Winter 2014

Analysis of Student Perceptions of the Psychosocial Learning Environment in Online and Face-to-Face Career and Technical Education Courses

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A Dissertation Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirements for the Degree of

DOCTOR OF PHILOSOPHY IN EDUCATION

OCCUPATIONAL AND TECHNICAL STUDIES

OLD DOMINION UNIVERSITY
December 2014

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ABSTRACT

ANALYSIS OF STUDENT PERCEPTIONS OF THE PSYCHOSOCIAL LEARNING ENVIRONMENT IN ONLINE AND FACE-TO-FACE CAREER AND TECHNICAL EDUCATION COURSES

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Old Dominion University, 2014
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Career and technical education (CTE) courses offered online are becoming more common in secondary schools. Recognizing the adaptability of CTE courses and designing curricula to offer online learners the same experience as face-to-face learners is challenging for education professionals and requires analyses of both environments. A lack of empirical studies makes it important to conduct research on online learning environments from the perspectives of high school students.

This study analyzes student perceptions of the psychosocial learning environment in online and face-to-face career and technical education courses. The research explores and compares how high school students perceive their learning environment and should help online course developers in the preparation of effective courses.

This study used existing survey data from a school district in Washington State from the 2013/2014 school year. The instrument used in this study was the Distance Education Learning Environment Survey (DELES) which was modified and revalidated for use with high school students. Statistical analysis included an examination of the sum of the mean scores and standard deviations of the survey's seven scale areas using face-to-face and online student data. A Mann-Whitney *U* test was used to measure variability and compare the sum of the mean scores of each of the scales between online and face-to-face environments to determine if differences exist.

Analysis of the data from this study indicated that in the areas of active learning and autonomy, students perceived online education as offering more benefit than face-to-face education. In the areas of student interaction and collaboration and enjoyment, student perceptions favored the face-to-face environment.

DEDICATION

This dissertation and all the effort herein is dedicated to my loving and patient family. Through all the years of missed practices, games, concerts, and school plays, birthdays, Christmases, and summers, my family has encouraged me to earn my doctorate at all costs. Although the costs were sometimes high and the climb always steep, I am grateful for the belief and encouragement my family gave me throughout it all. I love you all, and I could not have accomplished it without your support. Thank you, John, Sean, James, Mom, Dad, Sue, Norris, Kathy, and all my four-legged family members.

Diane L. Carver

ACKNOWLEDGEMENTS

This work could not have been completed without my dissertation committee. Thank you, Drs. Kosloski, Ritz, and Stefaniak for helping me through this endeavor with your continual support and encouragement. I also wish to thank Dr. Scott Walker for the use of your survey and your words of wisdom and reassurance. And last but not least, thank you to the students and administration of the school district whose data were used for this analysis.

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CHAPTER I

INTRODUCTION

Online secondary education is growing in popularity in Washington State and around the world. Flexible scheduling and expanded learning opportunities make online learning a popular choice for high school students with a variety of educational needs and personal circumstances (Hart, 2012). In addition to offering students more educational choices, online learning may help school districts provide opportunities that may not otherwise be available. According to a 2012 report from the U.S. Department of Education, "Educational systems are under increasing pressure to reduce costs while maintaining or improving outcomes for students" (Bakia, Shear, Toyama, & Lasseter, 2012, p. v). In order to meet ever-increasing demands with fewer resources, school districts around the country are looking at online education as a viable alternative to face-to-face classes, and online secondary education programs are growing as a result. In the 2009-2010 school year it was estimated that 1.5 million kindergarten through 12th grade (K-12) students took part in some type of online learning experience in the United States (Wicks, 2010). While online learning continues to increase in secondary education, there is still little research describing student perceptions of how these courses compare with face-to-face courses in terms of the psychosocial learning environments (Bakia et al., 2012).

As educators continue to develop online options, there is a focus on providing relevant, practical, and engaging learning opportunities for all students. Through realistic application and pragmatic curriculum, career and technical education (CTE) programs have been shown to improve student achievement by providing a learning environment

that promotes relevance and student engagement (Asunda, 2011). As cited in the Carl D. Perkins Act of 2006, CTE is defined as

> ...organized educational activities that offer a sequence of courses that provides individuals with the academic and technical knowledge and skills they need to prepare for further education and for careers in current or emerging employment sectors. (U.S. Department of Education, 2007, sec. 3)

CTE courses emphasize problem-based learning, collaboration, active learning, skill development, and career exploration (Threeton, 2007). Studies indicate a learning environment that includes these and similar psychosocial elements improves student efficacy (Dorman, 2001). Integrating CTE and core topics with authentic problem solving in subjects such as engineering and science may provide students with greater motivation to learn and succeed (Berry et al., 2004). Combining CTE programs with an online learning platform has the potential to further support student success by providing a greater range of educational opportunities and learning style options.

CTE courses offered online are becoming more common in secondary schools. The Carl D. Perkins Career and Technical Education Act of 2006 references distance education as a permissible use of grant funds, suggesting it may help improve access to CTE programs in secondary and postsecondary education (United States Department of Education, 2007). A report by Willms, Friesen, and Milton (2009) indicates students need to engage in work that is relevant, challenging, meaningful, and authentic. CTE curricula include real-world and career-related activities where students are encouraged to solve problems, work in teams, and discover their career interests through active engagement in the learning environment (Doolittle & Camp, 1999). Adding CTE courses to students'

general high school schedules can improve their motivation for overall learning achievement (Plank, 2001).

Theories and philosophies of how students learn provide a conceptual framework to describe the acquisition and processing of knowledge. CTE historically has been considered behaviorist in nature. In the early part of the 20th century, the idea of social efficiency prompted education theorists to view CTE as a method to create a trained and competent workforce. Legislation followed this logic promoting CTE as competency-based training designed to change behavior in an observable way to meet the needs of an industrial society (Doolittle & Camp, 1999). Through 1998, Perkins legislation continued to define CTE as preparing people for careers with less emphasis on higher level thinking or postsecondary education.

Although current Perkins legislation still identifies CTE as competency-based, today's CTE programs are no longer exclusively used for job training, and the stimulus-response behaviorist theory may not provide a solid foundation for the contemporary purpose of CTE in education. CTE today, with an emphasis on the application of academic skills, helps students find relevance in core academic subjects (Horne, 2010). With a focus on career education and guiding students through applied academics, some scholars view CTE as being aligned with the social constructivist philosophy (Bunch, 2009). The ability to interact with others, recognize the application of new information, and apply new knowledge outside of the classroom all contribute to a student's ability to construct his or her understanding, and this represents the foundation of CTE (Doolittle & Camp, 1999). The social constructivist philosophy holds that students acquire skills most effectively when they are supported by activities that help them construct knowledge

(Harasim, 2012). Whether online or face-to-face, CTE courses that incorporate these activities into the learning environment can help students build their knowledge through job-ready and academic skills (Brewer, 2004).

According to Fraser (1998), a learning environment is "the social, psychological and pedagogical contexts in which learning occurs and which affect student achievement and attitudes" (p. 3). The social constructivist philosophy proposes that learning environments which promote problem-solving, teamwork, collaboration, and application can provide students with the capacity and motivation to learn, whether they are involved in an online or face-to-face educational setting (Grier-Reed, Skaar, & Parson, 2009). High school students require support elements that are built into their learning environment if they are to be successful at constructing knowledge (International Association for K-12 Online Learning [iNACOL], 2011). A learning environment that encourages social, academic, and intellectual student engagement is important for students' motivation to learn. Willms et al. (2009) define social engagement as "a sense of belonging and participation in school life" (p. 7); academic engagement as, "participating in the formal requirements of schooling" (p. 7); and intellectual engagement as, "a serious emotional and cognitive investment in learning, using higher order thinking skills..." (p. 7). According to Dunleavy and Milton (2008), when students are intellectually engaged, they are invested in learning through deep and meaningful personal, psychological, and cognitive experiences.

