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ARE WORK-BASED LEARNING OPPORTUNITIES FOR STUDENTS ASSOCIATED WITH POSITIVE PLACEMENT AND PROGRAM COMPLETION?

A DISSERTATION APPROVED FOR THE
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BY THE COMMITTEE CONSISTING OF

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Abstract

Career technical education (CTE) is undergoing a resurgence in popularity. Amid this uptick in interest, one significant area of investment is in work-based learning (WBL) opportunities for students, which encompasses many types of learning activities that range from career exploration to internships. Existing studies examine the influence of WBL on outcomes while students are attending school, but few studies have examined whether WBL is related to student success after graduation from a program of study. This quantitative study tests the relationship between WBL hours and program completion and positive placement by using administrative and survey data (n = 3,881) from a standalone career technology center school district in Oklahoma that serves high school students and adults. Results indicated that the number of work-based learning hours were not associated with either program completion or positive placement. However, the type of learning provided was associated with these outcomes as students attending programs offering learning through active experimentation were 2.5 times more likely to receive a positive placement and 1.8 times more likely to complete their programs. Abstract conceptualization was also associated with these two outcomes, but not as strongly as active experimentation was. This study offers important contributions to the literature because it offers suggestive evidence that it is not necessarily the amount of time spent in work-based learning but the types of learning opportunities that are provided that influence program completion and positive placement.

Chapter 1: Introduction

I began my educational career at a K-12 school district located in Tulsa, Oklahoma teaching art to juniors and seniors. At the time, I knew career technical education (CTE) existed but knew little about its mission. During high school, I focused on college and never realized the career possibilities that a standalone CTE district offered. Career technical education was considered by many as a backup plan if someone could not attend college, or they did not do well academically.

I transitioned to teaching CTE classes during my fourth year of teaching. After five years of teaching CTE classes and watching the high school push college options to the detriment of students who were not prepared or interested, I decided to pursue a career at a standalone CTE school district as a career advisor and administrator. As a campus director for a standalone CTE district, I have witnessed how work-based learning (WBL) has positively affected the student and industry partner experience. Work-based learning can be described by many as an opportunity for students in education to link academic knowledge learned in the classroom with opportunities to practice this knowledge in a real-world work setting (Brown, 2003). Even when the experience has been negative, the student has learned from that experience and has completed a successful WBL experience with another industry partner. This could not happen unless CTE instructors and industry partners had a great relationship with each other. The prevailing thought has been that students who participate in multiple WBL experiences from elementary through high school, would be better prepared for the workforce through career exploration and would work longer in their field of study.

Career technical education has been a part of public education for the past one hundred years (Gordon & Schultz, 2020). It has been either embedded in the high school, offered at the local community college, or at a CTE district (Goldin & Katz, 1998). The country began expanding rapidly economically and technically during the latter part of the 1800s. This created a need to train more workers in more general skill pathways contrary to the predominant method of apprenticeships at that time (Benavot, 1983). When the Smith-Hughes Vocational Education Act legislation passed in 1917, it provided federal funding to help support the need for skills training programs taught in K-12 and college (Gordon & Schultz, 2020). Policymakers and reformers contend that CTE competed with higher education when it should be thought of as another option for high school students and therefore be given the same financial support (Rosen et al., 2018). The United States has seen a resurgence in the promotion and need of CTE with the private sector workforce needs being the primary catalyst (Fletcher Jr & Gordon, 2017; Holzer, 2015; Oviawe et al., 2017).

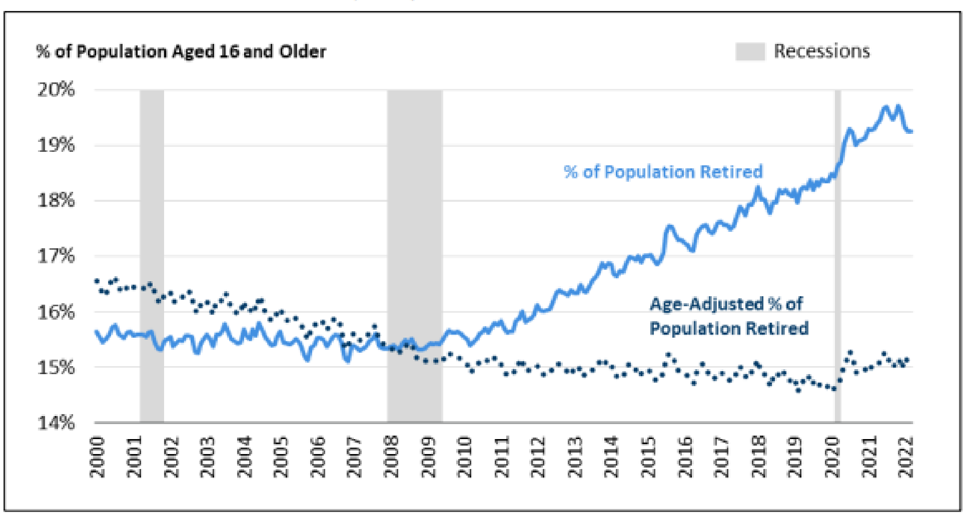
Within CTE, WBL is an integral part of the curriculum as the goal of CTE is to prepare students for success in the workplace. Work-based learning opportunities have expanded in recent years not only in CTE, but also in K-12 and higher education as an opportunity to invest in a skilled workforce now and in the future (Gordon & Schultz, 2020; Oviawe et al., 2017; Venkatraman et al., 2018). Work-based learning is implemented in a variety of educational settings such as K-12, college, and CTE districts. These institutions utilize WBL to strengthen the link between knowledge and hands-on industry experiences to expose the student to experiences they may have not received in the classroom (Atkinson, 2016; Haimson & Bellotti, 2001). While WBL is in CTE, many K-12 schools have begun to participate more in embodiments such as career exploration for younger students or internships for older students (Rosen et al., 2018). In various geographic locations, local companies offer students a chance to become exposed to multiple career pathways while allowing students to gain the knowledge and skills needed to succeed in today's workforce, especially soft skills training (Haimson & Bellotti, 2001). Research has found that this arrangement can be advantageous to the local workforce (Atkinson, 2016) in that the experiences foster interest in that career field.

The lack of a trained and skilled workforce has been a concern for businesses, government, and the overall financial prosperity of nations for years (Gault et al., 2010), but has been thrusted back into the spotlight in the last decade with an older workforce that will be retiring in greater numbers as shown in Figure 1 below (Calo, 2008) and an economy that has become more global in nature (Eger, 2005; Wang et al., 2011).

Figure 1

Graph of Percentage of Retired Workers as a Share of the Population

Figure 1. Retired Workers as a Share of the Population Aged 16 and Older
January 2000 to March 2022



Source: CRS analysis of the Current Population Survey data. Recession dates obtained from National Bureau of Economic Research (NBER), "US Business Cycle Expansions and Contractions," http://www.nber.org/cycles/cyclesmain.html.
Notes: The age adjustment is based on the population distribution in 2008.

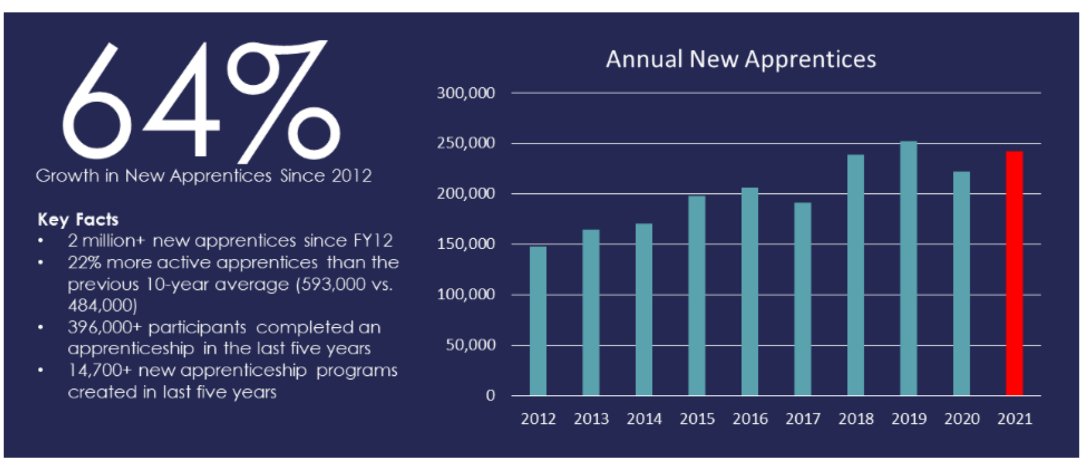
Public schools in the past two decades have emphasized preparing students for multiple pathways after graduation by making them college and career ready (Jimenez, 2020). Only 26%

of jobs require a college diploma (Carnevale et al., 2013). The expansion of CTE and WBL in high school and college is necessary to fill the work force needs that do not require a college degree but skilled training (Rosen et al., 2018).

Employers are increasingly willing to train workers on the job through programs such as apprenticeships or internships (Kim et al., 2020; Olsen et al., 2012, April). As shown in Figure 2 below, there has been a 64% growth in new apprentices since 2012 according to the U.S. Department of Labor. Schools and local industry partnerships have been a wonderful way for students to obtain skills and knowledge and for industry to fill needed vacancies through on the job training (Arabandi et al., 2021; Longley & Clarke, 2022; Watters et al., 2013). Through these partnerships, students explore a career and connect academic learning with practice in a real-world environment. This also has the added benefit of increasing students' interest in school by making academics more relevant and therefore positively affecting other student outcomes (Brown, 1998).

Figure 2

Chart Showing Growth in Apprentices Since 2012



Overall, the research concerning the effect of integrating CTE into K-12 classes and higher education has focused on how CTE in broad terms is related to the outcomes of attendance and academic achievement while students are in school (Bragg & Ruud, 2007; Castellano et al., 2012). Research suggests that linking CTE with K-12 and college academics increases student academic achievement and attendance among other outcomes (Brand et al., 2013; Dougherty, 2016). Few research studies have focused specifically on the effect of WBL on post-educational outcomes (Henderson & Trede, 2017; Smith, S. et al., 2018; Venkatraman et al., 2018). For example, existing research has examined post-educational outcomes of employment, enhancing skills outcomes, and students' understanding of workplace readiness (Jackson, 2013).

The outcome of positive placement is of notable interest. Positive placement refers to the job placement outcome of a student working in a career field of study related to their educational program and WBL experiences at least six months after graduation (Oklahoma Department of Career and Technical Education, 2023). Positive placement is also students continuing their education in that career field through higher education or entering the military. Career technical education districts place emphasis on this metric as the purpose of CTE is to prepare students for success in the workplace (Oklahoma Department of Career and Technical Education, 2023). The prevailing thought for the inclusion of WBL into the curriculum (Brown, 2003; Freestone et al., 2006; Griffith, 2001; Harris et al., 2001; Lester & Costley, 2010; Nisula & Metso, 2019; Wonacott, 2002) is that students who are exposed to the real-world of industry will have a better understanding of the career field, make professional connections, and have a deeper desire to work in that industry.

During WBL, schools provide classroom theory and supportive technical training in a career path and industry partners provide students the opportunity to experience and master the skills they learned in the classroom in a live setting with real-life scenarios. Exposure to the real-world of industry comes in the multiple forms of WBL such as learning about work through career awareness and exploration during guest speakers or career research. Students also learn through work during CTE and pre-employment experiences such as internships, high-quality simulation, or pre-apprenticeship.

Most of the literature on WBL discusses the effect of WBL on academic achievement, student classroom engagement, refinement of skills, and career exploration (Brand et al., 2013; Darche et al., 2009; Esters & Retallick, 2013; Kerins, 2007; Lester & Costley, 2010; Martin & Rees, 2019; Rodriguez et al., 2016; Williams, 2010). These studies focus primarily on student outcomes during the program and not on post-graduation outcomes. There are a few studies that focus on the relationship of WBL during school and program outcomes after graduation, such as positive placement (Garwe, 2020; Monteiro et al., 2016; Rowe & Zegwaard, 2017; Venkatraman et al., 2018). These studies tend to utilize a qualitative or mixed-methods approach that is limited because they are anecdotal in nature and the sample sizes tend to be low which can skew the relationship between WBL and positive placement after graduation. Career technical education districts use taxpayer money to ensure they meet community workforce training needs. One of the most important goals is to make certain that students have chosen the correct career field to which they will devote years of service.

Another gap was the lack of studies that focus on the relationship between WBL in standalone career technical center districts. Few studies (Akkerman & Bakker, 2012; Alfeld et al., 2013; Venkatraman et al., 2018) focused on standalone career technical center districts as most states incorporate CTE in K-12 or community colleges. Akkerman and Bakker (2012) discussed how schools can support CTE students to make a successful transition from a CTE program to work. They focused their study on a CTE center in the Netherlands to observe the educational process that exists between school and the apprenticeship. They found that it is not enough for the student's success to just show up at the apprenticeship and observe. They observed that the type of learning made a difference in the success of the WBL experience. A few studies, such as the ones discussed below, looked at the type of learning provided during classroom and WBL. Students must have time at school throughout the apprenticeship to reflect with students and instructors. Reflection was part of the experiential learning process that is important in WBL. Alfeld et al. (2013) also discussed how important the learning process in both the classroom and WBL was for a successful experience by providing professional development for instructors and WBL coordinators. Cannon and Geddes (2019) discussed using experiential learning theory to develop mechanisms for making WBL more effective learning experiences. Because of the lack of studies discussing the type of learning provided, this dissertation used the four stages of experiential learning theory to determine if there is a relationship between the type of learning provided and student outcomes.

Study Purpose

This study estimated the relationship between the number of WBL hours available to students during the program and the post-graduation outcomes of positive placement and program completion. Specifically, this study addresses the following questions:

> **Research question 1** – *Is the number of hours spent in work-based learning experiences associated with positive placement for graduates of a standalone career technical education district?*

Research question 2 – *Is the number of hours spent in work-based learning experiences associated with program completion for graduates of a standalone career technical education district?*

Research question 3 – *Is the type of learning provided (i.e., Kolb's four stages of learning) in a program associated with program completion and positive placement?*

The relationship was tested using logistic regression. In the models, proxy measures of the four stages of Kolb's (1981) experiential learning theory cycle were included as follows: active experimentation, concrete experience, abstract conceptualization, and reflective observation. Although Kolb stated that all four stages should be completed during the educational process for effective learning to occur, the logistic regression models tested the relationship of each stage with positive placement and program completion. The setting for most studies was the inclusion of WBL and CTE in the K-12 education or higher education since most states incorporate CTE into K-12 or community colleges. Oklahoma has a separate state agency (Oklahoma Department of Career and Technical Education) to regulate CTE located in twenty-nine CTE school districts, K-12, and skill centers embedded in prisons. For more than one hundred years, CTE in Oklahoma has prepared students for success in the workplace through twenty-nine CTE districts, skill centers, and K-12 education. In 2022 Oklahoma CTE had 446,940 total enrollments and served 6,671 companies across the state. The Oklahoma Department of Career and Technical Education receives approximately 169.1 million dollars in revenue each year through various sources such as state and federal appropriations and distributes this to the various CTE educational institutions throughout the state which is in addition to the local tax revenue that CTE districts collected from their local tax base (Oklahoma Department of Career and Technical Education, 2023).

This quantitative study examined the role of WBL in a stand-alone CTE district in Oklahoma. Data from the stand-alone CTE district consisted of information for 3,881 students who graduated in the 2021-2022 school year. Data includes student gender, age, ethnicity, GPA, completion status, economic status, special education status, locale, and positive placement. The CTE district accepts high school students from fourteen different K-12 districts and adults. The ages of adult students in student data ranged from 18 to 72. Surveys were sent to all instructors in the CTE district. It consisted of twelve questions gathering data about the number of hours WBL was offered in the program, the number of years the instructor has been in the industry, if the program used the four stages of experiential learning theory, and the number of hours each stage was offered. The four stages were used in the regression models as binary variables (if the stage was offered or not offered) and tested the relationship between the type of learning provided and student outcomes.

