

Career Cluster: Human Services

CIP Codes
12.0401 Cosmetology/Cosmetologist, General
19.0708 Child Care and Support Services Management
32.0105 Job Seeking/Changing Skills (Diversified Occupations)

Career Cluster: Information Technology

CIP Codes
09.0702 Digital Communications and Media/Multimedia
11.0201 Computer Programming/Programmer, General
11.0801 Web Page, Digital/Multimedia and Information Resources Design
11.0901 Computer Systems Networking and Telecommunications
15.1202 Computer Technology/Computer Systems Technology
52.1201 Management Information Systems, General

**Career Cluster: Law, Public safety and Security**

**CIP Codes**
43.0107 Criminal Justice/Police Science
43.9999 Homeland Security, Law Enforcement, Firefighting and Protective Services

**Career Cluster: Manufacturing**

**CIP Codes**
15.0303 Electrical, Electronic and Communications Engineering Technology/Technician
15.0403 Electromechanical Technology/Electromechanical Engineering Technology
15.1301 Drafting and Design Technology/Technician, General
48.0501 Machine Tool Technology/Machinist
48.0508 Welding Technology/Welder
48.0599 Precision Metal Working, Other
48.0703 Cabinetmaking and Millwork/Millwright
48.9999 Precision Production, Other

**Career Cluster: Marketing, Sales and Service**

**CIP Code**
52.1801 Sales, Distribution and Marketing Operations, General

**Career Cluster: Science, Technology, Engineering and Mathematics**

**CIP Codes**
15.0399 Electrical and Electronic Engineering Technologies/Technicians, Other
15.9999 Engineering Technologies/Technicians, Other
26.1201 Biotechnology
Career Cluster: Transportation, Distribution and Logistics

CIP Codes

47.0603 Autobody/Collision and Repair Technology/Technician
47.0604 Automobile/Automotive Mechanics Technology/Technician
47.0613 Medium/Heavy Vehicle and Truck Technician
47.0699 Vehicle Maintenance and Repair Technologies, Other
49.0202 Construction/Heavy Equipment/Earthmoving Equipment
52.0203 Logistics and Materials Management
Appendix C

Interpersonal Style Profile
Note: The Interpersonal Style Profile (ISP) publication can be found at:
Appendix D

Learning-Style Inventory
Note: The Learning Style Inventory (LSI) can be found at the following web address:
Appendix E

Approval Letter from the Office of Research Protections
Read

From: info@psu.edu (6)
To: bze5026@psu.edu (6)
Subject: STUDY000008592 has been approved
Date: Wed, Jun 6, 2018 08:30 PM
Save View On [Turn Off]. What is "Safe View?"
Template:IRB_T_Post-Review_Approved

This is an official Penn State communication from CATS IRB - Penn State's Centralized Application Tracking System for Institutional Review Board applications. Do not reply directly to this e-mail.

Notification of Approval

To: Dale Elwood
Link: STUDY000008592
P.I.: Dale Elwood
Title: CTE Teachers Interpersonal and Learning Styles
This submission has been approved. You can access the correspondence letter using the following link:

Description: Correspondence for STUDY000008592.pdf(0.01)

To review additional details, click the link above to access the project workspace.

Warning: This is a private and confidential message from Penn State’s Centralized Application Tracking System (CATS) and is intended for the specified recipient only. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution or copying of this information is STRICTLY PROHIBITED. If you received this message in error, please contact the Office for Research Protections or the Human Subjects Protection Office (contact information below) to report the error. Thank you.

Office Contacts: This is a system-generated email. Do not reply directly to this email. If a reply is necessary, please reply directly to the Office for Research Protections or the Human Subjects Protection Office (contact information below). For best service, please directly contact the IRB Coordinator assigned to your submission - this information can be found by clicking on the above link to your submission.

University Park and other campuses:
Office for Research Protections, Human Research Protection Program
The 330 Building, Suite 205
University Park, PA 16802-7014
Phone: 814-865-1775
Fax: 814-863-8699

https://webdev2.psu.edu/chronolog/faces/login?loginMethod=facet&loginMethod=facet&indexPage=ACMF OmniId=09d0b90a87558df9d8f79d7f6a7b9975e72a0162c8d68d749b7b8e16e2d8f997d
Email: QRPprotection@psu.edu

College of Medicine and Hershey Medical Center:
Human Subjects Protection Office
90 Hope Drive, Mail Code A115, P.O. Box 855
Hershey, Pennsylvania 17033-0855
(Physical Office Location: Academic Support Building Room 1140)
Phone: 717-531-9687
Fax number: 717-531-3937
Email: hsp@hmc.psu.edu
EXEMPTION DETERMINATION

Date: January 3, 2018
From: Lindsay Kowalski, IRB Analyst
To: Dale Elwood

<table>
<thead>
<tr>
<th>Type of Submission:</th>
<th>Initial Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title of Study:</td>
<td>A Comparison Between Interpersonal Style and Learning Style: A Quantitative Study of Secondary Career and Technical Education Teachers in Western Pennsylvania</td>
</tr>
<tr>
<td>Principal Investigator:</td>
<td>Dale Elwood</td>
</tr>
<tr>
<td>Study ID:</td>
<td>STUDY00008592</td>
</tr>
<tr>
<td>Submission ID:</td>
<td>STUDY00008592</td>
</tr>
<tr>
<td>Funding:</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

Documents Approved:
- CTE Teacher Interpersonal/Learning Styles (0.04), Category: IRB Protocol
- Interpersonal Style (0.01), Category: Data Collection Instrument
- Kolb LSI document (0.01), Category: Data Collection Instrument
- Program Area Clp Codes (0.01), Category: Data Collection Instrument
- Teacher Demographics (0.01), Category: Data Collection Instrument

The Office for Research Protections determined that the proposed activity, as described in the above-referenced submission, does not require formal IRB review because the research met the criteria for exempt research according to the policies of this institution and the provisions of applicable federal regulations.

Continuing Progress Reports are not required for exempt research. Record of this research determined to be exempt will be maintained for five years from the date of this notification. If your research will continue beyond five years, please contact the Office for Research Protections closer to the determination end date.

Changes to exempt research only need to be submitted to the Office for Research Protections if limited circumstances described in the below-referenced Investigator.

We would like to know how the IRB Program can better serve you. Please fill out our survey; it should take about a minute: https://www.research.psu.edu/irb/feedback.
Manual. If changes are being considered and there are questions about whether IRB review is needed, please contact the Office for Research Protections.

Penn State researchers are required to follow the requirements listed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within CATS IRB (http://irb.psu.edu).

This correspondence should be maintained with your records.
VITA

Brad Elwood

Administrator

Administrative Director at Central Westmoreland Career and Technology Center, New Stanton, PA, 15672

Education

2010 – 2020 Pennsylvania State University State College, PA

Doctor of Philosophy, May 2020

• Workforce Education and Development Program, Department of Learning and Performance Systems

2002 - 2005 California University of Pennsylvania California, PA

Master’s Degree in Education, December 2005

• Internship and Principal K-12 program, August 2005

2002 – 2005 Indiana University of Pennsylvania Indiana, PA

Vocational Director Certification, December 2005

• Supervisor of Vocational Education, December 2005

2002 Indiana University of Pennsylvania Indiana, PA

Bachelor’s Degree in Education, May 2002

• Center for Career and Technical Personnel Preparation Program, College of Education

Presentations