Supporting students through teacher interaction, student collaboration and communication, extending learning outside of class, problem solving, and inquiry learning has been shown to improve student achievement (Brewer, 2004; Rovai, 2002b).

These supportive practices, when considered in the design of high school curricula, may improve student learning in both online and face-to-face environments. Understanding how students perceive the psychosocial learning environment is an important step in developing curricula that will support student learning and achievement.

Studies conducted by the Bill and Melinda Gates Foundation (2012a; 2012b) suggest that student perceptions of instruction are predictive of student achievement. In fact, these studies have found that student perceptions are more predictive of achievement gains than classroom observations or standardized testing measures. In addition to more traditional measures of achievement, surveys of student perceptions of the learning environment and instruction may help professional educators determine how to improve practices and ultimately improve student outcomes (Bill & Melinda Gates Foundation, 2012a). As the constructivist philosophy supports, students are central to their own learning, and how they perceive their learning environment is an important element in how they form their understanding of their role in the class, their self-reflection, and their interaction with the teacher, other students, and course content (Stefl-Mabry, Radlick, & Doane, 2010).

Research is needed to identify how students perceive the psychosocial learning environments in secondary online and face-to-face CTE courses to ensure that appropriate features for student support are incorporated within course design (Patrick & Powell, 2009). This study, which is grounded in the social constructivist philosophy, analyzes and compares student perceptions of the psychosocial environments in online and face-to-face CTE courses. The resulting data from this study will help K-12 CTE professionals recognize how CTE students currently perceive learning environments to

ensure that the appropriate environmental supports are explicitly present in CTE online and face-to-face curricula.

Purpose Statement

The purpose of this study was to analyze student perceptions of the psychosocial learning environment in online and face-to-face high school career and technical education (CTE) courses to examine the efficacy of the psychosocial environment from a student's perspective.

Research Questions

The research questions addressed in this study were as follows:

RQ_1: How do students perceive the psychosocial environment in face-to-face career and technical education courses?

RQ_2: How do students perceive the psychosocial environment in online career and technical education courses?

RQ_3: How do student perceptions of the psychosocial learning environment in career and technical education differ for students in online courses compared with students in face-to-face courses?

Background and Significance

Online learning can be defined as a system of "instruction via a web-based educational delivery system that includes software to provide a structured learning environment" (Watson, Murin, Vashaw, Gemin, & Rapp, 2010, p. 8). The word virtual is often used to refer to the online environment, such as Virtual Learning Environment and Virtual High School (Harasim, 2012). Distance learning refers to "...teaching and learning being brought about by media: in principle students and their teachers do not

meet face-to-face" (Holmberg, 2005, p. 9). Modern technology allows all of these terms to be used to describe an educational situation in which the student uses a computer and software to learn, often at a distance from the learning institution. Although there are many ways to define each of these terms, for the purpose of this study, they are defined as previously stated.

For high school students, online learning expands educational opportunities (iNACOL, 2011). The remote learning environment is a natural fit for the millennial generation growing up with interactive technology that makes communicating, creating and retrieving information, and collaborating more than strictly face-to-face practices (Andrus, 2009; Aviles & Eastman, 2012; Lucking, Christmann, & Wighting, 2009). Online learning is often used to help students catch up on credits, allow them to experience extended learning, and give them the opportunity to take courses that may not be offered in their home high schools (Duffey & Fox, 2012). Students taking online courses may be working in a synchronous format where students and teachers interact in real time, or an asynchronous format, where course information and lessons are created in advance and available for students to work at an unspecified time. Students may access online courses from home or from another remote location such as a school, a public library, or another setting offering Internet access (Andrus, 2009).

Although online learning has increased in popularity in K-12 education nationwide, there is no empirical research indicating how students perceive the psychosocial learning environment in these classes compared with face-to-face classes. Studies show the importance of student perceptions and how educators may use data related to student perceptions to improve course quality (Bill & Melinda Gates

Foundation, 2012a; Gentry & Springer, 2002). This study compares student perceptions of the learning environment in online and face-to-face courses.

The student support practices that promote learning in a class environment are vital to addressing student needs and encouraging student success online and face-to-face (Daniels, 2009). Features related to student support in a learning environment include frequent and complex interaction among students and between teacher and student, regular and meaningful teacher feedback, a focus on topics that interest students, activities that allow students to apply their learning, and assignments that provide relevance and promote student engagement (Johnston, 2007; Keeler, Richter, Anderson-Inman, Horney, & Ditson, 2007; Lowes, 2007). A focus on student interest, active student engagement, and relevance are among the features often seen in career and technical education courses (Ruth, 2006).

Career and technical education (CTE) is a broad category of courses that provides career exploration, industry skill attainment, industry certification opportunities, postsecondary articulation connections, work-based learning experiences, and employability skill enhancement (Castellano, Stringfield, & Stone, 2002). Historically, terms for CTE have included vocational education, industrial education, manual education, and career education (Gordon, 2014). Since its early history with apprenticeships and preparing individuals with specific job skills, CTE has gone through several iterations characterized and influenced by the social, economic, and political atmosphere of the time.

The modern CTE movement began in the early 20th century to address the need for worker training (Gordon, 2014). Today's CTE programs still have roots in economic

and workforce development, but CTE has also taken on new roles in education including student leadership opportunities, relevance of academics, global awareness, and Advanced Placement (Partnership for 21st Century, 2010). CTE courses have the capacity to increase student engagement through relevant curriculum, hands-on learning practices, and affiliated leadership organization activities (Brewer, 2004; Kosloski, 2010).

CTE is available in skill centers and many middle and high schools throughout the United States (Wonacott, 2003). These career-focused secondary programs are comprised of courses where students have the opportunity to learn about a variety of occupations, gain specific job skills, and learn or enhance core academic information in a relevant, practical, applied setting. CTE programs are identified by Career Clusters and include studies in high demand career fields such as engineering, business, and health science (Reese, 2008). Career Clusters represent groupings of related occupations to assist students and educators in organizing career options (National Association of State Directors of Career and Technical Education Consortium, 2014).

With an emphasis on standardized testing and student achievement in core academic courses, some school districts may find it necessary to reduce or eliminate CTE courses in order to increase the number of core courses (Fletcher, 2006). Offering CTE online may provide greater opportunities for students to participate in these courses. Often seen as applied, hands-on courses, CTE may appear to be incompatible with an online learning environment. However, many CTE courses may be appropriate for an online venue, particularly those with a theoretical focus and those that are computer-based (Benson et al., 2004; Metz, 2010).

Computer-based CTE courses may be offered wholly online or as a hybrid where students receive hands-on experiences on the job or in a lab. For example, the Seneca Valley School District in Pennsylvania offers an online program that provides CTE opportunities where students complete their academic work online and then go to work for on-the-job career experience. This and similar CTE programs offer students the chance to earn core academic credit, college credit, and industry certifications (Association for Career and Technical Education [ACTE], 2010).

Including CTE in online course offerings at the high school level will provide greater potential for students to become involved in these relevant learning opportunities. It is crucial that all CTE courses are rich with dynamic, practical, applied, and cooperative elements, whether the courses are online or face-to-face. Analyzing the learning environments as they are currently perceived by students will help curriculum designers and teachers ensure these elements are incorporated into all CTE courses.