This study offers several key contributions to the WBL literature. First, it offers insight into whether there is a relationship between the quantity of WBL and student outcomes of positive placement and program completion. Second, it helps to identify programmatic features and learning types such as the four stages of ELT that could be associated with positive placement and program completion. Given the growth of CTE, this study offers valuable knowledge about how these investments may perform.

Chapter 2: Literature Review

This study examined the relationship between the number of WBL hours available to students and the post-graduation outcomes of positive placement and program completion. Proxy measures of the four stages of Kolb's (1981) experiential learning theory cycle were also included. I reviewed literature about the history of apprenticeship training in traditional schools (the precursor to the current iteration of WBL), the birth of CTE in traditional schools and higher education, and the role WBL played in strengthening those training experiences. I then transitioned into an explanation of experiential learning and how it is the foundation of CTE and WBL during students' classroom, lab, and WBL experiences. The discussion then transitioned to the use of WBL in various institutions such as K-12, CTE districts, industry, and higher education and into the influence of CTE and WBL on student outcomes during and after completion. I found that most of the studies being analyzed in the following paragraphs have been found to be qualitative or correlational while only focused on K-12 or higher education using modest samples. The studies tend to show consistency regarding the positive relationship of WBL on students' education but were usually weak due to the sample size and limited student data. There were a few studies that examined the relationship between WBL and student outcomes after graduation. Finally, I discuss gaps in the literature for which I have attempted to fill with my dissertation research.

History of Apprenticeships in Traditional School

The key elements of passing one's knowledge of a skill or trade to an apprentice could be considered as old as civilization (Hager & Hyland, 2003). In colonial America, although some formal education was available, few children attended. Formal education such as universities was reserved for those fortunate enough to have the means and opportunity to attend, typically the children of the elite in society. For most children, the apprenticeship model was the dominant way of educating and training the next generation. America was still mostly an agricultural society dependent on children to help at home (Rury, 2012). The early settlers understood the importance of education with the goal of passing knowledge and skills from generation to generation. An apprenticeship typically consisted of a young person working with an employer for a lengthy period in which the apprentice learned the trade from the master and labor, money, or both was given for that knowledge (Bilginsoy, 2003; Ryan, 2012; Snell, 1996).

With the advent of the industrial revolution, public education appeared in the late 1800's in one room schoolhouses teaching the basics of reading, writing, and arithmetic with children typically attending until their early teens (Rury, 2012). It was not until the early 1900's that a need for secondary education emerged as a means of producing a skilled workforce and the realization of an educated population as social capital for the betterment of the local community and society in general (Goldin & Katz, 1998). This provided the basis of the modern school system as we know it today.

Apprenticeships, which had been the predominant method of educating students, were becoming less common due to the growth of the factory system which only needed workers for more specialized functions in a larger system (Gordon & Schultz, 2020; Snell, 1996). As the Industrial Revolution grew in the 1800s and early 1900s, there was a need for the birth of CTE to meet the growing skill labor demands of local industries (Katz & Margo, 2014). At the beginning of the 20th century, only about one out of 30 adults were post-secondary educated which produced a growing need for CTE for those careers not needing a post-secondary education especially as the United States entered World War I which facilitated the need for training masses to produce goods (Gordon & Schultz, 2020).

Birth of CTE

Although apprenticeships were still needed in some areas of industry, a need arose to train student masses more quickly to meet the needs of the economy, which necessitated the need for CTE (Goldin & Katz, 1998; Goldin & Sokoloff, 1982; Stipanovic et al., 2012). A federal commission was appointed in 1914 to study the need for funding at the national level for CTE and out of that commission was born the Smith-Hughes Vocational Education Act of 1917 (Gordon & Schultz, 2020; Herr, 2013). Public secondary schools began to offer different curriculum tracks based on preparation for areas such as industrial education, college, or specific careers such as stenography (Rury, 2012; Wonacott, 2003). Higher education institutions also began to offer CTE. The next important CTE legislation was the Vocational Education Amendments of 1968 which replaced all CTE federal legislation from the Smith-Hughes Vocational Education Act through 1968 that consolidated previous legislation language, broadened the definition of CTE to match the current needs of the labor market, expanded CTE in postsecondary, and mainstreamed CTE closer to general education in the public-school systems (Evans, 1969; Gordon & Schultz, 2020). The Carl D. Perkins Vocational Education Act of 1984 became another milestone in the history of CTE funding by attempting to further improve labor skills in the adult population as well as increased their opportunities for CTE (Gordon & Schultz, 2020; Stipanovic et al., 2012). Up until 1984, the primary goal of CTE legislation was the expansion of CTE opportunities which changed to an emphasis on program improvement with a focus on at-risk student populations in our public schools (Gordon & Schultz, 2020; Malkus, 2019).

Starting in the 1990s, the focus on CTE shifted to the growth of technology in traditional vocational careers. The emphasis became the application of academic and vocational skills that were needed to compete in a growing globally competitive workforce for the upcoming 21st century (Fletcher Jr, 2006; Gordon & Schultz, 2020). The new global economy needed employees who could think critically and problem-solve (Oviawe et al., 2017; Rojewski & Hill, 2014). An amended Perkins Act in 1990 relied on a three-part approach that would better prepare the nation's workforce for 21st century demands (Gordon & Schultz, 2020; Levesque et al., 2008). The first approach was to integrate academics and CTE instead of isolating the two paths. The second approach was linking different segments of education with the goal of producing a student who was exposed to vocational, general education, and higher education. The third approach was to increase the link of school and work throughout students' education through programs that exposed students to workplace settings such as job shadowing or internships. It was also at this time that the name changed from vocational education to career technical education (career tech for short). Career technical education was no longer thought of as a separate track from general education but as an integrated educational necessity for secondary and post-secondary students to compete in a 21st century global society (Holzer, 2015; Rojewski & Hill, 2014; Smith, M. et al., 2018; Winchester-Seeto & Piggott, 2020).

Experiential Learning in CTE

Career technical education provided students with a variety of learning opportunities inside and outside the classroom that strengthened the academic foundation in the classroom. This exposure to multiple facets of learning styles and a focus on the learner to develop a keen sense of self through social interactions in education and the workplace could be associated with the method of experiential learning (EL) which has become a staple of CTE (Esters & Retallick, 2013). Esters and Retallick (2013) performed an exploratory study on the effect of an EL and WBL program on vocational identity, career decision self-efficacy, and career maturity in a college program. They used the conceptual framework of psychological constructivism which relied on the premise that it allowed learners to construct their own knowledge and those learners, through immersion or experience in the field, use this to deepen their understanding and meaning of the curriculum. Their sample size was only 62 and limited to undergraduate students in the College of Agriculture and Life Sciences enrolled in that specific learning program. They used the My Vocational Situation Scale to access vocational identity, career decision self-efficacy, and career maturity with a questionnaire to garner demographic information. Paired t-tests were performed and showed positively strong differences in mean pre- and post-assessment scores for career decision self-efficacy and vocational identity. Experiential learning could be defined simply as learning through experiences. Kolb et al. (2014) posits the experiential learning theory (ELT) as an integrated educational process that combines the learners' experience, perception, cognition, and behavior to link their concrete experiences, observations and reflections, formation of abstract concepts and generalizations, and tested implications of concepts in new situations in a continuous cycle of problem-solving.

Dewey was one of the first to discuss the importance of linking experiences and education in the early 20th century in which learning in a social environment was paramount to the outcome of the learning experience (Roberts, 2006; Seaman et al., 2017). The role of the school up to the early 20th century was to impart knowledge and facts. Dewey believed that a student's life experiences and integrating knowledge into real life situations was better for the student learning experience than memorizing facts (Lewis & Williams, 1994; Roberts, 2006).

Classroom

Learning began in the classroom through the delivery of curriculum in many traditional forms such as lecture, discussion, or laboratory experiences by the instructor. The use of EL in the classroom built upon that foundation by taking the student from a passive learner to the role of an active respondent (Hawtrey, 2007). It was this change in roles that gave students the power to control their own learning through opportunities to apply the knowledge gained in the classroom and connect it to their own life experiences (Sisselman-Borgia & Torino, 2017). The use of EL in the classroom was often limited to problem-based learning in which students were given scenarios of what they may encounter in industry for the purpose of utilizing deductive reasoning. These EL classroom cases should only be used as a preparatory tool for real world field experiences (Georgiou et al., 2008).

Providing Relevant Field Experiences with EL

Once students were introduced to the classroom curriculum through EL, the next step was for them to practice in a real-world environment. It was through this cycle of constructing knowledge and meaning from field experiences that students made the connection between theory and practice to develop new skills and new ways of thinking (Lewis & Williams, 1994). It was not enough to place students in field experiences with the expectation of learning to occur, although the student may have learned some lessons. Instructors must be knowledgeable and deliberate when using EL to connect students with experiences so that students are exposed to all four stages of the ELT cycle (Kolb & Kolb, 2017) to receive the maximum learning benefit. The placement of students should be thought of more as a continuous learning process instead of an outcome (Kolb & Kolb, 2009; Cannon & Geddes, 2019).

WBL

Experiential learning has been the foundation of CTE learning from its conception. This learning process has morphed in CTE into more than just hands-on learning into a more complicated cycle of learning and trying with an emphasis of reflection on “active experimentation” that integrated their experiences into theories from which they turned into another round of experiences in a complex cycle of learning (Lewis & Williams, 1994; McCarthy, 2010).

Providing students with real-world training using EL in CTE came in the form of WBL which is an umbrella term for those experiences. The term work-integrated learning (WIL) is widely used outside of the United States but shares the same definition and purpose as WBL. Work-based learning is the combining of workplace experiences and CTE curriculum so that students construct knowledge through the workplace in structured or uncertain situations (Brown, 2003; Harnish & Wilke-Schnaufer, 1998). Experiential learning in WBL is essential to the academic and career success of students (Esters & Retallick, 2013; Watters et al., 2013). Watters et al. (2013) examined the theories of organizational knowledge, workplace learning, and EL to explore strategies that educational institutions can utilize to enhance WBL transition outcomes in Australia. The state government of Queensland instigated the Gateway to Industry Schools Program to promote vocational options for high school students utilizing WBL. Watters et al. (2013) adopted a longitudinal case study approach using data from twenty schools out of the one hundred and fourteen secondary schools across Queensland. Primary data were obtained in interviews with key stakeholders while secondary data were obtained from teaching materials, websites, and policy documents. They found that the various schools within the partnership projects enacted those partnerships in numerous ways although they were given the same guidelines and therefore were poorly implemented as various high schools. The findings lacked clarity and it was hard to follow the author’s logical flow of how they arrived at their findings and conclusions based on the minimal data reporting that was gleaned. For WBL to be considered a successful strategy, it must be designed with EL in mind to occur in a designed and structured placement that encourages reflective learning in a participatory cycle as to involve the student, WBL mentor, and the instructor throughout the experience (Chisholm et al., 2009; Coll et al., 2011).

WBL Programs

K-12 School Programs

Work-based learning was not exclusive to CTE and has been utilized extensively in core academic curricula to offer opportunities and benefits for students to enhance academic coursework (Darche et al., 2009). Work-based learning was embedded in K-12 schools throughout the United States. It was used in elementary and middle schools through career awareness and exploration programs. Some examples included guest speakers, field trips, or career research. The concept of career-readiness for high school students has been thrust into the spotlight in the past few decades especially after amendments to the Carl Perkins Act in 1990 and the School-to-Work Opportunities Act of 1994. Exposure of high school students to careers became more focused and intentionally structured to promote learning through EL rather than just exposing students to the career without any form of learning process (Stasz & Stern, 1998). Stasz and Stern (1998) completed a descriptive analysis of multiple studies that examined through direct quotes from various high school and community college students and instructors involved in WBL. They explored the purposes of WBL and the effect it had on student achievement. Although the study went in-depth concerning how WBL was structured and delivered at the various educational institutions, there was little quantitative evidence for the success of WBL that was presented. The broad definition of career-readiness is a students' attributes and abilities to navigate and thrive in a labor market that is rapidly changing thanks to technological advancements (Alfeld et al., 2013; Jackson, 2018).

Industry Partnership

Career technical education has long relied on a strong collaborative relationship between education and industry. It is a symbiotic relationship in which CTE provides a skilled workforce and industry provides career opportunities, training environment for WBL, and a source of relevant curriculum objectives (Gordon & Schultz, 2020). In recent years, even universities and industries that relied on university graduates have realized the importance of WBL and have integrated it into the curriculum as a pedagogical tool to enhance the learning experience (Berndtsson et al., 2020; Boud & Garrick, 2012; Jackson, 2017; Monteiro et al., 2016). Jackson (2017) investigated how WBL influenced the development of a student's pre-professional identity in undergraduates in a Western Australian university using a qualitative approach in the form of structured reflections over two time periods from 105 business students. Students used the WBL to develop their professional identity by working closely with industry professionals to observe, question, and interact. Jackson chose the 105 students in the final stages of their degree that participated in WBL. The author was thorough when describing the method section, especially when describing the ethical portion of the procedures. Students were required to write two reflections towards the end of their WBL experience. Those reflections were structured to focus on how WBL influenced their pre-professional identity. Jackson (2017) found themes that helped students develop their pre-professional identity that used EL such as understanding of responsibilities, self-evaluation and reflection, and self-directed learning. Industry representatives were willing to partner with educational institutions to provide WBL opportunities which are critical to the success of students and the program. Instructors and industry partners must work together to share knowledge and develop curriculum and assessments that reflect an authentic learning environment through WBL (Watters et al., 2013).

An authentic learning environment in which both the industry partner and instructor work closely together was demonstrated by Berndtsson et al. (2020) from Sweden who examined sixteen articles pertaining to nursing education using an integration review method to identify models of WIL that integrated theory and practice between nursing education and the clinical placement of students. This study utilized the guidelines of Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) to conduct the research. During the quality assessment process, researchers ranked the articles utilizing the consolidated criteria for reporting qualitative studies checklist for both quantitative and qualitative. Three themes (supervisor support, variety of modules, and teacher/clinical supervisor collaboration) were used to present the results of their research. Berndtsson et al. (2020) found that supervisor support was needed to help nursing students develop their professional identity as supervisors serve as role models to provide students with peer support and critical thinking skills. Their findings demonstrated the critical importance that industry partners play in WBL programs to enhance a student's education.

Higher Education Programs

The higher education community is beginning to understand the importance of WBL in the development of competent graduates who are better prepared for the world of work (Monteiro et al., 2016; Little & Brennan, 1996; Oliver, 2015). Monteiro et al. (2016) examined the effect of gender and WBL of 411 college graduates and their perceptions of competency and overall preparedness for the labor market. Through the utilization of a questionnaire given to 411 graduate students in their final year of their master's degree, the authors found that there was no significant difference for men and women in relation to either the main effect of WBL on their perception of workplace readiness. The study used descriptive statistics for the evaluation of competencies by gender and WBL experience. Rowe and Zegwaard (2017) examined the growing emphasis on higher education institutions to produce employable graduates through WBL and made a distinction between graduate employability and employment outcomes. Smith et al. (2014) also researched the need for WBL in higher education to address a growing industry dissatisfaction with graduate employment readiness. A series of five studies were developed to capture both quantitative and qualitative data on fourteen universities in Australia. The studies included the following: Cross-sectional (institutional study), Proxy-longitudinal (subject study), Alumni Interview, Employer Interview, and Employer Survey. Their aim for the project was "to provide a systematic and rigorously derived empirical evidence-base for making judgements about the value and impact of WIL to universities, students, industry and government" (Smith et al., 2014, p. 20). They concluded that, even after they control multiple factors such as work experience, age, or progression in curriculum, WBL placement during school had a significant impact on all graduate outcomes but especially on employability. Employers' feedback during the WBL experience confirmed that students are more self-aware of their skills, better professional communicators, and are more committed to and interested in the job and therefore are more work-ready when they graduate.

WBL and Student Outcomes

This section reviewed the research that has examined the various student outcomes of CTE and WBL opportunities from diverse educational settings. The outcomes examined below are derived from various points of a student's educational experience including after graduation.

Achievement/Engagement

Up until the 1980s, CTE was thought of as a separate educational track for those who could not manage the academic rigor of high school and higher education. The Perkins Act of 1990 sought to break down that barrier by dramatically increasing federal funding for CTE and began to push integration of academics and vocational skills in CTE (Gordon & Schultz, 2020). Students who participated in CTE in high school with embedded WBL components, became more engaged in other classes as they realized the relevance and connection between CTE and their other high school classes (Brown, 1998; Darche et al., 2009; Wonacott, 2002). Bailey and Merritt (1997) reported on preparation programs in high schools that used school-to-work strategies to prepare students for careers and college. Their report discussed the basic elements of school-to-work in which learning is authentic in nature, learner-centered, and guided by students' experience outside of the classroom such as workplace learning (Bailey & Merritt, 1997). Their conclusion was that if school-to-work programs are planned and implemented well, students can integrate academic and career skills while positively impacting their grades and test scores with the hope of becoming a better candidate for college admission.

A report on how WBL in high school can affect career pathways was commissioned by the Australian government in 2005. Smith and Green (2005) utilized a comprehensive survey that was sent to respondents that were part of previous projects. The survey gathered 424 potential respondents from one of the previous projects and 375 from thirteen schools in two states in Australia. Data were also supplemented by telephone interviews. Smith and Green (2005) found multiple conclusions regarding the effectiveness of WBL and CTE during high school, but the strongest finding that emerged was how important workplace exposure during high school was to assisting students in developing increased confidence with social interactions and helping them with making better informed decisions regarding career and further educational choices after high school graduation.

Graduation/Attendance

When students become more engaged in school due to participation in CTE or WBL relevant to their interests, their attendance and graduation rates can be positively influenced (Castellano et al., 2012; Castellano et al., 2017; Kemple & Snipes, 2000). Castellano et al. (2017) examined the effect of CTE on high school achievement outcomes such as grade point average (GPA) and graduation rate using data from a large urban school district in western United States in a longitudinal study. Although it focused on CTE, it discussed WBL as a major component of the CTE experience. The method was a natural experiment in which students were already enrolled in CTE through a random lottery and compared to those not enrolled in CTE. The study comprised 1,175 students enrolled in CTE, and 829 students enrolled in a normal comprehensive high school class schedule. They concluded that there was no significant effect of enrollment in CTE courses on GPA. They found that CTE increased students' probability of graduation by an average of 11.31%. Many students who drop out of school do not see relevance in what they are learning to their future beyond school (Rogers-Chapman & Darling-Hammond, 2013). Through participation in CTE and WBL, students begin to understand the relevance of education to their current and future success (Alfeld et al., 2013; Jackson & Wirt, 1996; Sampson et al., 2011).

Post-Secondary Outcomes

This section analyzed the effect of WBL on post-secondary outcomes such as employment and transition to higher education. When students leave high school, they are often unprepared academically and professionally for their next step in life. Students who completed

CTE and/or participated in WBL are often better prepared for the workforce or continuing education at a post-secondary institution (Griffith, 2001; Haimson & Bellotti, 2001; Maxwell & Rubin, 2002; Stone III & Aliaga, 2005). Although CTE and WBL prepare students to be college and career ready, the reality is that most students who participate in CTE and WBL begin their career after high school rather than continuing to higher education (DeLuca et al., 2006). DeLuca et al. (2006) examined course taking patterns of high school students using the National Longitudinal Study of Youth 1997 data to examine if CTE and WBL affected college enrollment. They focused on 1,691 youths born in 1980 and a subgroup of 873 students for which they obtained transcript data. One finding indicated that students participating in tech-prep programs seemed to be associated with lower chances of college enrollment. Although there was a negative relationship, they cautioned that more research was needed as well as a holistic view of those students in the fact that they went directly into the labor market to begin a career with wages significantly higher than those without CTE. Work-based learning participation during high school allowed students to develop or refine career skills through work experience and allowed application of academic knowledge (Smith, 2014). It also allowed students to develop their professional identity early and make better informed career or educational decisions after graduation (Esters & Retallick, 2013; Martin & Rees, 2019; Rodriguez et al., 2016).

Griffith (2001) studied the effect of 4,050 high school students' participation in WBL on their activities one year after graduation. The methods section was not helpful when determining exactly how data were collected but spends most of the section describing how WBL was classified and should be placed in another section of the study. The sample was large at 6,214 eligible seniors. They completed a state graduate questionnaire. One year after graduation, students were mailed a follow-up questionnaire which gathered information on their education or work status including wage information. The questionnaire was like the follow-up information that CTE districts in Oklahoma gather from students after graduation. The study found that CTE students with WBL reported higher wage earnings and identified that they were better prepared for the job they received after graduation compared to those who did not participate in CTE or WBL.

Labor Market Outcomes

Career technical education is closely aligned with labor market outcomes. The main purpose of CTE is to provide students with a quality education to receive a job in the career field for which they have trained. Career technical education districts are continuously in tune with the local, state, and federal job market outlook to meet those industries' workforce needs. The districts accomplished this through active participation in the local and state chamber of commerce, active advisory committee meetings with local industry partners, and yearly review of program data gathered through yearly student follow-up procedures, and job outlook data through such agencies as the Bureau of Labor Statistics. Career technical education districts are always in touch with the labor market's performance, specifically with wage and employment data. They use this data to fill job vacancies and evaluate program capacity. Career technical education districts examine the following components of the labor market to make relevant and timely decisions of program offerings:

- Labor supply and demand
- Specific industry demand
- Unemployment rate

Distinctive characteristics of WBL played a role in labor market outcomes in assorted studies. The characteristics of timing, quality, and quantity and their influence on labor market outcomes have been studied with findings varied from positive, negative, or neutral (Dwesini, 2017; Garwe, 2020; Holzer, 2015; Venkatraman et al., 2018). Jackson and Collings (2018) explored the influence of practical WBL on graduate employment outcomes using quantitative analysis. They studied the employment outcomes of approximately 1,200 college graduates in Australia. Results indicated that students who completed WBL during school reported a higher full-time placement rate (57.3%) than those who did not (47%), but this was only in the short term as the rate became the same the more time passed after graduation. Work-based learning provided improved non-technical skills, clarity of the career expectations, clarity of application between academic and profession, and easier transition to the workplace (Cranmer, 2006; Jackson & Collings, 2018; Luekitinan, 2018; Shandra & Hogan, 2008).

Gaps in the literature

The literature review highlighted three gaps in literature pertaining to WBL. The first gap was that most literature on WBL discussed the effect on academic achievement, student engagement, refinement of skills, and career exploration during the educational experience (Bryant et al., 2013; Freestone et al., 2006; Jackson, 2017; Trede, 2012). These studies focused primarily on students during the program and not on post-graduation outcomes. There were few studies that focused on the relationship of WBL during school and program outcomes after graduation, such as positive placement (Garwe, 2020; Monteiro et al., 2016; Rowe & Zegwaard, 2017; Venkatraman et al., 2018). These studies mentioned tended to utilize a qualitative or mixed-methods approach that was limited because they used data anecdotal in nature and sample sizes tended to be low which can skew the relationship between WBL and success after graduation. This dissertation utilized a quantitative methods approach to determine if there was a relationship between the number of WBL hours and the outcomes of positive placement and completion in a standalone CTE district. This study also tested the type of learning offered based on the four stages of Kolb's experiential learning theory cycle.

The second gap was the lack of studies that focused on the relationship between WBL and student outcomes in standalone CTE districts. The setting for these studies has primarily been K-12 or higher education. There were only a few studies (Akkerman & Bakker, 2012; Alfeld et al., 2013; Venkatraman et al., 2018) that focused on standalone CTE districts as most states incorporated CTE into the K-12 or local community colleges. Oklahoma has a separate CTE educational system that is governed by its own state agency. This presents the perfect chance to gather research data from one of the 29 CTE districts in Oklahoma.

The third gap was the lack of studies that focused on the type of learning process involved during the WBL. This study included experiential learning theory in understanding the relationship between WBL and the outcomes of positive placement and completion. The four stages of experiential learning theory were used as binary variables in the regression models based upon the answers from the WBL survey given to instructors. Most studies discussed the learning process while examining the student outcomes (Bailey & Merritt, 1997; Brown, 1998; Darche et al., 2009), but most of those do not include experiential learning theory when describing the student learning experience although some do discuss the influence of experiential learning in the classroom and WBL experience that helped to shape the student learning experience (Cannon & Geddes, 2019; Esters & Retallick, 2013; Watters et al., 2013). Some studies (Castellano et al., 2017; Kemple & Snipes, 2000; Wonacott, 2002) examined the effects of CTE as a learning process on student outcomes.

Chapter 3: Theoretical Framework

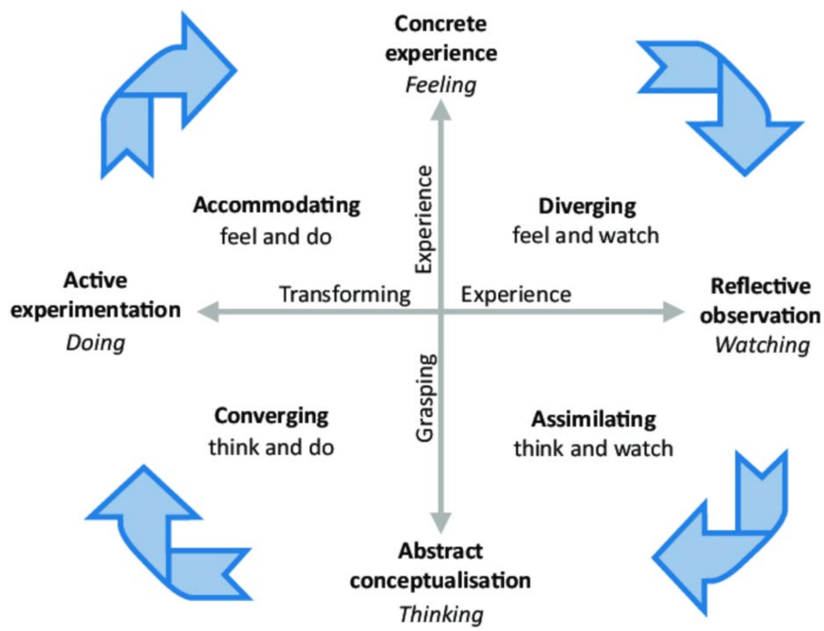
This study draws on experiential learning theory (ELT) as a lens for informing the data analysis and overall research design. David A. Kolb developed ELT in 1974 as a modern view on previous works by John Dewey, Kurt Lewin, and Jean Piaget. At the beginning of the twentieth century, most education was formal in nature in which the instructor presented the information, and the student was expected to learn and apply that knowledge. A more experience-based educational approach to learning began to emerge in colleges in the form of laboratory classes and clinical experiences (Lewis & Williams, 1994). Experiential learning theory suggests that students learn best through a process of learning by doing through a continuous cycle of action/reflection and experience/abstraction and it is through this process that they are better able to connect academic classroom knowledge to real-world situations in which that knowledge is practiced (Yardley et al., 2012). By engaging students in direct experiences and reflection, students are better able to connect theories and classroom knowledge to real-world situations (Seaman et al., 2017). Since the development of ELT in 1974 by Kolb, many educational innovations that have been developed as 'non-traditional' have utilized ELT as a basis for the educational process (Kolb & Kolb, 2017).

Kolb and Kolb (2009) theorize that when instructors expose students to new experiences, those experiences allow the transformation of experience to knowledge to occur. Those experiences follow the four stages of the ELT cycle: active experimentation (AE), concrete experience (CE), abstract conceptualization (AC), and reflective observation (RO) (Figure 3). Kolb & Kolb (2017) theorize that a learner could start in any of the four stages, but the cycle should be completed in entirety for effective learning to occur as each stage is dependent on each other. Kolb and Kolb (2009, p. 43 - 44) posit that ELT integrates the work of past EL pioneers around six propositions common to all scholars:

1. Learning is best conceived as a process, not in terms of outcomes. A process that includes feedback on the effectiveness of the student's learning efforts.
2. All learning is re-learning. Learning is best facilitated by a process that draws out the students' beliefs and ideas about a topic so that they can be examined, tested, and integrated with new, more refined ideas.
3. Learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world. Conflict, differences, and disagreement are what drive the learning process. In learning, one is called on to move back and forth between opposing modes of reflection, action, feeling, and thinking.
4. Learning is a holistic process of adaptation. It is not just the result of cognition but involves the integrated functioning of the total person – thinking, feeling, perceiving, and behaving. It encompasses other specialized models of adaptation from the scientific method to problem solving, decision-making, and creativity.
5. Learning results from synergetic transactions between the person and the environment. Stable and enduring patterns of human learning arise from consistent patterns of transaction between the individual and his or her environment. Thus, people create themselves through the choice of actual occasions they live through.
6. Learning is the process of creating knowledge as opposed to the traditional 'transmission' model in which pre-existing ideas are transmitted to the learner.

Figure 3

Kolb's Experiential Learning Theory Cycle



Experiential learning theory evolved from the psychological constructivism ideology that student experiences influence and help construct the learning for students (Esters & Retallick, 2013). The four stages of the ELT cycle in which students learn by doing, learn in real-life experiences, learn through hands-on projects, and learn through solving problems that they will encounter in the job, when combined with the fundamentals they encounter in the experience such as the external environment and sensory influences can help the student amplify the effectiveness of the experience and maximize learning (Beard & Wilson, 2002). In many discussions of educational reform, many purpose models of teaching and learning in which students are more active participants and the instructor role changes from a deliverer of knowledge to becoming more of a facilitator (Padron & Waxman, 1999).

Experiential Learning Process

EL can be defined simply as learning through experiences. Kolb et al. (2014) posits the experiential learning theory (ELT) as an integrated educational process that combines the learner's experiences, perceptions, cognitions, and behaviors to link their concrete experiences, observations and reflections, formation of abstract concepts and generalizations, and tests implications of concepts in new situations in a continuous cycle of problem-solving. Experiential learning in the workplace is "a learning environment that can enhance and supplement formal education and can foster personal development through meaningful work and career-development opportunities" (Kolb, 1984, p. 4). EL can be utilized to link education, work, and personal development (Kolb, 1984).

Experiential learning begins with involving the student in an experience and then facilitating the reflection about the experience. It is during this reflection that students develop new skills, attitudes, and new ways of thinking in a cycle of professional growth (Lewis & Williams, 1994). Experiential learning can be used in various educational settings and is not relegated to experiences outside of the classroom. Chickering & Gamson (1987) recommend "active learning" as one of their seven areas of good educational practice which encourages students to do more than just absorb knowledge from the instructor, but to participate in activities and reflect on those learning experiences. Experiential learning in the classroom can manifest in many different forms such as real-life scenarios, group projects, or role playing. These types of EL experiences help students relate theory to industry and help analyze those real-life situations to develop solutions before they encounter them in the workplace (Chickering & Gamson, 1987). Some examples of EL include the following:

- performing experiments in chemistry class
- learning about food by growing a garden

- learning about animals by visiting the zoo
- becoming an apprentice to learn carpentry
- practicing customer service skills by role playing in class

Concrete Experience

The concrete experience is all about involvement as it engages the learner in an activity or task instead of just reading or watching about it. This experience or situation may be new to the learner although it could be an existing experience that the learner reinterprets because of new concepts that were formed during the learning process. These experiences relate to everyday experiences that can occur in a learner's educational journey and in their professional or personal life. Although this step is normally the beginning of the cycle, the learner does not have to start from this step (Kolb & Kolb, 2009).

Reflective Observation

Reflective observation allows the learner to reflect after engaging the experience or task through the lens of their existing knowledge base and allows communication between the learner and others involved to review their understanding comparing it to the experience. It is through this process that learners find out if there are any inconsistencies that may have occurred between the experience and their understanding based on prior knowledge. An example would be if a health student had to learn a new procedure as part of their clinical education and after practicing the new procedure would think about how they could have done the procedure better next time (Kolb & Kolb, 2009).