Recent research from the Bill and Melinda Gates Foundation (2012) indicates that student perceptions play an important role in student success and achievement. This study is significant because it explores how students perceive the psychosocial learning environment in online and face-to-face CTE courses as a factor of potential student achievement. This knowledge will assist education professionals in developing courses that incorporate environmental features that will enhance learning outcomes for students.

Limitations

The following limitations apply to this study:

- The survey data used for this study were from one school district in Washington State which may limit the ability of other researchers to

generalize the results. Data from districts across Washington State would have allowed the results to be more widely generalized.

- The Distance Education Learning Environment Survey data used in this study were previously collected by school district officials. While it is assumed that proper procedures for data collection were followed, the researcher was not able to oversee the collection process.
- The data used in this study were those of high school students during the 2013-2014 school year which may limit other researchers' ability to generalize the results to future populations. Data from several years would have allowed the researcher to view trends in online learning which may help educators and future researchers understand the changing dynamics in online learning.

Assumptions

The following assumptions applied to this study:

- Online students have limited contact with the teacher either live or via the Internet. Student and teacher contact is based on Washington State Alternative Learning Experiences (ALE) requirements as appropriate based on online time. These requirements are outlined in WAC 392-121-182 in which direct personal contact is defined as

  > ...a one-to-one meeting between a certificated teacher and the student, or, where appropriate, between the certificated teacher, the student, and the student's parent. Direct personal contact can be accomplished in person or through the use of telephone, e-mail,

> instant messaging, interactive video communication, or other means of digital communication (Alternative Learning Experience Requirements, 2011, para. 17).

- Students are enrolled in Washington State approved CTE courses.
- Students are enrolled in courses that are appropriate for their learning abilities.
- Teachers are adequately certified in Washington State to teach the CTE courses.
- Students responded to the survey only once.

Procedures

This study used existing data that were collected using the Distance Education Learning Environment Survey (DELES) which measured student perceptions of the psychosocial learning environment in CTE classes in one Washington State school district and the district-affiliated online program. The DELES survey was developed for postsecondary online students and was adapted to be used for secondary online and face-to-face students. Surveys were given to high school (grades 9-12) career and technical education students. A director from the school district administered the surveys to students. Student responses were confidential and names were not included in the final survey results.

The survey consisted of 42 Likert items which formed 7 scales following a factor analysis. Descriptive statistics were used to answer Research Questions 1 and 2. A Mann-Whitney *U* test was used to identify the differences in perceptions between online and face-to-face students and answer Research Question 3.

Definition of Terms

The following terms are defined to assist the reader:

Applied Learning: A pedagogical approach that helps students connect theory and practice.

Asynchronous: A course design where learning is done on a student's own time (Harasim, 2000).

Authentic Learning: "A pedagogical approach that situates learning tasks in the context of future use" (Herrington, Reeves, & Oliver, 2014, p. 401).

Behaviorist Learning Theory: A learning theory based on the proposition that behavior can be observed and researched scientifically, and learning is often the response to a conditioning stimulus (Harasim, 2012).

Career and Technical Education (CTE): Organized educational activities offering students a sequence of courses that includes academic and technical knowledge and skills necessary to prepare them for advanced education and careers in current or emerging employment sectors (United Stated Department of Education, 2007).

Consortium Providers: Online schools that offer consortium memberships to districts who wish to allow students to participate in distance learning courses (Watson et al., 2010).

Experiential Learning: Learning that is participative, interactive, and deals with real-world problems and open-ended situations through semi-structured learning experiences (Gentry, 1990).

Flipped Classroom Design: "...a specific type of blended learning design that uses technology to move lectures outside the classroom and uses learning activities to move practice with concepts inside the classroom." (Strayer, 2012, p. 171).

Hybrid (also called Blended) Course: A course designed with synchronous and asynchronous components of instruction and learning (Harasim, 2012).

Multi-District Schools: Online schools or programs that serve more than one district (Watson et al., 2010).

Online Learning: Learning via an Internet-based educational delivery system that includes software to provide a structured learning environment (Harasim, 2000).

Problem-based Learning: A learner-centered instructional model "that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem" (Savery, 2006, p. 9).

Psychosocial Learning Environment: The emotional climate that exists within a classroom or other learning environment (Walker & Fraser, 2005).

Single-District Programs: Online schools serving students who reside within the district that is providing the online courses (Watson et al., 2010).

Social Constructivist Philosophy: A learning philosophy which states that learning is a function of how an individual creates meaning from his or her experiences and interactions with other people and the world (Dabbagh & Bannan-Ritland, 2005).

State Virtual Schools: Online schools run by a state and serving students within that state (Watson et al., 2010).

Synchronous: A course design where students and teachers interact in real time (Harasim, 2000).

Summary and Overview

Distance learning is not a new phenomenon, but advances in technology have created a vehicle where students may learn remotely; this vehicle is online learning. Offering online learning for high school students is a growing trend and the number of students enrolling in online courses is increasing annually (iNACOL, 2011). If educators and curriculum developers understand student perceptions of learning environments in online and face-to-face CTE courses, they may identify and develop curricula that will help support student learning (Bill & Melinda Gates Foundation, 2012b). This study was designed to analyze student perceptions of the psychosocial environments in online and face-to-face career and technical education courses.

Chapter II's Literature Review will provide an overview of career and technical education, learning theories, and online learning in high schools. Literature examining secondary CTE in traditional classrooms will be reviewed. The constructivist learning philosophy will be addressed and will be used as a foundation for this study. Online learning will be described and current research related to online learning will be examined. This section will also include a review of literature regarding student perceptions of the psychosocial learning environment.

Chapter III will discuss the methods and procedures used to conduct this study. Chapter IV will provide the findings of the statistical analysis of the survey data. Finally, this research dissertation will draw conclusions to address the research questions and identify areas of future research.

CHAPTER II

LITERATURE REVIEW

This chapter will provide an overview of career and technical education including its early foundations and contemporary issues. Learning theories will be described and will provide a foundation for the study. Additionally, psychosocial learning environments will be defined and reviewed from the research literature.

Career and Technical Education

Career and Technical Education (CTE) is a broad category of courses that provide for career exploration, industry skill attainment, industry certification opportunities, post-secondary articulation connections, work-based learning experiences, and employability skill enhancement (Wang, 2010). The Perkins Act of 2006 defines CTE in section 3(5) as

> ...organized educational activities that offer a sequence of courses that provides individuals with coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and for careers in current or emerging professions, provides technical skill proficiency, an industry-recognized credential, a certificate, or an associate degree; may include prerequisite courses (other than a remedial course) that meet other requirements; and include competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, occupation-specific skills, and knowledge of all aspects of an industry, including entrepreneurship, of an individual. (United States Department of Education, 2007, sec 3.5)

CTE courses are offered in middle schools, high schools, and many post-secondary institutions throughout the country. Historically, terms for career and technical education have included industrial, manual, vocational, and career education (Wonacott, 2003). From Jean Jacques Rousseau and Johann Heinrich Pestalozzi came our early theories of vocational education. These theories stemmed from the European concept of class structures where education was not equally distributed for all citizens. Prior to the work of these early theorists, education was not freely available for everyone, but society needed the lower social classes to gain working-class skills. The teaching and learning of these skills became known as vocational education (Gordon, 2014).

History of CTE.

Apprenticeships were a popular form of education in early America and represented the first form of vocational education (Kuchinke, 2013; Wonacott, 2003). Two forms of apprenticeships were used in the United States, voluntary and involuntary, with the latter providing a way for society to deal with indigent and orphaned children. The Industrial Revolution saw a decline in apprenticeships and paved the way for a new system of education for all children (Gordon, 2014). The first act legislating CTE, the Morrill Act of 1862, resulted from the growing demand in the United States for vocational education, in particular in the agricultural and technical fields. The Morrill Act provided land-grant funding for institutions of higher education to deliver vocational education throughout the country. This legislative act, which helped make education available for agricultural and industrial workers, provided the opportunity for a wider range of citizens to gain practical skills for employment and life (National Association of State Universities & Land-Grant Colleges, 2008).

David Snedden, Commissioner of Education for Massachusetts and author of *The Problem of Vocational Education* (1910), helped bring about the expansion of American vocational education. Snedden described what he believed was the downfall of institutions like the home, the farm, and apprenticeships that had previously prepared individuals for a work environment (Wonacott, 2003). According to Snedden, vocational education could be divided into four categories: professional, commercial, agriculture, and household arts, all of which helped promote social efficiency by providing education for all citizens (Knoll, 2009).

Classical education in early America was largely restricted to the wealthy and elite and served to maintain the virtue of the commonwealth. In the early 20th century, American classical education was associated with the refinement of the upper class. The newly emerging middle class sought to acquire the social and political refinement associated with a classical education (Howe, 2011). Schooling in the early 20th century was aimed at students who were bound for college and the careers that followed a collegiate path (Wonacott, 2003). Many youth were not served by public education and needed a program that provided skills for entering the workforce (Knoll, 2009; Kuchinke, 2013). The Smith-Lever Act of 1914 extended the federal funding for cooperative work through the land-grant colleges and universities (Gordon, 2014). Following the Smith-Lever Act, the Commission on National Aid to Vocational Education promoted the idea that vocational training should be included in general high school curricula to provide the opportunity for students to prepare for life and work (Friedel, 2011; Wonacott, 2003).

Providing an educational system in the United States that would be beneficial to all students became a focus, and some believed it prompted schools to become more

democratic as educational and social policies helped move children from factory employment to public schooling (Heck, 2004). Vocational education fit this new model of public education and became an integral component in an economic system that required greater efficiency in fields where practical skills needed to be enhanced (Gordon, 2014; Wonacott, 2003). Vocational education provided not only a means for students to obtain employable skills, but also led to new teaching methods, hands-on learning theories, and purposeful education for all students (Pautler, 1999).

Another early leader in vocational education was John Dewey, born in 1859. As a method to prepare youth for social and civic life, Dewey's philosophy was that the purpose of education was to help develop young minds, develop youth's capacity for thought, and develop their ability to participate in the advancement of society (Garrison, Neubert, & Reich, 2012; Kunchinke, 2013). In Dewey's view, education must focus on an individual's growth and lifelong learning. To impose non-intrinsic goals would remove the learners from present reality and prepare them for a future that was disconnected from everyday life (Dewey, 1916). Only through an occupational context could students embrace their interests, learn academics, and grow intellectually (Garrison et al., 2012). This philosophy works well with the concept of vocational education where constructivism and relevancy are stressed, but it differed markedly from the competency-based ideas held by Charles Prosser and other proponents of vocational education (Gordon, 2014; Hickman, Neubert, & Reich, 2009).

According to Smith (1999), the 1910 Census Report indicated that of the 16 million individuals engaged in agriculture and mechanical industries, most of them had inadequate preparation for those vocations. The Morrill Act of 1862, the Smith-Lever Act

of 1914, and the Smith-Hughes Act of 1917, which provided federal grants for vocational education, indicated the purpose of vocational education was to provide students the skills for employment that required less than a bachelor's degree (Scott & Sarkees-Wircenski, 2004). The passage of the Smith-Hughes Act in 1917 initiated the role of the federal government in vocational education at the pre-baccalaureate level (Wolfe, 1978). This Act required states to establish a board for vocational education. Some states created a separate board rather than incorporating this new requirement into an existing education board, which led to "isolation and lack of integration of vocational education into comprehensive high schools" (Friedel, 2011, p. 39).

Another consequence of the Smith-Hughes Act was the creation of the position of Commissioner for Vocational Education (Pautler, 1999). Charles Prosser, the first person to hold this position, provided a foundation for vocational studies through his 16 Theories of Vocational Education, which differentiated vocational and general education (Hyslop-Margison, 1999). While Dewey believed education should help children become better citizens, Prosser felt that society would benefit most if education provided skills for the workplace. Prosser and other vocational education advocates felt that education should mimic real work conditions, capitalize on special aptitudes of learners, be taught by specially trained teachers, stress occupational standards, serve small groups, and include on-the-job training opportunities (Kuchinke, 2013; Wonacott, 2003). The debate continues today over whether education should primarily serve to help children become more well-rounded citizens or help them obtain skills for employment (Gordon, 2014).

The Smith-Hughes Act also provided federal funding to support vocational teachers and administrators (Gordon, 2014). Following the passage of this Act, vocational

student enrollments at the pre-baccalaureate level expanded ten-fold between 1920 and 1940 and doubled again by 1970 (Friedel, 2011). The George-Reed Act, the George-Ellzey Act, and the George-Deen Act, all of which followed the Smith-Hughes Act, provided additional funding for vocational education in the 1930s to expand agriculture, trade and industry, and home economics education (Gordon, 2014). The George-Deen Act expanded vocational education funding to include distributive occupations and created distributive education as a new category (Wonacott, 2003). The George-Barden Act of 1946 also provided federal vocational education funding and granted an independent standing for home economics, separating it from trade and industry, and ensuring the program's share of federal dollars (Gordon, 2014). In addition, "This act was the first federal law to recognize vocational student organizations (VSOs) by stating that federal funds could be used for vocational agricultural teacher activities related to the vocational student organization" (Friedel, 2011, p. 40).

The Vocational Education Act (VEA) of 1963 provided funds to maintain, expand, and improve existing programs in vocational education. With the exception of the Smith-Hughes Act, the VEA essentially replaced previous vocational legislation and specified that vocational programs must serve special populations including disadvantaged, language minorities, and women (Wolfe, 1978). The last major amendments to the VEA, the Education Amendments of 1976, addressed issues that developed since the 1968 amendments (Gordon, 2014). These issues included sex discrimination and bias in vocational education programs; insufficient funding for handicapped, disadvantaged, postsecondary vocational education, and Native Americans;

and a lack of systematic planning and evaluation for state programs (Gordon, 2014; Wolfe, 1978).

Contemporary CTE.

Vocational education shifted in 1983 with the publication of the report *A Nation at Risk* (Friedel, 2011). Educational philosophers and reformers in the United States saw vocational education as part of the problem facing the nation in its attempt to remain competitive in an emerging global economy (Wonacott, 2003). They viewed the vocational movement as too narrowly focused on job preparation and without enough emphasis on core academics. In order to compete globally, the report stressed that education needed to focus on academic, not vocational studies, and general rather than specific skills. Ultimately, the report contended that vocational education did not prepare students adequately for work or higher education (Pautler, 1999).

The Carl D. Perkins Vocational Education and Applied Technology Act of 1984 helped to redefine vocational education and focus efforts toward improving programs and providing better service and access for special needs students (Friedel, 2011; Gordon, 2014). This Act and the revisions that followed provided a way for vocational education to fit within the new paradigm of educational reform, including the emphasis on academic achievement (Manley, 2011). Teaching of general occupational competencies and integrating academics and industry skills were emphasized in the Carl D. Perkins Act of 1998 (American Vocational Association, 1998). When the legislation was reauthorized again in 2006, programs of study and Career Clusters were introduced to help ensure students were prepared for the new career pathways of the 21st Century. The attainment of industry skills, industry-recognized certification, and post-secondary preparation were

all part of the language in the most recent reauthorization of the Carl D. Perkins Act of 2006 (Perkins IV), which stressed the importance of leadership and employment skills (Brustein, 2006). The 2006 legislation also changed the term vocational education to career and technical education to reflect the emphasis on career preparation (Manley, 2011).