Abstract Conceptualization

The learner in the abstract conceptualization stage reflects on the experience which could result in a new idea, or modification of an existing concept utilizing the reflections of the experience. It is during this phase that the learner has learned from the experience and is better equipped to deal with the identical or analogous situation. They use ideas, logical approaches, and theories rather than relying on feelings or interpersonal concern to understand the new experience or problem (Kolb & Kolb, 2009).

Active Experimentation

The learner in the active experimentation stage actively experiments with multiple solutions to determine what works and takes a practical approach to the situation. During experimentation, learners apply their conclusions to new experiences with the goals of being able to make predictions based on knowledge gained, analyzing tasks, and applying the acquired knowledge in future planning (Kolb & Kolb, 2009).

Experiential learning theory has a component embedded in the process called a learning styles inventory (LSI) used by the learner to identify their preferred learning styles. The learner then uses the identified learning styles to better navigate the experiential learning theory cycle (Kolb, 1981). Although the LSI has been described by some researchers such as Freedman and Stumpf as being unreliable and improperly structured, it should not be the sole contribution to the overall implementation and success of ELT (Kolb, 1981). This process of identifying how a student learns best becomes important in WBL. Kolb identifies nine diverse ways of navigating the learning cycle that students utilize based upon personality, educational specialization, professional career, culture, and adaptive competencies. The following styles provide a framework for understanding yourself and others who do not share your style so that you can help foster more productive interactions with WBL partners (Kolb & Kolb, 2017, p. 23 - 24):

- Experiencing – the ability to find meaning from deep involvement in experience. It draws on CE while balancing AE and RO.
- Imagining – the ability to imagine possibilities by observing and reflecting on experiences. It combines the learning modes of CE and RO.
- Reflecting – the ability to connect experience and ideas through sustained reflection. It draws on RO while balancing CE and AC.
- Analyzing – the ability to integrate and systematize ideas through reflection. It combines RO and AC.
- Thinking – the capacity for disciplined involvement in abstract and logical reasoning. It draws on AC while balancing AE and RO.
- Deciding – the ability to use theories and models to decide on problem solutions and courses of action. It combines AC and AE.
- Acting – a strong motivation for goal directed action that integrates people and tasks. It draws on AE while balancing CE and AC.
- Initiating – the ability to initiate action to deal with experiences and situations. It involves AE and CE.
- Balancing – the ability to adapt by weighing the pros and cons of acting versus reflecting and experiencing versus thinking. It balances CE, AC, AE, and RO.

When students are ready to start the WBL experience, the instructor identifies the WBL location that best suits the learning style needs of the student and the industry (Esters & Retallick, 2013).

Experiential learning theory combines the four cycles into two related modes of grasping experience (concrete experience and abstract conceptualization) and transforming experience (reflective observation and active experimentation) (Kolb & Kolb, 2009). The ELT cycle is also divided into four learning quadrants: Diverging, Assimilating, Converging, and Accommodating. Each learning quadrant is tied to two cycles. For example, diverging learning is characteristic of concrete experience and reflective observation. Diverging learners prefer watching to doing, have strong imaginations, and prefer to work in groups. Assimilating learners have characteristics of abstract conceptualization and reflective observation. Concepts and abstract ideas appeal to them more than people. Converging learners have characteristics of abstract conceptualization and active experimentation. They like to solve problems and experiment with innovative ideas. Accommodating learners have characteristics of concrete experience and active experimentation. They tend to be practical thinkers that are driven by new challenges solving problems intuitively (Kolb & Kolb, 2009).

Work-based learning is an experiential learning process by which the instructor, student, and employer must be engaged through every step from preparation and placement being in continuous communication (Freestone et al., 2006). Experiential learning theory provides a roadmap through which all participants must navigate for successful WBL. When using EL during WBL, research has shown multiple benefits to the learner, such as increased development of interpersonal and professional skills (Chisholm et al., 2009). Chisholm et al. (2009) examine how ELT can be used to develop a common framework that helps to establish WBL as a more formalized and accepted educational experience that would help to eliminate the resistance of traditional academic institutions to utilize WBL. They emphasize the fundamental need for rational and reflective thinking as the lynch pin to WBL which is critical in the ELT cycle. Students have a chance to use the academic knowledge learned in the classroom for a concrete experience. During these experiences, students develop their intelligence concerning teamwork and communication skills (Trede, 2012; Venkatraman et al., 2018). It is through embedding EL in WBL that students develop skills for independent and social learning while developing their career identity and self-efficacy which ELT posits that the greater number of WBL hours in industry associates with higher rates of positive placement (Byrom & Aiken, 2014; Esters & Retallick, 2013). The hypothesis is that the more students interact with employees in the industry, the more industry contacts, and relationships they will possess which should increase their job placement opportunities.

Chapter 4: Methods

Study Purpose and Research Questions

This study tested whether there is an association between the number of hours in WBL experiences and the student outcomes of positive placement and program completion for CTE students. It also tested whether there is an association between the type of learning provided and the student outcomes of program completion and positive placement. Specifically, the following research questions were addressed:

Research question 1 - *Is the number of hours spent in work-based learning experiences associated with positive placement for graduates of a standalone career technical education district?*

Research question 2 - *Is the number of hours spent in work-based learning experiences associated with program completion for graduates of a standalone career technical education district?*

Research question 3 - *Is the type of learning provided (i.e., Kolb's four stages of learning) in a program associated with program completion and positive placement?*

The study used a quantitative methods approach to analyze program outcome data gathered six months after the student graduates and instructor surveys. There were multiple studies that examined the academic and skills benefits of WBL for students during the program (Castellano et al., 2012; Kemple & Snipes, 2000; Smith & Green, 2005). Studies have shown that WBL was positively associated with positive career placement after graduation by examining how well students transition from academic to career utilizing qualitative research methods (Griffith, 2001; Haimson & Bellotti, 2001; Maxwell & Rubin, 2002). There are few studies that utilized quantitative methods to analyze relationships between WBL and the student outcomes of positive placement and completion. There were also a couple of studies that looked at the association between the type of learning provided and the student outcomes of program completion and positive placement.

Study Setting and Data Sources

Table 1 below lists WBL benefits for students, businesses, and schools according to the Oklahoma Department of Career and Technical Education (2023). Table 2 below lists the full-time student enrollment information of the standalone CTE district utilized for this dissertation study.

Table 1. WBL Benefits for Students, Business, and Schools

Students	Business	Schools
Touch, feel, and experience a career	Opportunity to influence their future workforce	Provide students with valuable experiences to prepare for career
Develop soft skills	Build a pool of skilled workers	Create closer ties with business and community
Gain work experience to prepare them for career	Serve as a recruitment strategy	Increase student motivation
Get their foot in the door that might lead to a job offer	Allow business to experience potential employees	Increase student enrollment
Build a network with professionals	Create a positive reputation in the community for providing growth for students	Reduce dropout rate
Observe professionals in their chosen career		
Get exposure to careers in the community		

Table 2. District Wide Student Information

Category	Student Group	Student Type	n
District	All Students	All	5,664
Disability Status	With a Disability	Adult	82
		High School	355
	Without a Disability	Adult	1,496
		High School	3,731
Economic Status	Economically Disadvantaged	Adult	544
		High School	453
	Not Econ Disadvantaged	Adult	1,034
		High School	3,633
Gender	Female	Adult	606
		High School	1,772
	Male	Adult	971
		High School	2,302
	Unknown	Adult	1
		High School	12
Race/Ethnicity	American Indian/Alaska Native	Adult	162
		High School	451
	Asian	Adult	57
		High School	188
	Black	Adult	181
		High School	344
	Hawaiian or Pacific Islander	Adult	2
		High School	8
	Hispanic	Adult	261
		High School	1,152
	Two or More	Adult	79
		High School	196
	Unknown	Adult	10
		High School	15
	White	Adult	826
		High School	1,732
Student Type	Adult	All	1,578
	High School	All	4,086

n = Number of Students

Table 3 below lists all programs offered at the CTE district and their enrollment information. The apps column documented the number of applications that the program received for the 2021 - 2022 school year. Enrollment is the number of students accepted into the program. Capacity is the maximum number of students that can be enrolled in the program. The column, Cap %, is the percentage of students enrolled in the program compared to the actual enrollment number.

Table 3. Enrollment by Program and Campus SY 21-22

Program	Campus	Apps	Enrollment	Capacity	Cap. %
Accounting	2	110	44	48	91
Advanced Pre-Engineering	1	126	147	240	61
Aerospace Structure Tech	3	32	14	48	29
Animation	3	124	69	72	95
Applied Engineering Tech	6	65	37	36	102
Auto Mainten. Light Repair	4	72	40	36	111
Auto Service Tech	4	337	214	212	100
Aviation Generals-HS	3	61	49	72	68
Aviation Maintenance Tech	3	221	190	224	84
Biomedical Science PLTW	8	29	52	100	52
	1	51	59	72	81
Business Management Ent.	6	181	39	36	108
Carpentry	1	79	35	42	83
	7	67	34	36	94
Certified Machine Operator	4	17	9	25	36
Certified Machine Technician	4	80	93	154	60
Collision Refinishing	4	45	41	44	93
Collision Repair	4	56	45	48	93
Computer Repair	6	74	38	36	105
	3	74	37	36	102
Cosmetologist-Adult	4	199	36	54	66
Cosmetologist-HS	4	143	71	72	98
	2	143	57	72	79
	7	72	35	36	97
Criminal Justice Invest.	2	44	38	36	105
Criminal Justice Pract. Law	2	85	37	36	102
Culinary Arts	6	209	88	108	81
Cyber Security/Forensics	3	122	74	72	102
Dental Assisting	5	62	37	36	102
Digital Graphics	7	62	36	36	100
Drafting	4	74	68	92	73
Early Care & Education	2	55	67	72	93
Electrical Trades	7	133	36	36	100
Electricity	1	113	36	50	72
Electronic Control Systems	7	45	35	36	97
Emergency Medical Tech	2	347	115	136	84

Enterprise Network Assoc.	3	25	21	36	58
Enterprise Network Techn.	3	20	10	36	27
Found. App Development	8	14	27	120	22
Foundation of Construction	8	57	50	60	83
Foundation of Engineering	8	627	675	1,033	65
Found. Fashion/Apparel Des.	8	55	49	100	49
Found, of Interior Design	8	52	55	90	61
Foundations of Manufact.	8	413	346	500	69
Foundations of Web Design	8	93	97	100	97
Health Science Technology	4	124	82	80	102
	6	124	73	80	91
	2	111	76	72	105
	3	111	78	72	108
	7	62	40	40	100
HVAC Technician	1	212	75	72	104
IT System Administration	6	41	37	36	102
	3	41	41	36	113
Legal Professional Assistant	2	67	37	36	102
Light Diesel Truck Techn.	4	19	15	23	65
Masonry	1	25	17	18	94
Mechatronics Systems Tech.	4	40	39	36	108
Medical Assist. (With or w/o	5	302	128	137	93
Phlebotomy)	6	35	38	36	105
Medical Coding	2	96	16	18	88
Medical Health Clerk	2	65	42	44	95
Med/Heavy Diesel Tech.	4	70	38	36	105
Mobile App Development	3	52	37	36	102
Motorcycle Technician	4	85	38	36	105
Multimedia Design Assistant	3	63	35	36	97
Nursing Assistant	2	182	44	64	68
Nursing Options	5	54	74	72	102
Paramedic	2	139	66	68	97
Pharmacy Technician	5	64	39	36	108
	6	64	37	36	102
Photography	6	71	62	72	86
Powersports Technology	4	55	36	36	100
Practical Nursing	5	1,197	109	106	102
Private Pilot Ground School	3	49	35	32	109
Production Printing	7	28	21	36	58
Professional Barbering	2	99	18	18	100
Professional Dental Assistant	5	140	40	40	100
Professional Truck Driving	4	137	59	70	84
Radiologic Technologist	5	170	34	33	103

Restaurant/Lodging Manage.	6	43	28	36	77
Sound Engineering	6	45	31	32	96
	3	89	64	64	100
Sports Medicine	5	76	65	72	90
Surgical Technology	5	319	57	60	95
TV Production	3	79	54	64	84
Vision Care Assist/Tech	5	67	36	36	100
Visual Graphic Design	3	112	59	72	81
Welding Combination	4	66	33	36	91
	1	58	36	32	112
	2	102	59	56	105
	7	62	34	34	100
Welding Fabricator	1	73	13	32	40

To address the three research questions posed at the beginning of the methods chapter, the study drew upon existing program data about student outcomes collected each year at the CTE district and instructor surveys that asked if the four stages of the ELT cycle were utilized as a type of learning in the classroom and WBL. The study sample drew upon existing data about student outcomes for 3,881 full-time students enrolled in programs in the 2021 – 2022 school year. The CTE district operates six campuses in one metro area in a Midwestern state. High school students from fourteen K-12 school districts can attend for free. The district also accepts adult students in certain programs. The programs are a mixture of adult only, high school only, or a blend of both. The CTE district used in this study is the oldest and largest independent CTE district in Oklahoma and one of only twenty-nine independent CTE districts in Oklahoma.

The CTE district's mission is educating people for success in the workplace. It accomplishes this mission by offering eighty-two programs in thirteen of the sixteen career clusters. It also provides students with multiple schedule options to meet their needs from attending school half-day, full-day, or evening. High school students only attend half-days while adult students can choose one of the three depending upon what the program offers. Every program incorporates a form of WBL including industry guest speakers in the classroom or internships at the job site. Data were used from the follow-up process. The district institutional research department provided data for other variables such as age or ethnicity which were not gathered through the follow-up process.

The literature review detailed the names and definitions of WBL that can occur and explored those different names connecting them to the general descriptions (Alfeld et al., 2013; Bailey & Merritt, 1997; Brown, 2003; Gordon & Schultz, 2020). This study utilized the definition of WBL by the Oklahoma Department of Career and Technical Education. It defines WBL as structured opportunities for students to interact with employers or community partners either at school, at a worksite, or virtually, using technology to link students and employers in various locations. The goals of WBL are for students to build awareness of potential careers, facilitate student exploration of career opportunities, and to begin student preparation for careers (Oklahoma Department of Career and Technical Education, 2023). Only WBL in which there is direct contact with industry was included (Table 4).

Table 4. WBL opportunities

Learn About Work	Learn Through Work	Learn at Work
Guest Speakers	Internships	Apprenticeship
Field Trips	Clinical Experiences	On-The-Job Training
Job Shadowing		
Mentoring		

This choice rested on the assumption that direct industry contact is a particularly important aspect of WBL as students complete training in CTE. During this time, they are at the point of their career exploration journey where WBL shifts from career exploration to training an employee through such experiences as apprenticeship, on-the-job training, or clinical. It is during these experiences that students either solidify their commitment to the career field or decide that their passion lies in another career field. For these reasons, these experiences completed partly inside or completely outside the classroom will be the types of WBL opportunities studied in this dissertation.

Variables

Dependent Variables

The student outcomes of positive placement and completion are the dependent variables. Positive placement and completion are examples of many outcomes measured each year during the follow-up process performed for each graduating student. GPA is also a dependent variable. The four stages of the ELT cycle were also used to test the relationship between the type of learning provided and the student outcomes described above. These outcomes are considered more appropriate performance measures for CTE students as opposed to typical standardized test measures and grades used to evaluate students in traditional schools (Hamlin et al., 2023). These outcomes are used to create the program review document. The program review document is used to gain insight into key performance measures of the CTE district full-time programs.

The Oklahoma Department of Career Technical Education defines positive placement as a CTE student graduate that has enlisted in the military, is employed in the career field in which they trained or continuing in higher education in a related field of study. Positive placement is one of the top metrics utilized by CTE districts to evaluate the viability and success of full-time programs. The idea being that if graduates are not finding employment or continuing their education in that career field, then why offer that program. Completion is defined as a student who completes all program requirements and receives a certificate of completion from the CTE district.