Ninety percent of high school graduates have completed CTE courses according to the National Center for Education Statistics (2011). The recent Harvard Business School report, *Pathways to Prosperity: Meeting the Challenge of Preparing Young Americans for the 21st Century*, stresses that the focus on academics along with the neglect of CTE may have jeopardized our economic and strategic national agendas (Symonds, Schwartz, & Ferguson, 2011). Data collection in CTE is helping provide more evidence that CTE is an important factor for a well-educated population. Today's CTE programs include studies in high demand, high-wage career fields such as engineering, business, and health care (Kotamraju, 2007).

Foundations of Learning Theories

Theories of how and why people learn and even how to define learning have been debated by education theorists and researchers for at least the last two centuries (Pritchard, 2009). Even the foundation of learning is debated today as social scientists discuss and attempt to identify the basis for human learning (Yilmaz, 2011). Some argue that learning is based on the response to external stimuli while others argue that it develops when individuals build their knowledge through their interactions and experiences with the world (Hickman et al., 2009; Yilmaz, 2011). Defining learning, therefore, has been a difficult and contentious endeavor which often includes a dialogue

on whether learning is simply a resulting behavior or includes the cognitive processes involved in learning (Lachman, 1997).

While learning can be defined as a change in behavior resulting from stimulus or experience, this definition may neglect the inner-workings of the mind and the processes involved in learning (De Houwer, Barnes-Holmes, & Moors, 2013). Some researchers argue that a more functional definition of learning must encompass not only the resulting behavior, but also how the mind processes the world and the experiences of the individual (Hickman et al., 2009). The Merriam-Webster definition of learning is "to gain knowledge, understanding, or skill by study or experience" (*Merriam-Webster's Dictionary and Thesaurus*, 2014, para. 1). This definition may also overlook the cognitive processes involved in learning.

The Behaviorist Learning Theory focuses on observation and behaviors that can be seen and measured (Yilmaz, 2011). Through this theory, learning may be studied and changed using a scientific method (Harasim, 2012). Theorists such as Thorndike, Locke, and Rousseau emphasized that researchers could condition learner behavior by modifying a learning environment to elicit a desired response. Famous behaviorist theorists include Ivan Pavlov (1849-1936) and Burrhus Frederic Skinner (1904-1990), both of whom focused on operant conditioning theories where an association is made between behaviors and behavioral consequences (Moore, 2011). The behaviorist theory continued to eclipse other educational theories through the 1900s as researchers sought to find effective teaching methods through a stimulus-response and reinforcement model such as classical conditioning (Ornstein & Hunkins, 2012; Schunk & Pajares, 2004).

Dominating the psychology landscape of the 20th century was the idea that learning is a result of reinforcing behavioral changes until the preferred behavior is observed (Cooper, 1993). How individuals process information to reach understanding is not visible, therefore not observable as required by the behaviorist theory (Cooper, 1993). Seeking to learn more about the accompanying learning processes, social scientists began looking for other ways to explain human activities, including learning, that cannot be easily observed (Cooper, 1993; Yilmaz, 2011). Cognitive Learning Theory emerged as a method to explain what happens in the human mind and how those inner workings can affect learning (Harasim, 2012).

Cognitivism as a learning theory began to emerge in the early 20th century through the work of Tolman, Piaget, Vygotsky, and Bruner (Yilmaz, 2011). Tolman's work paved the way for other researchers when he suggested that rats in a maze had not only learned behaviorally how to navigate the maze but also had created a mental map of it (Greenwood, 1999). The cognitive theory broke ground in education by providing researchers and educators a framework with which they could assert that learning was more than just behavior modification and the result of stimulus and reward (Cooper, 1993). Although behaviorism continued to provide a foundation for learning and education, cognitivism allowed for a deeper study into the processes of the brain during learning (Greenwood, 1999).

Even as the cognitive theory gained mainstream attention in education and research communities, many researchers felt there were missing elements to their understanding of the nature of learning (Ornstein & Hunkins, 2012). As a reaction to both behaviorism and cognitivism, the constructivist learning philosophy held that individuals

create or construct their knowledge by making connections in their own lives and experiences.

Although there is still disagreement in educational philosophy over the definition of learning, there exist two major branches in the psychology of learning that have created two major theories or philosophies for career and technical education: behaviorism and constructivism (Doolittle & Camp, 1999; Pritchard, 2009). The underlying theory that has guided CTE instruction has historically been behaviorism. In a time when workers were needed to perform routine tasks, the need for learners to change their behavior for employment was of primary concern (Doolittle & Camp, 1999). This history even helps define current CTE through legislation, particularly the Carl D. Perkins Act of 2006, which identifies CTE as competency-based education that includes student attainment of industry-defined career and technical skill proficiencies and achievement on technical assessments (Brustein, 2006).

Charles Prosser's *Vocational Education in a Democracy* introduced Prosser's sixteen theorems which set a foundation for vocational education. Prosser theorized that education was more than just liberal arts designed to train the minds of the elite in a population (Doolittle & Camp, 1999). Industrial workers also required education, and Prosser believed preparing youth for employment should be a paramount priority to develop and sustain a vibrant society (Gordon, 2014). This philosophy represented a behaviorist view of vocational education as students needed primarily to be able to perform a specific task to be most efficient in the workplace. The social efficiency doctrine that underlies the early theories of CTE emphasized the notion that an efficient

society would foster success and satisfaction of the individuals within the society (Doolittle & Camp, 1999; Wirth, 1975).

Many of today's CTE courses emphasize competency-based instruction with performance indicators, performance measures, and industry certifications. This emphasis on behavior-based outcomes, which is dictated by current legislation through the Carl D. Perkins Act of 2006, provides evidence that many CTE courses are defined and legislated from a behaviorist perspective (Dobbins, 1999). However, needs in the workplace stress creativity, problem-solving, collaboration, and critical thinking which may not be easily accomplished through a behaviorist approached (Kerka, 1997). According to Hager (2008),

> ...even in those vocational education courses that emphasize skill (or bodily) learning, behavioristic approaches to teaching and curriculum have had limited lasting success. Such success seems to be restricted to repetitive tasks that can be readily routinized and are relatively context-invariant; for example, performance of basic operations on a photocopier. (p. 7)

As the applications and philosophies of CTE adjust to reflect modern social and economic situations, the foundational learning theory for CTE may also warrant review, and some CTE professionals are envisioning CTE through a constructivist approach (Doolittle & Camp, 1999; Kerka, 1997). According to Education Secretary Arne Duncan, students today must be prepared for the careers of the future, and to accomplish this "They will need a blend of academic, technical, and employability skills – like critical thinking, collaboration and communication. They will need to be adaptable, and also to learn from failure" (U.S. Department of Education, 2013, para. 6).

Constructivism was first introduced as a learning theory by Lev Vygotsky in the early 20th century (Ornstein & Hunkins, 2012). Jean Piaget, another influential proponent of constructivism, claimed that children build their knowledge during their sensori-motor period of development as they experience and learn about the world and apply what they learn to new situations with increasingly complex behavior patterns (Pritchard, 2009). According to Pritchard, constructivists believe that "...learning takes place when new information is built into and added onto an individual's current structure of knowledge, understanding and skills" (p. 17). Constructivists see a learner as "an empowered, problem-solving individual capable of responding flexibly to problems that have no clear set of boundaries or singular answers" (Liang & Chen, 2012, p. 548).

The constructivist doctrine emphasizes that the learner is central to his or her learning, and teaching is not to transmit knowledge but to guide students through the process of constructing their own knowledge through learning tasks. The learner's previous knowledge plays an important role in the construction of new knowledge, and authentic contextualized problem solving is emphasized (Rossing, Miller, Cecil, & Stamper, 2012). With school and workplace connections needed in today's CTE classes, the constructivist approach enables teachers to scaffold instruction and assists students in the application of problem-solving techniques through which students build schemas that can eventually be applied in the workplace (Bunch, 2009). Constructivist teachers serve as mentors, guides, and facilitators as students bring their own unique perspectives and prior knowledge and beliefs to the learning environment in order to construct new, relevant knowledge (Doolittle & Camp, 1999). Real-world, authentic learning is

emphasized through collaboration, social negotiation, and exploration of the subject matter (Paily, 2013).

Course design that is structured using a constructivist philosophy incorporates teamwork, encouragement of discovery learning, authentic learning opportunities, collaboration, and encouragement of self-awareness in the learning process (Doolittle & Camp, 1999; Gagne, Briggs, & Wagner, 1992; Paily, 2013). Student engagement is also an important element in constructivist course design where students are encouraged to explain, elaborate, and evaluate course content (Paily, 2013). However, as Scott (2011) contends, "Viewing curriculum development and implementation from constructivist perspectives requires reform" (p. 192). Examining constructivist factors in the CTE learning environment is vital for future course design (Doolittle & Camp, 1999; Hamat & Embi, 2010).

Although some CTE courses are structured using a behaviorist model, and current legislation dictates that CTE is competency-based with industry standards and skills assessments, changing times may require changes in CTE and how the curricula are delivered to students (Doolittle & Camp, 1999). Helping students make connections among secondary school, work, post-secondary education, and life is a cornerstone of CTE, and the constructivist philosophy may work to describe these learning connections (Bunch, 2009). Additionally, research in workplace education finds learners are engaged in problem-solving activities, hands-on practices, reflection, and interpretation, which leads to a constructivist approach emphasizing the learners' roles in constructing their understanding of the job (Kerka, 1997). Employers require a workforce that has training and experience with these skills (Rojewski, 2002). Even with a legislated emphasis on

specific industry skill attainment, students and future employers may find additional benefit from constructivist-based instruction in CTE courses (Doolittle & Camp, 1999).

Business and industry organizations today need employees who can solve problems, work in diverse teams, effectively utilize technology, and are self-motivated and disciplined (Burke, 2011; Washbon, 2012). These skills, referred to as 21st century skills, are often associated with the constructivist approach to teaching and learning (Doolittle & Camp, 1999; Liang & Chen, 2012; Partnership for 21st Century, 2010). Although The Perkins Act of 2006 places an emphasis on competency-based instruction through industry standards and industry certifications, it also stresses the importance of academic integration, 21st century employment skills, and lifelong learning (Brustein, 2006). The recent restructuring of the workplace requires employees to have a variety of skills that were not foremost decades ago. Employees today need to communicate globally, adapt to quickly changing information technology, and network with a wide range of individuals at all levels of hierarchy (Rossing et al., 2012).

Online and Distance Learning

Online learning has its roots in distance learning. The shared history of online and distance learning grew out of the need for individuals to learn anywhere and anytime, a convenience that has precipitated the growth of distance learning since its early inception in correspondence and home studies (Caruth & Caruth, 2013). Through advances in hardware and software technology, greater access through the Internet, open resources, and the need for more educational opportunities, students today have unprecedented access to learning content (Watson, Murin, Vashaw, Gemin, & Rapp, 2012). From Advanced Placement academics to helping students recover credit from failed courses,

online opportunities present students with a variety of ways to participate in this educational evolution (Streiffert, 2010; Watson, Murin, Vashaw, Gemin, & Rapp, 2011).

Distance learning can be defined as "improved capabilities in knowledge and/or behaviors as a result of mediated experiences that are constrained by time and/or distance such that the learner does not share the same situation with what is being learned" (Caglar, 2013, p. 10). According to Holmberg (1986),

> ...distance education includes the various forms of study at all levels which are not under the continuous, immediate supervision of tutors present with their students in lecture rooms or on the same premises, but which, nevertheless, benefit from the planning, guidance and tuition of tutorial organization. (p. 26)

Distance learning represents a combination of learning methods that began with correspondence courses in the mid to late 19th Century (Banas & Emory, 1998). Online learning, a corollary of distance learning, is education that takes place via the Internet using web-based delivery models in a structured learning environment where students and teachers are geographically separated (Watson et al., 2012).

History of online and distance learning.

An early precursor to online learning and representing the beginning of the distance learning model, the first correspondence course was the Pitman Shorthand training program which was delivered to students through the postal service (Sumner, 2000). Participants in this program, mainly females, received a certificate upon completion allowing them to prove their competence in stenographic shorthand (Sumner, 2000). As distance education programs grew, the growth of distance education eventually led to the establishment of Correspondence University in 1883 (Hampel, 2010). In 1890,

the Colliery School of Mines began providing distance education programs offering safety courses to mine, iron, and railroad workers (Benson, 1970). To expand agricultural knowledge to rural families in Pennsylvania, Pennsylvania State University began a correspondence course in 1892 (Banas & Emory, 1998).

Although these correspondence courses allowed individuals to participate in advanced learning programs, they involved time delays and left the learners feeling isolated (Banas & Emory, 1998). To address the time delay issue, live delivery of distance education via radio allowed learners to tune in for their courses, expanding the ownership of broadcast stations to educational institutions. According to Casey (2008), "By 1921, the first educational radio licenses were granted to the University of Salt Lake City, the University of Wisconsin, and the University of Minnesota" (p. 46).

The next step in the evolution of distance learning came in 1934 with television delivery through the University of Iowa (Lessick et al., 2013). Support for this type of delivery method came from the Federal Communications Commission (FCC) when the Commission developed the Instructional Television Fixed Service (ITFS), a "band of 20 television channels available to educational institutions to provide a low-cost, fixed-range, subscriber-based system capable of being utilized for the distribution of broadcast courses" (Casey, 2008, p. 46). The Public Broadcasting Act and the Corporation for Public Broadcasting (CPB) in 1967 helped to promote and expand distance educational opportunities through television and radio and eventually led to the establishment of the Public Broadcasting Service (Casey, 2008).

Computerized learning began with the development of Programmed Logic for Automated Teaching Operations, commonly known as PLATO (Van Meer, 2003). When

University of Illinois professors Don Bitzer and Dan Alpert began researching the use of computers in teaching in 1959, they collaborated with engineering colleagues and students to form the Computer-based Education Research Laboratory (CERL) and eventually designed the PLATO hardware. PLATO hardware not only allowed students to learn through the computer, but it also enabled them to interact with the platform and have their grades processed through the computer system (Van Meer, 2003). Although not commonly available to most individuals in the 1960s, computers would eventually become another method for delivering educational content (Caruth & Caruth, 2013). This was the beginning of the innovation that led to interactive games, online chat rooms, cable modems, smart phones, instant messaging, blogging, and other electronic communications (Caruth & Caruth, 2013).

The rest of the education world began recognizing computer-based learning in the 1970s following the invention of the packet-switch and e-mail (Harasim, 2000). Although most educators had only limited access to computer networks, the scientific research community working with Advanced Research Projects Agency Network (ARPANET) was able to make connections to education through e-mail communications beginning in 1969 (Campbell-Kelly & Garcia-Swartz, 2013). With the development of the Internet and local area networks in the 1980s, learning was no longer just available on isolated computers, and the opportunities to teach and learn in an interactive, engaging, online environment expanded (Harasim, 2000).