Independent Variables

A survey given to all instructors was the source of the independent variables WBL hours, concrete experience, reflective observation, abstract conceptualization, and active experimentation. The survey (Appendix A) was sent through the school district email system to 168 instructors. There were 109 respondents. At least one instructor from each program responded. Data were clustered at the program level. Instructors were asked how many hours in their program students can participate in WBL (Clinical, Internship, Guest Speakers, Field Trips, or Workplace Tours).

Instructors were also asked eight questions about offering the four stages of the ELT cycle in the type of learning provided to students. The four stages are concrete experience, reflective observation, abstract conceptualization, and active experimentation. The instructors were asked if each of the four stages were offered in the program using a yes or no question. They were not given the name of the stage, only a definition and three examples of what type of learning looks like in the classroom or WBL. They were also asked to approximate the number of hours offered in each stage. Data for the yes or no questions were converted to binary variables for each of the four stages. A binary variable titled ELT (all four stages offered) was used in Table 12 in the results chapter that denoted whether the program used all four stages of the ELT cycle. Only the total number of WBL hours possible per program were used in the regression models as the school district does not currently track the number of WBL hours for each student in a district database.

Table 5 lists the summary statistics for the survey data. The minimum number of WBL hours offered to students was zero with a maximum of 1,059. The mean number of WBL hours was 101.33. In the sample, 81% of students were exposed to concrete experience during their program, 73% were exposed to reflective observation, 93% were exposed to abstract conceptualization, and 83% were exposed to active experimentation.

Table 5. Summary Statistics Survey Data (n = 109)

Variable	Mean	S.D.	Min	Max
WBL hours	101.33	155.75	0	1,059
Concrete experience	0.81	0.40	0	1
Reflective observation	0.73	0.44	0	1
Abstract conceptualization	0.93	0.26	0	1
Active experimentation	0.83	0.37	0	1

Control Variables

The control variables listed in Table 6 were chosen due to their potential influence on the dependent variables of positive placement, completion, and GPA. They were identified while completing research for the literature review. When conducting correlational research, internal validity of the research must be ensured by addressing validity threats such as confounding variables. If variables that may influence your dependent variables other than your independent variables are not considered, research bias could cause misinterpretation of the results.

Individual student data were chosen as research (Drysdale et al., 2016; McBeath et al., 2018) indicated that individual student characteristics may play a role in student achievement. Some programs taught at the district are traditionally male or female dominate, and that social dynamic could affect results (Tanggaard, 2007). Age and ethnicity of the student could affect the

WBL experience if they are placed in environments in which they are a minority or there is a significant difference in age between the student and the industry employees (Thompson et al., 2016).

The second group was the geographic locale in which the student lives. It was divided into the three categories of suburban, urban, and small city/rural. The category criteria are derived from the National Center for Education Statistics (NCES) locale definitions, as shown in Appendix B. Where students live can have an influence on their career options depending on the local job market (Gibbs, 1995). Suburban and especially urban areas are more inclined to offer more economically diverse opportunities than rural areas due to the concentration of businesses (Matthews et al., 2009).

Table 6 lists the control variables used in the regression models. A logistic regression model is appropriate when the dependent variable is dichotomous. The dependent variables of positive placement and completion are dichotomous. The model was designed to analyze data such as the dependent, independent, and control variables to explain the relationship between the binary dependent variables of positive placement and completion and the independent variables of WBL hours, AE, CE, AC, RO, and multiple control variables listed in Table 5 that can be nominal, ordinal, or interval in nature. A linear regression model is utilized when the variable is continuous. Student GPA is the dependent variable for the linear regression model in the results chapter.

Table 6. Description of Control Variables

Control Variables		
Individual Student Data	Gender	Male Female Unknown
	Age	15 - 72

Ethnicity	Black Hispanic Native Other race White
GPA	0.0 – 4.0
Completion	Program Completer Course Concentrator
Economic Status	Not Economically Disadvantaged Economically Disadvantaged
Special Education	Without a Disability With a Disability
Geographic Locale	Small City/Rural Suburban Large City

Table 7 presents a summary statistics overview of student data variables of analysis. Student data obtained from the standalone CTE district contained 3,881 student entries. Data included the variables positive placement, GPA, completion, female, age, ethnicity, economically disadvantaged, special education, and geographic locale. Dummy variables of zero and one were used for positive placement, CE, RO, AC, AE, completion, ethnicity, economically disadvantaged, special education, and geographic locale. Dummy variables of zero, one, and two were used for gender. Student GPA and age were continuous variables.

The dependent variables utilized in the regression models are positive placement, completion, and GPA. The mean for positive placement was 0.93 which indicated that 93% of the students were either employed in the program career field, enlisted in the military, or continued in higher education. For the variable of completion, 85% of students completed their program. The GPA mean of all students was 3.27.

The control variables were female, age, White, Black, Hispanic, Native, Other Race, economically disadvantaged, special education, suburban, and large city. The mean student age of the sample was twenty with a maximum age of 72. In the ethnic control variable, 45% of students were White, 10% were Black, 27% were Hispanic, 10% were Native, and 9% identified as Other Race. Thirty-seven percent of students were economically disadvantaged. Eight percent of students were designated as special education. Forty-three percent of samples lived in suburban areas, 44% lived in a large city, and 13% lived in small town/rural areas.

Table 7. Summary Statistics Student Data (n = 3881)

Variable	Mean	S.D.	Min	Max
Positive placement	0.93	0.25	0	1
GPA	3.27	0.85	0	4
Completion	0.85	0.40	0	1
Female	0.43	0.50	0	2
Age	20.43	6.36	15	72
White	0.45	0.50	0	1
Black	0.10	0.29	0	1
Hispanic	0.27	0.44	0	1
Native	0.10	0.30	0	1
Other Race	0.09	0.29	0	1
Economically disadvantaged	0.37	0.48	0	1
Special education	0.08	0.27	0	1
Suburban	0.43	0.50	0	1
Large city	0.44	0.50	0	1

Analysis

Descriptive Statistics

The study sample was internal student data gathered each school year through the application process, during school, and after graduation. The first step was to perform summary statistics (means, standard deviation, minimum and maximum values) for each of the variables. The second step was to run a correlation using the independent and dependent variables.

The data analyses proceeded as follows. First a correlational table was presented that examined bivariate correlations among the independent and dependent variables utilized in the regression models. Second, a logistic regression model predicting positive placement was performed, accounting for program-level clustering of student observations. In Model 1, the association between positive placement and WBL hours was estimated. Binary variables for concrete experience, reflective observation, abstract conceptualization, and active experimentation are also included in Model 1. In Model 2, variables for student age, female, economically disadvantaged, ethnicity, and special education status are introduced. For ethnicity, the reference category is White. In Model 3, a model with full controls was performed. Geographic locale variables are added for large city, suburban, and small town/rural. Small town/rural was the reference category.

Third, a logistic regression model predicting completion was performed, accounting for program-level clustering of student observations. In Model 1, the association between completion and WBL hours was estimated. Binary variables for concrete experience, reflective observation, abstract conceptualization, and active experimentation are also included in Model 1. In Model 2, variables for student age, female, economically disadvantaged, ethnicity, and special education status are introduced. For ethnicity, the reference category was White. In Model 3, a model with full controls was performed. Geographic locale variables are added for large city, suburban, and small town/rural. Small town/rural was the reference category.

Fourth, a linear regression model predicting GPA was performed, accounting for program-level clustering of student observations. In Model 1, the association between GPA and

WBL hours was estimated. Binary variables for concrete experience, reflective observation, abstract conceptualization, and active experimentation are also included in Model 1. In Model 2, variables for student age, female, economically disadvantaged, ethnicity, and special education status are introduced. For ethnicity, the reference category was White. In Model 3, a model with full controls was performed. Geographic locale variables are added for large city, suburban, and small town/rural. Small town/rural was the reference category.

Fifth, three models predicting positive placement, completion, and GPA were performed using a binary independent variable (ELT all four stages offered) representing programs that offered all four stages of the ELT cycle and WBL hours. Logistic regression was used for positive placement and completion. Linear regression was used for GPA. Each model included all control variables. The logistic regression models for positive placement and completion are presented as odds ratios. To interpretate odds ratios, estimates lower than one has a lower likelihood of occurring while estimates greater than one has a higher likelihood of occurring. The linear regression models that used GPA as the dependent variable utilized standard coefficients for interpretation. All models accounted for program-level clustering of the total WBL hours possible and inclusion of the four stages of Kolb's experiential learning cycle as individual independent variables with the last table including programs with all four stages. Inclusion of WBL hours and ELT cycle stages were generalized to the program and are not specific to the instructor or student. These regression analyses employed control variables identified in research that may misled the possible relationship between WBL hours, AE, CE, AC, RO, and the dependent variables of positive placement, completion, and GPA.

Ethics

Ethical concerns were considered during the dissertation process in the following steps. All student data and other data, such as school district and campus location, were kept confidential by using placeholder information. Permission to gather data from the school district was obtained through the proper administrative channels with a clear explanation of how data was collected and utilized.

Limitations

The first and greatest limitation was the number of WBL hours presented were clustered at the program level and not to individual students. The district does not currently keep individual WBL data at the district level. The second limitation was gathering WBL hours offered for each program from the instructors with a clear and consistent understanding of the definition described in Chapter 4 above of WBL hours in which there is direct contact with industry partners and the students. The definition was communicated to the instructors on the survey asking for the total number of WBL hours possible, but instructors could interpret the definition differently.

Chapter 5: Results

This study tests whether there is an association between the number of hours in WBL experiences and the student outcomes of positive placement and program completion for CTE students. It also tests whether there is an association between the type of learning provided during classroom and WBL experiences and the student outcomes of program completion and positive placement.

This chapter presents the results of data analysis in Tables 8 – 12 below. A correlational analysis was performed, and Table 8 presents the bi-variate correlations among key variables of analysis matrix data for all independent and dependent variables. A correlation matrix provides the correlation between all pairs of values in a matrix format. It is used to summarize a large data set and to identify patterns to help the researcher make informed decisions by visualizing which variables are correlated. Each cell in the correlation matrix contains the correlation coefficient, where a value of one is considered a strong relationship between variables, zero a neutral relationship and negative one not a strong relationship. Data were used to build regression models. Tables 9 and 10 are logistic regression models specified using the full set of variables. Logistic regression is performed to estimate the probability of an event occurring based on a set of independent variables. Tables 9 and 10 presents estimates as odds ratios (OR). Odds ratios represent the odds that an outcome would occur given an event or the odds absent that same event. To interpret odds ratios, estimates lower than one has a lower likelihood of occurring while an estimate greater than one has a higher likelihood of occurring. A linear regression analysis was performed and Table 11 presents data using the full set of variables. Linear regression analysis is performed to explain the relationship between one dependent variable and one or more independent variables. Data were presented at p values and coefficients which indicate whether the relationship of two variables is statistically significant. Significance levels are denoted at the bottom of the table at values of .001, .01, and .05.

Table 12 contains two logistic regression models predicting positive placement and completion using odds ratios. Table 12 also contains a linear regression model predicting GPA. All three models are performed using all variables. The difference between these models in Table 12 and the models in the previous three tables is the combination of the four stages of the ELT cycle into one variable. The ELT (all four stages offered) variable is dichotomous denoting the presence or absence of all four stages offered during the program.

Table 8 Results

Correlations for the independent and dependent variables are presented in Table 8. Positive placement shows no association with the number of WBL hours offered in each program. Grade point average shows a statistically significant positive correlation with both positive placement (r = .132, $p < .01$) and the number of WBL hours possible in the program (r = .122, $p < .01$). The results for completion show a positive correlation with positive placement (r = .140, $p < .01$) and a higher correlation with GPA (r = .375, $p < .01$). The four stages of the ELT cycle when compared to positive placement, WBL hours, GPA, and completion demonstrate various levels of correlation from negative relationships, no correlation, or statistically significant correlation. Concrete experience shows no correlation with positive placement and completion, but there is a statistically significant correlation with WBL hours (r = .297, $p < .01$) and a slightly less correlation with GPA (r = .041, $p < .05$). Reflective observation is similar having correlations with both WBL hours and GPA only. Active experimentation shows the strongest correlation at $p < .01$ with positive placement, WBL hours, and completion. Students who are exposed to more active experimentation in programs are more likely to have positive placement and be a program completer.

Table 8. Bi-variate Correlations among Key Variables of Analysis

	1	2	3	4	5	6	7
1. Positive placement (dependent variable)							
2. WBL hours possible	-.019						
3. GPA	.132**	.122**					
4. Completion	.140**	-.027	.375**				
5. Concrete experience	-.015	.297**	.041*	-.014			
6. Reflective observation	-.007	.340**	.073**	.000	.680**		
7. Abstract conceptualization	.046**	.172**	.005	.039*	.534**	.430**	
8. Active experimentation	.065**	.255**	.027	.059**	.504**	.381**	.633**

*$p < .05$. **$p < .01$.

Table 9 presents a logistic regression model predicting positive placement accounting for program-level clustering of student observations. In Model 1, the association between positive placement and WBL hours is estimated. No association between WBL hours and positive placement (OR = 1) is found. Binary variables for concrete experience, reflective observation, abstract conceptualization, and active experimentation are also included in Model 1. Active experimentation shows a significant positive relationship to positive placement (OR = 2.61). Students exposed to active experimentation in their CTE program are about 2.61 times more likely to have positive placement after the program than those not exposed. Abstract conceptualization is also noteworthy. Although not as statistically significant as active experimentation (OR = 1.78), students exposed to abstract conceptualization are still 1.78 times more likely for positive placement accounting for program clustering. Reflective observation and concrete experience were less likely to influence positive placement of students with an odds ratio less than one.

In Model 2, variables for student age, female, economically disadvantaged, ethnicity, and special education were introduced. For ethnicity variables Black, Hispanic, Native, Other Race, the reference category is White. Students who are economically disadvantaged are statistically less likely to have positive placement after graduation than those who are not (OR = 0.42, $p < .001$). Students identified as special education are statistically less likely to have positive placement after graduation (OR = 0.55, $p < 0.01$). Although not considered statistically significant, it is worth noting that Black students are 1.41 times more likely than White students to have positive placement (OR = 1.41).

In Model 3, full controls were introduced. Geographic locale variables were added for large city, suburban, and small town/rural. Small town/rural is the reference category. No meaningful relationship between geographic locale and positive placement is found.

Table 9. Logistic Regression Model Predicting Positive Placement (Odds Ratios)

	(1)	(2)	(3)
VARIABLES	Positive Placement	Positive Placement	Positive Placement
WBL hours	1.00	1.00	1.00
	(0.00)	(0.00)	(0.00)
Reflective observation	0.80	0.89	0.89
	(0.47)	(0.45)	(0.45)
Active experimentation	2.61	2.51	2.50
	(1.50)	(1.26)	(1.25)
Abstract conceptualization	1.78	1.81	1.80
	(1.00)	(0.90)	(0.90)
Concrete experience	0.46	0.46	0.46
	(0.26)	(0.22)	(0.22)
Student age		0.99	0.99
		(0.01)	(0.01)
Female		1.27	1.27
		(0.20)	(0.20)
Economically disadvantaged		0.42***	0.42***
		(0.07)	(0.07)
Black		1.41	1.39
		(0.30)	(0.30)

Hispanic		0.87	0.86
		(0.13)	(0.13)
Native		0.99	1.01
		(0.19)	(0.19)
Other race		0.79	0.78
		(0.11)	(0.11)
Special education		0.55**	0.55**
		(0.10)	(0.10)
Large city			1.21
			(0.22)
Suburban			1.28
			(0.24)
Constant	2.28	3.89	3.17
	(1.62)	(2.96)	(2.44)
Observations	3,845	3,845	3,845

*** p<0.001, ** p<0.01, *p<0.05, White and small city are the reference categories. Odds ratios are presented with standard errors in parentheses. Models account for clustering at the program level.

A logistic regression analysis predicting completion was performed accounting for program-level clustering of student observations (Table 10). In Model 1, the association between completion and WBL hours is estimated. Binary variables for concrete experience, reflective observation, abstract conceptualization, and active experimentation were also included in Model 1. Students exposed to active experimentation are 1.81 times more likely to complete the program (OR = 1.81). The variable of abstract conceptualization is noteworthy (OR = 1.26) but not as significant as active experimentation.

In Model 2, variables for student age, female, economically disadvantaged, ethnicity, and special education were introduced. For ethnicity variables Black, Hispanic, Native, Other Race, the reference category is White. The odds ratios for student age, female, and economically disadvantaged show no significant association to completion as all are close to an odds ratio of one. Although ethnicity is not significantly associated with completion, it is interesting to note that students who are Black (OR = .78), Hispanic (OR = .82), and Native American (OR = .87) are slightly less likely than White students to complete the program.

In Model 3, full controls were introduced. Geographic locale variables were added for large city, suburban, and small town/rural. Small town/rural is the reference category. Students located in large cities are less likely to complete the program (OR = .73) although the odds ratios number is not statistically significant.

Table 10. Logistic Regression Model Predicting Completion (Odds Ratios)

	(1)	(2)	(3)
VARIABLES	Completion	Completion	Completion
WBL hours	1.00	1.00	1.00
	(0.00)	(0.00)	(0.00)
Reflective observation	1.10	1.10	1.09
	(0.72)	(0.71)	(0.71)
Active experimentation	1.81	1.83	1.82
	(0.58)	(0.63)	(0.62)
Abstract conceptualization	1.26	1.29	1.29
	(0.43)	(0.45)	(0.44)
Concrete experience	0.60	0.59	0.60
	(0.30)	(0.29)	(0.29)
Student age		1.00	1.00
		(0.01)	(0.01)
Female		1.01	1.01
		(0.21)	(0.20)
Economically disadvantaged		1.07	1.08
		(0.19)	(0.19)
Black		0.78	0.88
		(0.14)	(0.18)
Hispanic		0.82	0.91
		(0.13)	(0.14)
Native		0.87	0.86
		(0.12)	(0.12)
Other race		1.04	1.07
		(0.17)	(0.17)
Special education		0.80	0.79
		(0.17)	(0.17)
Large city			0.73

			(0.12)
Suburban			0.91
			(0.15)
Constant	3.33*	3.41*	3.96*
	(1.76)	(2.07)	(2.40)
Observations	3,881	3,881	3,881

*** p<0.001, ** p<0.01, *p<0.05, White and small city are the reference categories. Odds ratios are presented with standard errors in parentheses. Models account for clustering at the program level.

A linear regression analysis (Table 11) predicting GPA was performed, accounting for program-level clustering of student observations. A linear regression analysis was used because GPA is a continuous outcome variable. In Model 1, the association between GPA and WBL hours was estimated. Binary variables for concrete experience, reflective observation, abstract conceptualization, and active experimentation were also included in Model 1. Model 1 found no relationship between GPA and WBL hours. No relationship between GPA and the binary variables of concrete experience, reflective observation, abstract conceptualization, and active experimentation was found.

In Model 2, variables for student age, female, economically disadvantaged, ethnicity, and special education were introduced. For ethnicity variables Black, Hispanic, Native, Other Race, the reference category is White. In Model 2, age and GPA shows a relationship that is statistically significant ($p < .001$). There is a statistically significant relationship between female and GPA ($p < .05$). A statistically significant negative relationship is found between the ethnicities of Black ($p < .001$), Hispanic ($p < .001$), and Native ($p < .05$) and GPA. A negative relationship between Special Education and GPA is found to be statistically significant ($p < .001$).

In Model 3, full controls were introduced. Geographic locale variables were added for large city, suburban, and small town/rural. Small town/rural was the reference category. A statistically significant negative relationship between Large city and GPA is found ($p < .05$).

Table 11. Linear Regression Model Predicting GPA

	(1)	(2)	(3)
VARIABLES	GPA	GPA	GPA
WBL hours	0.00**	0.00	0.00
	(0.00)	(0.00)	(0.00)
Reflective observation	0.11	0.09	0.09
	(0.16)	(0.14)	(0.14)
Active experimentation	0.02	-0.02	-0.02
	(0.08)	(0.09)	(0.09)
Abstract conceptualization	-0.12	-0.09	-0.09
	(0.12)	(0.12)	(0.12)
Concrete experience	-0.03	0.00	0.01
	(0.14)	(0.12)	(0.12)
Student age		0.01***	0.01***
		(0.00)	(0.00)
Female		0.16*	0.16*
		(0.06)	(0.06)
Economically disadvantaged		-0.01	-0.01
		(0.05)	(0.05)
Black		-0.40***	-0.35***
		(0.06)	(0.06)
Hispanic		-0.18***	-0.13*
		(0.05)	(0.05)
Native		-0.08*	-0.09*
		(0.04)	(0.04)
Other race		0.00	0.01
		(0.05)	(0.05)
Special education		-0.46***	-0.46***
		(0.08)	(0.08)
Large city			-0.14*
			(0.05)
Suburban			-0.06
			(0.06)
Constant	3.37***	3.14***	3.22***
	(0.17)	(0.21)	(0.22)

Observations	3,881	3,881	3,881
R-squared	0.02	0.07	0.08

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, *p<0.05, White and small city are the reference categories.
Models account for clustering at the program level.

Two logistic regression analyses (Table 12) predicting positive placement and completion were performed, accounting for program-level clustering of student observations. In Model 1, the association between positive placement and WBL hours was estimated. All student variables were included in this model. For ethnicity, the variables are Black, Hispanic, Native, and Other Race. The reference category is White. The variable ELT (all four stages offered) is represented by binary numbers of zero or one which designated whether all four stages of the ELT cycle were used in the program. No association between ELT (all four stages offered) and positive placement is found (OR = 0.96). Economically disadvantaged students are less likely to have positive placement (OR = 0.44, $p < .001$). Special education students are significantly less likely to have positive placement (OR = 0.55, $p < .01$).

In Model 2, the association between completion and WBL hours was estimated. All student variables were included in this model. For ethnicity, the variables are Black, Hispanic, Native, and Other Race. The reference category is White. The variable ELT (all four stages offered) is represented by binary numbers of zero or one which designates whether all four stages of the ELT cycle were used in the program. Model 2 finds no association between ELT (all four stages offered) and completion. The model also finds no association between completion and all other variables in the model.

One linear regression analysis (Table 12) predicting GPA was performed, accounting for program-level clustering of student observations. For ethnicity, the variables are Black, Hispanic, Native, and Other Race. The reference category is White. The variable ELT (all four stages offered) is represented by binary numbers of zero or one which designates whether all four stages of the ELT cycle were used in the program. In Model 3, the association between positive placement and WBL hours was estimated. All student variables were included in this model. Model 3 finds no relationship between ELT cycle and GPA.

Table 12. Four ELT Stages Logistic Regression Models (Odds Ratios) and Linear Regression Model

	(1)	(2)	(3)
VARIABLES	Positive Placement	Completion	GPA
WBL hours	1.00	1.00	0.00
	(0.00)	(0.00)	(0.00)
ELT (all four stages offered)	0.96	1.17	0.06
	(0.39)	(0.47)	(0.09)
Student age	0.99	1.00	0.01***
	(0.01)	(0.01)	(0.00)
Female	1.43	1.11	0.16*
	(0.28)	(0.23)	(0.06)
Economically disadvantaged	0.44***	1.09	-0.01
	(0.07)	(0.19)	(0.05)
Black	1.44	0.90	-0.35***
	(0.31)	(0.18)	(0.06)
Hispanic	0.90	0.92	-0.14**
	(0.14)	(0.14)	(0.05)
Native	1.00	0.86	-0.09*
	(0.19)	(0.12)	(0.04)
Other race	0.78	1.06	0.02
	(0.10)	(0.17)	(0.05)
Special education	0.55**	0.80	-0.46***
	(0.11)	(0.17)	(0.08)
Large city	1.20	0.72	-0.14*
	(0.22)	(0.12)	(0.06)
Suburban	1.31	0.92	-0.06
	(0.24)	(0.16)	(0.06)
Constant	9.28***	6.48***	3.06***
	(4.18)	(2.98)	(0.10)
Observations	3,845	3,845	3,845

R-squared	0.08

Robust seeform in parentheses
All models testing programs that offer all four stages of the ELT cycle
*** p<0.001, ** p<0.01, *p<0.05, White and small city are the reference categories.
Models account for clustering at the program level.

One of the main takeaways in the findings in Tables 8 through 12 is that active experimentation stands out as the most influential indicator for positive placement and program completion. Students are much more likely to complete the program and receive a job in the program field of study when they have active experimentation incorporated into their program. However, WBL hours are not associated with either of the outcomes of interest.

Chapter 6: Discussion

This study investigates three research questions that test whether there is an association between the number of hours in WBL experiences and the student outcomes of positive placement and program completion for adult students. It also tests whether there is an association between the type of learning provided and the student outcomes of program completion and positive placement. In this chapter, I discuss the key findings from this study as they relate to the study purpose and research questions:

Research question 1 – *Is the number of hours spent in work-based learning experiences associated with positive placement for graduates of a standalone career technical education district?*

Research question 2 – *Is the number of hours spent in work-based learning experiences associated with program completion for graduates of a standalone career technical education district?*

Research question 3 – *Is the type of learning provided (i.e., Kolb's four stages of learning) associated with program completion and positive placement?*

The lack of a trained and skilled workforce has been a growing concern for companies and the government for decades. Just completing a college degree is not a guarantee of obtaining a job or being successful. Higher education institutions and K-12 are beginning to understand that there is more to education than classroom learning. As outlined in chapter one of this study, higher education institutions are being pressured to include enhancing skills outcomes and better understanding of workplace readiness (Jackson, 2013). These aspects have been at the center of CTE since its inception. Public education is also beginning to incorporate CTE educational strategies in student academics. High schools that once pushed college for all students are feeling pressure from the local, state, and federal level to prepare students for all pathways post-graduation with an emphasis on workforce readiness. This study examines the relationship between a student's exposure to WBL experiences and positive placement after completing a career program at a standalone CTE district.

I then provide a more in-depth analysis of the results relating to the research question and other significant areas of the study such as the literature review and theoretical framework. I will conclude the chapter by reviewing the ethical and limitations of the study and offer suggestions for future research and discuss implications for changes to policy and practice in CTE and other educational institutions.

Summary of Main Findings

The overall results show no association between the number of WBL hours in the program and positive placement or program completion. While the literature review suggests that increasing opportunities in WBL contributes to increases in workforce readiness (Esters & Retallick, 2013; Griffith, 2001; Martin & Rees, 2019), the odds ratios value of one in the positive placement and program completion logistic regression models suggest no association. An important caveat to this interpretation is that WBL is such a broad term used to describe multiple levels of student experiences from learning about a career through research to long-term career immersion such as apprenticeships. For this reason, the four stages of the ELT cycle are included as independent variables in this study as a lens for understanding data analyses and results and to focus the understanding of the type of learning provided that makes successful WBL experiences (Coll et al., 2011; Esters & Retallick, 2013; Watters et al., 2013). Since ELT states that all four stages of the cycle must be completed for effective learning to occur, Table 12 in chapter five combines the four stages into the ELT (all four stages offered) variable that designates those programs in which all four stages are implemented. Although all four stages must be completed, some learners prefer some types of learning over others due to individual learning styles.

Teachers were asked in the survey if they offered the four stages of the ELT cycle in their curriculum and WBL experiences. The four stages of reflective observation, active experimentation, abstract conceptualization, and concrete experience are included in the logistic and linear regression models with positive placement, program completion, and GPA serving as the key dependent variables and utilizing odds ratios for the logistic regression models to interpret. The comparison with existing literature section below compares the findings in this study to findings described in the literature review will be sectioned by results based upon the dependent variables (positive placement, completion, GPA) utilized in the regression models reviewed in Chapter 5. The two logistic regression and one linear regression model including the variable of ELT (all four stages offered) will also be discussed below.

Positive Placement

In the logistic regression model predicting positive placement (Table 9), students exposed to the two stages of active experimentation and abstract conceptualization are found to be more likely to have positive placement. The odds ratios for active experimentation and abstract conceptualization are 2.61 and 1.78, respectively. Although the odds ratios for active and abstract are not statistically significant, the score still shows a positive influence on positive placement for students exposed to both stages. In the abstract conceptualization stage, students reflect on the experience which could result in a new idea, or modification of an existing concept utilizing the reflections of the experience. The student learns from experience and is better equipped to deal with identical or analogous situations. The learner in the active experimentation stage actively experiments with multiple solutions to determine what works and takes a practical approach to the situation. During experimentation, learners apply their conclusions to new experiences with the goals of being able to make predictions based on knowledge gained, analyzing tasks, and applying the acquired knowledge in future planning. Students that are economically disadvantaged and special education are less likely to have positive placement. Black students are more likely to have positive placement than White students.

Program Completion

In the logistic regression model predicting completion (Table 10), students who are exposed to active experimentation are 1.81 times more likely to complete their program. The control variables of student characteristics and locale show no difference between the variables and completion with the OR scores hovering slightly below or above one. In the active experimentation stage, students actively experiment with multiple solutions to determine what works best. They apply their conclusions to new experiences. During this stage, students are more heavily involved in more direct problem-solving experiences that studies find to keep students engaged both mentally and physically to the classroom and WBL experience which improves completion. Students who participate in CTE and robust WBL experiences, become more engaged in the class and other academic courses they may be taking in tandem with the CTE course (Brown, 1998; Darche et al., 2009; Wonacott, 2002). Correlations (Table 8) between completion and the four stages of ELT also shows statistically higher relationship between completion and active experimentation ($p < .01$). Abstract conceptualization is also a significant predictor just as it is in the positive placement logistic regression model (Table 9) and the completion logistic regression model ($p < .05$). During the abstract conceptualization stage, students learn from the WBL experience and are better equipped to deal with identical or analogous situations. They rely on ideas, logical approaches, and theories rather than feelings to understand and manage the new experience or problem. Students can manage the increase in WBL and curriculum difficulties, which should lead to better completion rates.

GPA

The results of the linear regression model predicting GPA (Table 11) show that the four stages of ELT are not associated with GPA. When student characteristics are introduced to the model, several statistically significant associations appear between the variables and GPA. The first variable, student age, records that for every year older students are more likely to possess a higher GPA. A student's ethnicity is statistically significant when compared to GPA. Black and Hispanic have statistically lower GPAs compared to White students. Special education students also have a statistically lower GPA compared to those not in special education. This is the only model where a student's locale has any significance on the dependent variable. The model shows that students who live in a large city have a lower GPA than those who live in smaller cities or rural areas.

In the correlations model (Table 8), higher GPA is positively correlated with positive placement ($p < .01$). It is also positively correlated with completion ($p < .01$). Students who are more engaged in the learning process tend to have a higher GPA and are more dedicated to completing the program especially when the curriculum or WBL is relevant to their interests (Castellano et al., 2012; Castellano et al., 2017; Kemple & Snipes, 2000). One oddity found on the correlation table is the significant correlation between GPA and reflective observation ($p < .01$). Concrete experience is significant, but lower than reflective observation ($p < .05$). It stands out because the two logistic regression models and one linear regression model show no relationship between the dependent variable and the two stages of concrete experience and reflective observation. Concrete experience is about involvement and engagement of the student in an activity or task instead of just reading or watching about it. Reflective observation allows the student to reflect after engaging the experience through the lens of their existing knowledge base and allows communication between the learner and others involved to review their understanding comparing it to the experience (Kolb & Kolb, 2017). This connection is worth exploring in future study.

Four Stages of ELT Cycle

Table 12 includes two logistic regression models predicting positive placement and completion. The third model is a linear regression model predicting GPA. All three regression models use the variable ELT (all four stages offered) combining the four stages (CE, RO, AC, AE) used as separate variables in Tables 9–11. The variable is binary in that either the program uses all four stages of the ELT cycle or not. Experiential learning theory posits that all four stages of the cycle must be utilized for effective learning to occur. The four stages are dependent on one another for the development of new knowledge. The models in Table 12 present the relationships between the variable ELT (all four stages offered) and the three dependent variables of positive placement, completion, and GPA. There is no relationship between variable ELT (all four stages offered) and the dependent variables.