As education grew to utilize the newest technologies, educators began to include computers in their instructional delivery (Caruth & Caruth, 2013). With the availability of the Internet and the World Wide Web, online became an increasingly common delivery

method for learning in public, business, and educational settings (Aranda, 2006). According to Garrison and Shale (1987) there are three factors identifying modern online education: the teacher-student interaction is non-contiguous, educational-related communication between teacher and student is two-way, and technology is used for the purpose of communication.

As instructional authoring software and collaboration tools became more powerful and bandwidth increased, a generation of computer-mediated instruction emerged, and online learning experienced swift growth beginning in the mid-1990s (Aslan & Reigeluth, 2011). The invention of the personal computer meant online learning was no longer exclusive to the research community. Now a widely used platform in military, business, and higher education settings, online learning is commonplace. Designing online curriculum for younger students and specifically to meet learner needs are important considerations in the evolution of distance and online learning (Lynch, 2004).

Constructivism and online learning.

The use of technology has helped educators structure online learning through a constructivist framework allowing online students to learn through communication, personal interaction, networking, and social collaboration, all of which exemplify constructivist learning processes (Hamat & Embi, 2010). Many online learning programs are developed through a constructivist approach as students interpret and build their knowledge through personal meaning (Rovai, 2004). Pange and Pange (2011) found that a core aspect of online learning is personalization. They suggest online learners should be given the opportunity to influence their learning agenda according to personal needs,

pace, and capabilities. Cunningham and Duffy (1996) classify constructivism into cognitive constructivism and social constructivism, where social constructivism refers to knowledge that is socially created. Pange and Pange (2011) found that the use of the constructivist philosophy in online learning and communications is a common theme.

According to Paily (2013), "In a constructivist learning environment the role of the teacher is to facilitate and guide the knowledge construction process by engaging students in meaningful learning" (p. 40). Online learners have the opportunity to dialog and collaborate with other learners as they process their knowledge. This collaborative process is facilitated by a number of technology resources such as the Internet, Web 2.0, wikis, blogs, podcasts, social networking, and other collaboration and communication tools (Harasim, 2012). Paily suggests that "Combining the developments in information technology and the trend of constructivism can transform the learning process" (2013, p. 41). Social interaction and communication are foundational for online learning, and these technology tools allow students to connect and communicate in ways that may be restrictive in a traditional classroom setting (Chatti, Jarke, & Frosch-Wilke, 2007).

Distance learning in various contexts.

There are distinct differences among online learning contexts including secondary education, higher education, and the workforce. These differences may be attributed to the differences in learner needs, motivation, maturity, self-direction, experience and comfort with technology, perceptions and confidence in the instructor, and relationship with the learning material (Benson, 2002; Nemanich, Banks, & Vera, 2009).

According to Githens, Sauer, Crawford, and Wilson (2012), "As the U.S. economy continues to transition, employers need the ability to tap into a workforce with

the required skills to meet new demands" (p. 36). These demands include the use of online resources and online learning materials. Additionally, with the varying needs of working adults, online learning may serve an important role in workforce education allowing employees the flexibility to learn at times that are convenient for them (Floyd, 2003). Corporate, military, and public organizations are depending on online resources to help train employees through simulations, game-based learning, online writing, and computer-adaptive assessments (Mackey, Derr, & O'Connor, 2009). Although generally seen as self-directed, working adult learners often need collaboration and facilitation to guide their learning (MacKeracher, 2004). A common trend in workforce education is the hybrid course which combines online learning with face-to-face meetings, further enhancing the workplace collaboration model (Liang & Chen, 2012).

In higher education, online learning is quickly being used by many colleges and universities around the world (Benson et al, 2005; Wang, Shannon, & Ross, 2013). Students seeing the most success in higher education online courses are those who have had prior experience with technology and are self-motivated to learn (Wang et al., 2013). With cost and flexibility more important than ever to college students, online courses have grown as has the number of college and university students who participate in online learning (Anderson, Boyles, & Rainie, 2012). Massive open online courses (MOOCs) are courses provided at no charge through many universities to allow access and academic engagement for millions of individuals. MOOCs, which began appearing on the Web in 2012, provide opportunities for anyone, from serious students to hobbyists to those wanting to learn a new skill (Anderson et al., 2012; Baggaley, 2013). This influx

of online opportunities in higher education has expanded the demand for online courses (Tunks, 2012).

In K-12 public schools, online learning has also become more common and more in-demand by students and parents (Andrus, 2009). Online learning through public schools in the United States is divided into categories in an attempt to manage and serve a vast market of school-aged online learners (Barbour et al., 2011). State virtual schools such as Florida Virtual Academy serve an entire state and are state-run. Multi-district online schools are district-run online schools that serve several districts (Washington State Superintendent of Public Instruction, 2012; Watson et al., 2011).

Single-district programs serve only the students within a school district's boundaries and may include homeschooled and privately schooled students within that geographic location. Consortium and educational service agency programs allow districts to pool resources and offer online programs to their students with cost sharing advantages (Barbour et al., 2011; Watson et al., 2012). Many of the district-run programs report having relatively few students enrolled in their online courses. According to a Watson et al. (2012) Keeping Pace report, "It seems likely that most districts are not offering a comprehensive catalog of courses, but rather are meeting a specific need using a provider from outside the district" (p. 20). This specific need may include credit retrieval, additional elective options, and the opportunity to take additional courses that would not otherwise fit in a student's schedule (Barbour et al., 2011). Some districts are now requiring students to take at least one online course to help prepare them for higher education and the workplace (Sheehy, 2012; Watson et al., 2012).

Online schools offer a full online program while supplemental programs provide online opportunities for students to supplement their face-to-face education (Watson, Winograd, & Kalmon, 2004). According to the 2010 report, *A National Primer on K-12 Online Learning*, statewide virtual schools of various sizes exist in 40 states. States with fully online programs numbered 31 serving an estimated 275,000 students (Wicks, 2010). Florida Virtual Academy, which was the largest of these state-run programs in 2010, had enrollment in excess of 210,000. In 2011, full-time online schools serving students statewide were available in 27 states plus Washington, DC (Watson et al., 2012). These programs offer a variety of courses and the opportunity for students to earn a diploma through an online route providing flexibility and convenience for families (Kirby, Sharpe, Bourgeois, & Greene, 2010; Wicks, 2010).

With the single school district model, some school districts offer wholly online programs while others have a hybrid or blended model where both online and face-to-face instruction are included in the curriculum (Atkins, Bennett, Brown, Chopra, Dede, & Fishman, 2010). The 2011 Keeping Pace report affirms that blended environments are most common in district programs since districts are most often serving their own local resident students. These programs provide students with some face-to-face instruction and lab access in addition to the online content (Watson et al., 2011).

Online programs may be offered through synchronous or asynchronous models, and 74% of public school online enrollments are at the high school level (Watson et al., 2012). A synchronous online model involves communication in real time; students and teachers interact online through technology such as video and chat capabilities. An asynchronous forum allows students and teachers to communicate in a time-separate

manner such as e-mail or other online discussion forums that can be accessed at different times (Callaway, 2012). Both synchronous and asynchronous models are currently being used in the various K-12 programs, and multiple settings are being used including local school buildings to allow access to the necessary technology (Kronholz, 2011).