Comparison of Findings with Previous Literature

This study finds evidence that the number of hours in WBL does not have a relationship with the student outcomes of positive placement and completion. There are a few studies that found the same evidence as this study or had mixed results (Monteiro et al., 2016; Smith & Green, 2005). These findings run contrary to numerous studies identified in the literature review chapter that find a positive relationship between WBL experiences and student outcomes, especially completion (Castellano et al., 2017; Jackson & Collings, 2018). This study did find evidence that the type and quality of learning offered may be associated with better student outcomes of positive placement, completion, and GPA. This is consistent with multiple studies indicating a positive link between the quality of learning students receive in the classroom and WBL with student outcomes (Dwesini, 2017; Garwe, 2020; Holzer, 2015).

Quality of Learning in Classroom and WBL

CTE utilizes EL to provide students a variety of learning opportunities inside and outside the classroom using multiple facets of learning styles and a focus on the learner to develop a sense of self through social interactions in education and the workplace (Esters & Retallick, 2013; Roberts, 2006). EL takes the student from a passive learner to the role of an active respondent (Hawtrey, 2007). It is not enough to place students in WBL experiences hoping that they learn something through observation. The experiences must be thoroughly planned and deliberately customized to the student's educational needs to receive the maximum learning benefit (Kolb & Kolb, 2017). Student exposure to career and training is becoming more focused and intentional using EL (Stasz & Stern, 1998). A quality WBL experience relies on ELT cycle stages such as active experimentation to help guide the student through a complex learning process in which the student is forced to observe, question, and interact with industry professionals. Those same industry professionals must be willing to partner with the teacher to develop a robust experience for the student by frequently sharing knowledge and developing curriculum and assessments that reflect an authentic learning environment (Watters et al., 2013). The process should be thought of as a continuous learning process instead of an outcome, so the student receives the maximum learning benefit of EL (Kolb & Kolb, 2009; Cannon & Geddes, 2019). Smith et al. (2014) study concluded that even after controlling multiple student characteristics as my study did, they found that WBL placement during school has a significant impact on all graduate outcomes, especially on employability. They solicited employers' feedback during the WBL experience and confirmed that students are more self-aware of their skills, better professional communicators, and are committed to and interested in the job. This is a major difference between Smith et al.'s (2014) study and my study which I believe is worthy to note and will discuss in more detail in the limitations section below.

Bailey and Merritt (1997) report on preparation programs in high school that utilize strategies to prepare students for careers and college and conclude that the quality not quantity of the school-to-work programs is key to student success. They conclude that if these programs are planned and implemented well, students can integrate academic and career skills, positively impact their grades and test scores with the hope of college success as well as career readiness. In my logistic regression predicting completion, students who participated in active experimentation and abstract conceptualization in CTE were more likely to complete their program. Castellano et al. (2017) also found that CTE imbedded with relevant and quality WBL opportunities positively influenced attendance and graduation rates but had no significant effect on GPA. My dissertation finds comparable results in the linear regression model predicting GPA and found no significant effect with WBL hours and the four stages of ELT cycle. Their findings regarding the positive influence relevant and quality WBL is like my findings that the type and quality of learning through the ELT cycle also shows positive relationship.

Although Castellano et al. (2017), Chapman & Darling-Hammond (2013), and Alfeld et al. (2013) found that participation in CTE and WBL did increase students' probability of completion contrary to my findings, their research did not examine the specific influences of the four ELT cycle stages or go into more depth as to the specific nature of the WBL experience involving curriculum or process. Castellano et al. (2017) utilizes a study like my research by comparing students with varying degrees of exposure to CTE and WBL to student outcomes by using multiple regression models. They find that students exposed to more CTE are more likely to have a higher GPA and complete the program. The difference to my research is that they concentrate on just high school students. They also concentrate more on the effects of CTE courses and little on WBL. Berndtsson et al. (2020) completed a study using an integration review method to identify models of WBL that integrate theory and practice between nursing education and the clinical placement of students to improve the WBL experience through research. They found that the quality of supervisor support, variety of modules, and teacher/clinical supervisor collaboration were needed to help students develop their professional identity for better integration into the workforce and better placement.

Comparison with Theoretical Framework

This study draws on ELT as the lens for understanding the data analyses and results of this study. David A. Kolb developed the theory as a comprehensive approach to learning that includes a student's experience, perception, cognition, and behavior in a continuous learning cycle in which the student is in control of the process. WBL utilizes many of the components of ELT to help students identify how they learn best. For the WBL experience to work well, everyone involved in the process that includes the student, teacher, and the employer must be involved in every stage of the ELT cycle in a continuous communication cycle. When using EL during WBL opportunities, research has shown multiple benefits to the learner, such as increased development of interpersonal and professional skills (Chisholm et al., 2009).

Although this study found no relationship between the number of WBL hours and the outcomes of positive placement and completion, it did find evidence that certain stages of the

ELT cycle can have a positive relationship with positive placement and completion. The findings in the logistic regression models suggest that all four stages of the ELT cycle are not necessary for successful positive placement and completion outcomes. Instead, it is certain stages of the ELT cycle that really seem to matter. This is contrary to Kolb (1981) who states that all four stages of the cycle must be executed for effective learning to occur and that no one stage is effective. My thought is that there are other factors such as a student's learning style that play a part in the findings that certain stages can be effective to the learning process without executing the other four. Kolb explains that all learners respond to all types of learning types to varying degrees of effectiveness, but learners do favor certain stages of learning based on preferences. Because of this finding, CTE leaders and educators must review the style of learning in classrooms and WBL to verify that instructors are providing students with ample time in each of the four stages of the ELT cycle and not focusing more time on one or two.

When students are exposed to career settings through WBL and utilize EL in the both the classroom and WBL experience, they develop skills for independent and social learning while developing their career identity and self-efficacy through increased contact with industry. This increased interaction prepares the student more extensively for success in the workplace after graduation than just classroom experience. The results section outlines that connection through regression models showing a strong relationship between exposure to certain stages of the ELT cycle and positive placement and completion. Since students are more engaged in learning because they have more control of the process through EL, they are more likely to stay committed to the completion of the program and better prepared to find a job after graduation. Some stages of the ELT cycle are more salient for academic success as some stages may match better to the student's learning style. Although Kolb (1981) states that the learner must experience all four stages for authentic learning to take place, perhaps ELT needs more testing.

Kolb & Kolb (2009) combine concrete experience and abstract conceptualization into a mode of grasping experiences. Reflective observation and active experimentation are combined into the mode of transforming experiences. It is noteworthy that in the results, one stage (AE & AC) from each mode was found to have a strong relationship to positive placement and completion. This should be further investigated in future research that should include a detailed examination of the amount of time devoted to the four stages in both classroom and WBL settings.

Limitations

Discussing the limitations of this study is important to understanding the context of the results and helping to advance future research. The most substantial limitation is that the number of WBL hours are generalized to all students in the program even though some students may not have participated in WBL or only a portion of the hours possible. An important conclusion from this study is the finding that there is no relationship between the number of WBL hours and positive placement. The limitation of program WBL hours versus individual WBL hours is an important consideration that should be examined in any future research. Currently, the career technology center from which data was obtained does not have a mechanism in place to track individual WBL hours for all students in an easy to access database to run reports. The district is currently working on a district wide repository for documenting and tracking WBL which will be helpful in further research. It is also worth noting that student attendance data were not analyzed – attendance may influence student experiences and outcomes (Hamlin, 2021).

A key finding from this research is the importance of the four stages of the ELT cycle to students' completion and positive placement. The two stages of active experimentation and abstract conceptualization have a positive relationship with completion and positive placement. Data were compiled using a survey (Appendix A) given to all instructors. Not all instructors completed the survey even though at least one teacher from each program completed it. Many of the programs offered at the CTE district are taught by multiple instructors. For example, the welding program is taught by seven instructors on four different campuses. If only one instructor completes the survey, those findings are generalized to all students in the welding program like the WBL hours being used to represent the program and not the individual students. The data concerning the ELT cycle stages is not specific enough to determine whether the ELT cycle stage is utilized in the classroom setting or the WBL experience. Although the utilization in both learning areas is important, it would have been helpful to the research to determine to which area it is applied. Another area of concern is whether the instructors understood the meaning and context of the questions. Although each question is accompanied by three detailed examples of how it would be applied, most of the instructors employed at CTE district are from industry and do not possess the educational training that K-12 instructors must complete. This limits their ability to understand the full meaning of the questions which results in various answers from multiple instructors that teach the same program.

The lack of teacher education training for CTE district instructors presents another potential limitation. This researcher attempted to include instructor certification and years in their industry as control variables, but because the survey questions inquiring about the number of WBL hours and inclusion of the four stages of the ELT cycle must be accounted for clustering at the program level, instructor specific data could not be included. Instructor specific data such as certification and years in the industry would have been important (Mobra & Hamlin, 2020). Some research has shown that instructors who have taken the traditional route of teacher certification compared to being alternatively certified have better student outcomes although this diminishes with time as the non-traditionally trained teacher becomes trained through professional development and experience (Mobra & Hamlin, 2020). The traditional and non-traditional certification routes could impact the quality of education that a student receives that prepares them for completion and positive placement (Boyd et al., 2007).

Smith et al. (2014) conclude that even after controlling multiple student characteristics as this study did, they find that WBL placement during school has a significant impact on all graduate outcomes, especially on employability. They solicited employers' feedback during the WBL experience and confirmed that students are more self-aware of their skills, better professional communicators, and are committed to and interested in the job. Gathering data from industry feedback during the WBL experience is another major limitation to this study. The number of WBL hours is generalized to the program. The problem is that this study does not specify the quality or type of learning offered at the WBL experience with specific feedback from the student or the industry partner. This information is important as this study found evidence that the quality and type of learning in WBL is important to student outcomes. There are feedback processes in place during the WBL experience, but that documentation is purged after the students complete the program. This study would produce more relevant data and results if it was conducted with a current group of students that followed them through the program and after completion.

The research process is a daunting experience that was challenging most of the time but a rewarding learning experience throughout the entire process. The process of narrowing down the size and scope of the dissertation at the beginning of the process was the biggest challenge. As described in the previous paragraph describing the limitations, this study should encompass more data than it does. The time factor is a major challenge that afflicts many students who go through this process. Ideally, this study could last for two years so that the limitations described in the above paragraphs could have been addressed. Another hurdle was receiving participation from the instructors to complete the survey. The ideal scenario would have been 100 percent instructor participation. Because of clustering at the program level for variables such as WBL hours and ELT cycle stages, many variables such as instructor certification and their years in industry were not utilized as they could not be attributed to specific student data. All the study limitations described above may have influence on the results of this study due to the generalized nature of the information and how it is applied to the models. Some students who did not participate in WBL experiences or who may have had a bad WBL experience, would have skewed data depending on the number of such students. This is why more specific data is needed as described above to control those types of scenarios.

A final issue relates to selection bias concerns (Hamlin, 2018). Namely, certain types of students may opt for certain CTE programs. For example, it is possible that the experiences offered in high skills CTE programs with higher paying career opportunities attract more motivated students so that the association between outcomes and program experiences is confounded by unobserved student characteristics.

Questions for Policy and Practice

The gap in skills training for high school and adult students resulting in a workforce shortage is critical for all participants (educational institutions, policy makers, and industry) to address (Fletcher Jr & Gordon, 2017, Gordon & Schultz, 2020; Rosen et al., 2018). K-12 education has been preparing students primarily for college and considering other pathways such as CTE for students who are not suitable for college although only approximately 26% of jobs require a college diploma (Carnevale et al., 2013; Rosen et al., 2018). Policy makers, educators, and industry have finally begun to realize over the past decade or two that this college preparation model cannot sustain a viable and robust economy that is becoming more global in nature (Eger, 2005; Wang et al., 2011). The United States has seen a resurgence in the promotion and need of CTE and WBL with the private sector workforce needs being the primary catalyst (Fletcher Jr & Gordon, 2017; Holzer, 2015; Oviawe et al., 2017). Industry is placing pressure on policy makers to increase funding for K-12 and CTE to increase training opportunities for high school and adult students. State and federal lawmakers hear the calls and have made increases in funding, but not to the level needed to address the looming workforce shortage (Gordon & Schultz, 2020). Local communities and industries have stepped up in recent years to help fill that gap by creating partnerships with local K-12, CTE districts, and higher education institutions. Local industries such as the construction industry are partnering with the local school to create a construction academy in which students voluntarily take part in curriculum and WBL experiences to expose them to the industry. Industries are also partnering with local CTE districts in Oklahoma to fund manufacturing programs in high schools such as Glenpool public schools in which they fund part of the instructor's salary and cost of equipment and supplies. These types of local partnerships are the future for solving the workforce shortage. If lawmakers are not willing to provide the necessary funding to expand CTE to high school and adult students, then they can make it easier for partnerships like the ones described above to flourish through specific legislation.

As a campus director for a standalone CTE district, I am working on expanding WBL opportunities for the programs located at my campus. The first step is providing instructors with professional development opportunities that set the foundation for a quality WBL experience for both the student and the industry partner. My previous experience as the director of a campus with all health programs provided an opportunity to examine many variations in WBL opportunities as all programs required clinical experiences. The WBL experiences ranged from poorly planned to innovative and beneficial to both parties. I was able to collate the best practices of the quality WBL experiences and utilize them to improve the WBL in all programs during my time as campus director. I was able to witness firsthand how a poorly planned and executed WBL experience can be detrimental to the academic progress of the student and the relationship between the school and industry partner.

I was able to identify those programs with poor quality WBL and work with them through training to provide the students with a better-quality experience. When I moved to take over as director for another campus, I was able to bring that same knowledge to the programs at the new campus. Most of the programs at the new campus offered little WBL experience beyond industry professionals visiting the classrooms to speak with students or participating in mock interviews with students. The COVID pandemic was not helpful and further diminished the WBL opportunities for students. Based upon previous knowledge and experience as well as data gathered throughout my dissertation research, I am currently working to build an electronic database for the district that will allow all instructors in the district to enter WBL data into one central database from which district administration will be able to access WBL data to make informed decisions at the district level. The database will also allow the instructor, student, and industry partners to communicate more effectively through regular feedback such as surveys and clear expectations and goals of the WBL experience to which all three participants agree. The district is developing processes and procedures related to WBL to ensure that all programs across the district are providing the best possible academic WBL experience. Concentrating on the quality of the WBL should be the highest priority of education institutions that want to provide this experience to their students.

Although the results were from CTE data, higher educational institutions and K-12 schools could benefit from the results. Research outlined in the literature review of this study have reviewed the growing trend of those institutions to increase EL and WBL opportunities to increase student success during school and post-graduation outcomes such as workforce placement (Monteiro et al., 2016; Little & Brennan, 1996; Oliver, 2015). Smith et al. (2014) concludes that WBL placement during school has a significant impact on all graduate outcomes but especially on employability. Many college degree programs such as nursing already rely heavily on EL experiences through clinicals and simulations. These experiences rely on all four stages of the ELT cycle in a constant continuous improvement process with timely and relevant feedback through multiple modes such as written, verbal, and practical.

Future Research in Study Context

Limitations discussed in a previous section are crucial in discussing future research into the relationship of WBL and types of learning to student outcomes. The most substantial limitation is that the number of WBL hours are generalized to all students in the program. Some students may not have the opportunity to participate in WBL for several reasons. Future research would include data gathered through various methods such as individual student surveys or a school database that keeps track of student WBL experiences. Student feedback during the program would be beneficial to the research as it would allow the researcher to obtain other information relevant to the study. If the researcher is not able to obtain WBL data while the students are in the program, then a school database containing the specific WBL data such as individual student hours and experiences would be helpful. The CTE district in this study is currently working on a database to track individual WBL hours.

Obtaining WBL information related to specific students is crucial to anyone wanting to further the research outlined in this dissertation. Although this dissertation reported no relationship between the number of WBL hours and the student outcomes of positive placement and completion, I believe that specific student data would have shown a strong relationship based upon my extensive professional experience with WBL covered in the previous section. It is crucial that educational institutions develop a robust system of data collection for not only WBL hours, but also for communication between the instructor, student, and industry professional to ensure a quality educational experience.

Student attendance should be included and analyzed in any future research as it may influence student experiences and outcomes (Hamlin, 2021). Previous research finds that when students become more engaged in school due to participation in WBL experiences relevant to their career interests, their attendance rates can positively influence program outcomes (Castellano et al., 2012; Castellano et al., 2017; Kemple & Snipes, 2000). In most programs at the standalone CTE district in this dissertation, WBL experiences such as internships are only allowed if the student has good attendance and grades. It would be interesting to explore relationships between attendance and grades with success in WBL.

Work-based learning is an important opportunity for students to network with industry professionals. Networking can be crucial in industry to leverage social connections for present and future job opportunities. Students who participate in WBL are in essence interviewing for a position with that company. It provides the employer with the opportunity to know the student and test their knowledge. In the fourteen years I have served as administrator over programs with WBL, most students find employment after graduation with the company for which they completed their WBL experience. Students who display behaviors that are not professional during the WBL such as poor attendance or lack of motivation are significantly less likely to be employed.

The relationship between the four stages of the ELT cycle and the student outcomes of positive placement, completion, and GPA is an interesting finding that should be explored in further detail. The two stages of active experimentation and abstract conceptualization have a strong relationship with completion and positive placement. Students who participate in CTE with EL utilized in the classroom or WBL become more engaged in the educational experience as they better understand the relevance and connection between classroom and industry (Brown, 1998; Yardley et al., 2012). Using EL in educational programs has shown an increase in the development of interpersonal and professional skills (Chisholm et al., 2009). Data for the inclusion of the four stages of ELT were also clustered at the program level. This exposure to ELT should be evaluated and analyzed at the student level.

Providing adequate training for instructors is just as important for successful WBL experience as it is for students. Instructors need to learn the best pedagogical strategies that provide students with the most rewarding WBL experience. This concept also applies to the industry professional who will be mentoring the student during the WBL. Although they would not need the extensive training as the instructor would need, they still would need to be trained in best practices such as regular feedback. Future studies would need to have a robust method of documenting and analyzing curriculum and pedagogy utilized in both the classroom and WBL to further study the possible relationship between the type of learning and student outcomes.

Due to time constraints, student data for this research were from the 2021-2022 school year. Data received from the school district was student demographics only. Program information such as WBL hours and utilization of active experimentation, concrete experience, abstract conceptualization, and reflective observation was gathered using a survey sent to all 168 instructors. Some instructors who taught in the school year identified were no longer in the district during this study. Although the curriculum stays the same from instructor to instructor, availability of WBL hours and implementation of ELT cycle stages may vary. It is for this reason that any future research that dives deeper into the relationship between the ELT cycle and student outcomes should be completed in the current school year to provide more accurate and relevant information.

This study examines data gathered approximately six months after completion of the program. Although this is valuable information, future research needs to include career data from about three to five years after program completion. This data would be interesting to view to determine if EL and WBL offered in the program has longer lasting positive student outcomes longer than six months after graduation. Adding qualitative data through feedback from students, instructors, and industry would be an interesting addition to the research to gain a better understanding about the participants views of how EL and WBL influence the educational experience. Only one study is found to gather data one year after graduation which is six months later than the school in this study and found that students with WBL and CTE experience reported high wage earnings and identified that they were better prepared for the job they received after graduation compared to those who did not participate in CTE or WBL (Griffith, 2001).

The lack of teacher education training for CTE district instructors presents another potential limitation. The original design of this study attempts to include instructor variables such as the type of instructor certification and total amount of years spent in industry. The problem is that some instructors were no longer employed in the district. Since not all instructors responded to the survey, I was not able to tie teacher data to individual student data. A robust industry partnership is crucial to the success of CTE (Gordon & Schultz, 2020). Whether or not an instructor begins teaching directly from industry or has completed a teacher preparation course would be invaluable to add to future research. The theory is that instructors directly from industry would have the most relevant knowledge of the industry and multiple contacts for better WBL placement.

Conclusion

This study utilized a quantitative methods approach to analyze student data outcomes gathered six months after the student graduates from a program and data from instructor surveys. Logistic and linear regression models were used to predict relationships between independent and dependent variables using control variables to enhance the internal validity of this study by limiting the influence of extraneous variables.

The first logistic regression model predicting positive placement showed no association between WBL hours and positive placement. The independent variable of active experimentation showed a significant positive relationship to positive placement. Abstract conceptualization also showed a positive relationship to positive placement. Although ELT states that all four stages of the cycle must be completed for effective learning to occur, this research finds evidence that some stages have a stronger relationship with student outcomes and should be researched further as ELT is only a theory. Students that are economically disadvantaged and special education are less likely to have positive placement. CTE has always been a champion of providing career training opportunities to students through individualized education that caters to students who do not typically thrive in a traditional educational environment. This outcome is concerning and worth investigating in future research. Black students are more likely to have positive placement than white students. In the logistic regression model predicting completion, the relationship between active experimentation and completion is significant. The stages of active experimentation and abstract conceptualization showed the greatest influence on both completion and positive placement. These results are not surprising as CTE utilizes EL heavily in all their career programs.

The linear regression model predicting GPA found no relationship between WBL hours, concrete experience, abstract conceptualization, active experimentation, and reflective observation. The model found as student age increases, so does the likelihood of the GPA increase. Black and Hispanic students have statistically lower GPA compared to White students. Special education students are also more likely to have lower GPA.

These findings suggest that it does not matter the quantity of WBL hours, but the quality of those WBL experiences and the type of learning offered in the classroom and WBL. A good WBL experience should be beneficial to both the student and the employer and include a detailed plan for regular feedback and alignment between classroom competencies and opportunities available at the WBL experience. Future studies should include extensive research into the possible relationship between ELT cycle stages and successful WBL experiences. It should also include research into the foundation, construction, and execution of successful WBL and CTE. According to the findings, there is evidence that students should have more exposure to the four stages of the ELT cycle with more emphasis on learning activities incorporating active experimentation and abstract conceptualization and a robust system of procedures in place to guide students, industry partners, and instructors through the process.

As CTE leaders and educators continue to evaluate their programs each year for effectiveness of meeting the workforce needs of local, state, and national industries, there is a need to focus on the quality and type of learning taking place in and out of the classroom as described in the findings of this research. Just experiencing WBL is not enough to produce students who will be ready for the changing challenges of a growing global market. Students need rigorous and quality academic, technical, and employability training to compete in the workforce beyond skills training. Career technical education provides quality education beyond the skills to produce a well-rounded learner. Leaders should provide training to educators in the tenets of ELT to be utilized in classroom and WBL learning processes. Career technical education leaders and educators are beginning to realize that they must customize a student's learning experience. This can be accomplished through the implementation of ELT that recognizes that all students have their own learning style strengths.

These findings and other similar research are already having implications in changing the educational landscape of CTE. Career technical education and WBL are swiftly becoming a more prevalent educational choice for high school students and adults. Career technical education is already customizable by nature that rely on identifying student's strengths and weaknesses to design curriculum and learning opportunities such as WBL through the lens of ELT to produce a student that is ready for the workforce of today and the future. The implications for policy might be inclusion of even more stringent outcome performance measures in legislation and increased funding for professional development for educators that focus on quality and customizable types of learning that have been researched extensively and found to be effective in CTE and WBL.

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Appendix A: WBL Survey

Consent to Participate in Research University of Oklahoma

I am Sam Ramsey from Tulsa Tech and an OU graduate student, and I invite you to participate in my research entitled "Are work-based learning (WBL) opportunities for students associated with positive placement?".
You were selected as a participant because you are a full-time instructor employed at Tulsa Tech. This survey will focus on the following WBL forms (clinical, internship, Guest Speakers, Field Trips, and Workplace Tours) during which the student is able to work or interact closely with an employer.

By checking "I Agree" button below, I am agreeing to participate in this research.

If you would like further research participation information, please click the "Further Consent Information" button below.

Thank you for taking the time to complete this survey!

- I Agree
- Further Consent Information

What is the purpose of this research?
This research aims to investigate the use of WBL experiences in educational settings and if there is an association with students' success in job placement after graduation.

How many participants will be in this research?
About 170 people will take part in this research.

What will I be asked to do?
If you agree to be in this research, you will complete a 5 minute online survey.

What are the risks and benefits if I participate?
There are no risks. You will be given access to the results that could help you in deciding your students' participation in future WBL.

Will I be compensated for participating?
You will not be reimbursed for your time and participation in this research.

Who will see my information?
There will be no information in research reports that will make it possible to identify you. Research records will be stored securely, and only approved researchers and the OU Institutional Review Board will have access to the records.

Do I have to participate?
No. If you do not participate, you will not be penalized or lose benefits or services unrelated to the research. If you decide to participate, you don't have to answer any questions and can stop participating at any time.

What will happen to my data in the future?
We will not share your data or use it in future research.

Who do I contact with questions, concerns, or complaints?
If you have questions, concerns, or complaints about the research, contact me at sam.ramsey@tulsatech.edu or 918-828-1001. You can also contact the University of Oklahoma - Norman Campus Institutional Review Board (OU-NC IRB) at 405-325-8110 or irb@ou.edu if you have questions about your rights as a research participant, concerns, or complaints about the research and wish to talk to someone other than the researcher or if you cannot reach the researcher.
Please print this document for your records. IRB#______________ IRB Approval Date _______________________

Data collected online or by a device and transmitted electronically: You will be asked to complete an online survey as part of this research. The organization hosting the data collection platform has its own privacy and security policies for keeping your information confidential. There is a risk that the external organization, which is not part of the research team, may gain access to or retain your data or your IP address which could be used to re-identify you. No assurance can be made as to their use of the data you provide for purposes other than this research.

Q1 What program do you teach? (Please select only one from the following)

Q2 At what campus are you located?

- Lemley
- HSC
- Owasso
- Peoria
- Sand Springs
- Riverside
- Broken Arrow
- HSEP

Q3 Approximately how many total number of hours in your program do students have the opportunity to participate in Work-Based Learning (Clinical, Internship, Guest Speakers, Field Trips, or Workplace Tours)? Write your response in the blank below. (e.g. 45 hours)

- ______

Q4 In the program area that you are teaching, approximately how many years of work experience in total do you possess? Write your response in the blank below. (e.g. 6 years)

- ______

Q5 In the program area you teach, do students have an opportunity to learn from a new experience during their WBL?
Examples:
- Opportunity to learn a new technique for welding sheet metal.
- Opportunity to learn a new software program that you did not learn in class.
- Opportunity to learn a new blood draw phlebotomy technique.

- Yes
- No

Q6 Approximately what is the total number of hours students spend in those new experiences? Write your response in the blank below. (e.g. 43 hours)

- ______

Q7 During the WBL experience in the program you teach, do students have an opportunity to reflect on the new experience?
Examples:
- The student discusses the new welding technique with the company employee/classroom discussion.
- The student discusses the new software program with an employee/classroom discussion and how it relates to the other software taught in class.
- The student discusses the new phlebotomy technique with the employee/classroom discussion and their instructor to compare it to the techniques taught in class.

- Yes
- No

Q8 Approximately what is the total number of hours do students have an opportunity to reflect? Write your response in the blank below. (e.g. 43 hours)

- ______

Q9 During the WBL experience in the program you teach, are students given the chance to assess how their experiences can be applied in a real world setting?
Examples:
- The student thinks about how the new welding technique compares and contrasts with the techniques learned in class and how they may use it in the future.
- The student reads the manual for the software to gain a better understanding.
- The student researches multiple phlebotomy techniques and how they compare to the new one learned at the WBL experience and they realize that they need to have all their materials ready before drawing blood.

- Yes
- No

Q10 Approximately what is the total number of hours students spend assessing how their experiences can be applied in a real world setting? Write your response in the blank below. (e.g. 43 hours)

- _______

Q11 During the WBL experience in the program you teach, are students given the opportunity to apply the new WBL experiences they have had?
Examples:
- The student is allowed to weld sheet metal at the WBL experience using the new technique as well as others in order to compare and contrast.
- The student is allowed to utilize the new software at the company under supervision of an employee.
- The student is allowed to perform the new phlebotomy technique on real patients under supervision of a medical assistant.

- Yes
- No

Q12 Approximately what is the total number of hours students spend applying the new WBL experience they have had? Write your response in the blank below. (e.g. 43 hours)

- _________

Appendix B

Locale Classifications and Criteria

The NCES locale framework is composed of four basic types (City, Suburban, Town, and Rural) that each contains three subtypes. It relies on standard urban and rural definitions developed by the U.S. Census Bureau, and each type of locale is either urban or rural in its entirety. The NCES locales can be fully collapsed into a basic urban–rural dichotomy, or expanded into a more detailed collection of 12 distinct categories. These subtypes are differentiated by size (in the case of City and Suburban assignments) and proximity (in the case of Town and Rural assignments). For additional information about the locale criteria, see the Locale Boundaries file documentation.

City – Large (11): Territory inside an Urbanized Area and inside a Principal City with population of 250,000 or more.

City – Midsize (12): Territory inside an Urbanized Area and inside a Principal City with population less than 250,000 and greater than or equal to 100,000.

City – Small (13): Territory inside an Urbanized Area and inside a Principal City with population less than 100,000.

Suburban – Large (21): Territory outside a Principal City and inside an Urbanized Area with population of 250,000 or more.

Suburban – Midsize (22): Territory outside a Principal City and inside an Urbanized Area with population less than 250,000 and greater than or equal to 100,000.

Suburban – Small (23): Territory outside a Principal City and inside an Urbanized Area with population less than 100,000.

Town – Fringe (31): Territory inside an Urban Cluster that is less than or equal to 10 miles from an Urbanized Area.

Town – Distant (32): Territory inside an Urban Cluster that is more than 10 miles and less than or equal to 35 miles from an Urbanized Area.

Town – Remote (33): Territory inside an Urban Cluster that is more than 35 miles from an Urbanized Area.

Rural – Fringe (41): Census-defined rural territory that is less than or equal to 5 miles from an Urbanized Area, as well as rural territory that is less than or equal to 2.5 miles from an Urban Cluster.

Rural – Distant (42): Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an Urbanized Area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an Urban Cluster.

Rural – Remote (43): Census-defined rural territory that is more than 25 miles from an Urbanized Area and also more than 10 miles from an Urban Cluster.

Appendix C: IRB Approval

The UNIVERSITY of OKLAHOMA

Institutional Review Board for the Protection of Human Subjects

Approval of Initial Submission – Exempt from IRB Review – AP01

Date: November 08, 2023 **IRB#:** 16607

Principal Investigator: Sam B Ramsey

Approval Date: 11/08/2023

Exempt Category: 2

Study Title: Are work-based learning opportunities for high school students associated with positive placement?

On behalf of the Institutional Review Board (IRB), I have reviewed the above-referenced research study and determined that it meets the criteria for exemption from IRB review. To view the documents approved for this submission, open this study from the *My Studies* option, go to *Submission History*, go to *Completed Submissions* tab and then click the *Details* icon.

As principal investigator of this research study, you are responsible to:

- Conduct the research study in a manner consistent with the requirements of the IRB and federal regulations 45 CFR 46.
- Request approval from the IRB prior to implementing any/all modifications as changes could affect the exempt status determination.
- Maintain accurate and complete study records for evaluation by the HRPP Quality Improvement Program and, if applicable, inspection by regulatory agencies and/or the study sponsor.
- Notify the IRB at the completion of the project.

If you have questions about this notification or using iRIS, contact the IRB @ 405-325-8110 or irb@ou.edu.

Cordially,

Aimee Franklin, Ph.D.
Chair, Institutional Review Board