For a variety of reasons, online learning is growing in popularity for high school students in Washington State. The Washington State Digital Learning Department 2012-2013 Annual Report states over 23,000 K-12 students took at least one online course during the 2012-2013 school year. These students registered for a total of 72,000 online courses. During the 2012-2013 school year, 227 schools from 130 districts reported enrollment data for online courses (Washington State Superintendent of Public Instruction, 2013). As students continue to seek alternative opportunities in education, districts may look for ways to retain students by offering their own online options. Many district administrators and teachers recognize a potential for online learning to capture at-risk, disabled, disenfranchised, and accelerated students (Kronholz, 2011). In addition, rural school districts with fewer course offerings and limited teaching staff find online courses provide more opportunities for students (Barbour, 2008).

Some states and districts have begun requiring students to take at least one online course during their high school careers in order to experience the online learning environment that students will likely face in higher education and the workplace (Sheehy, 2012; Watson et al., 2011). These requirements are aimed at helping students navigate in an increasingly technological world as they prepare for careers and college (Sheehy, 2012). Although many education professionals agree that students will face online learning in their future, some researchers are not convinced requiring online courses is

the right prescription for all students. Amy Murin, lead researcher for the Evergreen Group, believes this requirement may tempt school administrators to hastily build or purchase online courses just to meet this requirement without regard for quality (Watson et al., 2012).

While online programs continue to increase, the attrition rate for online programs is often higher than that of face-to-face programs (Rovai, 2003). A sense of connection and community is sometimes seen as lacking in online courses, and this feeling of disconnectedness, isolation, and lack of personal relationships may factor into a student's decision to not continue an online course (Rovai, 2002a).

Swan (2003) describes three types of interaction associated with online learning: interaction with content, instructors, and peers. All three modes of interaction intertwine to form an online learning community. This sense of connection and interactivity between student and teacher, among students, with content, and with technology is critical to student engagement in all learning environments, and course designers are looking for ways to ensure students in online programs stay connected to their instructors, peers, and learning materials through interactive support and learning communities (Caglar, 2013; Swan, 2002).

Career and Technical Education Online

Career and Technical Education courses play an important role in the development of individual students and the future of American society (Brewer, 2004). By addressing industry skills, leadership, 21st century skills, and the integration of academic knowledge, CTE courses have become an important element in most high schools today (Stone, 2007). However, ensuring CTE opportunities are available for all

students can be challenging with increased graduation requirements in academics, increasing costs, and lack of available teachers with specialized CTE training (Fletcher, 2006). Offering CTE courses from a distance through an online medium may provide the opportunity for more students to participate in these programs, giving more students relevant career skills that are needed by employers (Brown, 2010). As the alliance between online learning and CTE moves forward in traditional middle and high school education, the unique histories make the merger unprecedented (Metz, 2010).

CTE courses boast a hands-on, applied, and experiential learning approach that may not appear to be compatible with online learning (Benson et al., 2005; Brewer, 2004; Manley, 2011; Plank, 2001). However, creative course design is enabling educators to offer courses with projects and activities that will engage and involve all students through rigor, relevance, and relationships (Atkins et al., 2010). Some CTE courses such as those in business and management, finance, computer science, and communications may be easily adapted to an online environment (Alonso, Manrique, Martinez, & Vines, 2011; Kuruvilla, Norton, Chalasani, & Gee, 2012; Webb, Gill, & Poe, 2005).

However, with hands-on elements often associated with CTE programs in agriculture, health sciences, engineering, and manufacturing, the use of hybrid models, virtual laboratories, and online simulations are often effective for enabling CTE students to experience online learning (Beckem & Watkins, 2012; Blackinton, 2013; Potkonjak, Jovanovic, Holland, & Uhomoibhi, 2013). According to Potkonjak et al. (2013), a virtual laboratory can be used in place of or as a precursor to a real laboratory and can be re-configured and adjusted much more easily than actual laboratory equipment. Hybrid courses, or those that have both online and face-to-face elements, may also enhance the

online learning experience for students when hands-on guidance and practice are necessary learning components (Blackinton, 2013). Online simulations, which allow students to interact with their learning environment through digital media, can "empower learners to acquire new knowledge and build upon existing competencies that are entirely driven by their experiences within the environment" (Beckem & Watkins, 2012, p. 62).

According to a study of online CTE in post-secondary environments, students evaluated their course experience in terms of course interaction, course support, course structure, and relationship with the instructor as high or higher than those of students face-to-face (Benson et al., 2005). This and similar studies indicate that student perceptions of the course design are significantly more indicative of a successful student experience than the delivery method alone (Barbour, 2007; Benson et al., 2005; Boling, Hough, Krinsky, Saleem, & Stevens, 2012; Liu & Cavanaugh, 2011).

Online CTE courses may use a variety of learning management systems and may include discussion forums, synchronous chats, computer-based simulations, video tutorials, and technology-based assessments (Benson et al., 2005; Lewis, 2011). A 2001 study of online CTE nursing students found that one significant difference between online and face-to-face students was the degree to which they felt socialized into the nursing profession. According to the study, students in the online program felt they were more socialized than those students in a face-to-face learning environment. Unlike socialization within other online courses, the socialization in the context of this study relates to the process through which professionals develop a sense of identity in a profession through shared attitudes, values, and beliefs (Nesler, Hanner, Melburg, & McGowan, 2001). This socialization into a professional field is an important component

of CTE, and it helps shape professionals that will continue to be connected to others within their chosen career field (Benson et al., 2004).

Distinctions between online and face-to-face learning.

DiRienzo and Lilly (2014) conducted a study of online and face-to-face business courses at the post-secondary level, and the results indicated that there is no difference between online and face-to-face delivery models concerning student learning outcomes. Others have suspected that for high school students, this finding may not hold true (Greener & Perriton, 2005). Some online students have fared worse than their face-to-face counterparts in high school courses, and researchers have surmised that this may be due to a lack of motivation, personal responsibility, and lack of school community connectedness (Greener & Perriton, 2005; Muilenburg & Berge, 2005).

However, a study that analyzed high school student grade outcomes of online and face-to-face students showed no significant difference (Langenhorst, 2011). According to Liang and Chen (2012), "online presence can sometimes be felt by the participants as much more intimate than physical presence" (p. 1332). In a comprehensive study of online high school algebra students, O'Dwyer, Carey, and Kleiman (2007) found that students were motivated by the use of technology and their ability to work with other students. At the same time, the students reported feeling limited in their ability to interact online with their instructor, although the result still showed no significant difference in student outcomes. Four areas that impact the effectiveness of online learning include content, immersion, interactivity, and communication (Kozlowski & Bell, 2007). Pituch and Lee (2006) point out that the level of student experience online is also an important indicator of future online success.

Whether online or face-to-face, course design and the instructor have a significant impact on student outcomes (Menchaca & Bekele, 2008). Using an online platform does not ensure that an instructor embraces new technology or makes the changes in pedagogy necessary to promote student learning in an online environment (Reeves, 2003). These pedagogical changes may include fostering a sense of community, helping students reflect on their own work and the work of others, establishing remote teams, responding promptly to student inquiries, and promoting dialogue (Chatti et al., 2007).

Discussion boards in an online environment allow students to reflect on their own thoughts and respond to the ideas of others at their own pace; online students are not required to wait their turn to reflect and respond (McComb, 1993). This may prove to be an advantage to online students as time and order constraints of a traditional classroom no longer apply allowing students the freedom to think critically, reflect honestly, and respond quickly (Menchaca & Bekele, 2008). The downside of the online discussion forum is the time involved in ensuring each post is well thought out and accurate. Students tend to put greater effort into online posts as they are viewed by more individuals and scrutinized more thoroughly by peers and instructors (Oravec, 2002; Wiesenberg & Hutton, 1996).

Challenges with online learning.

Even as online learning grows and becomes more commonplace in education, barriers to online education still exist for many students (Muilenburg & Berge, 2005; Werth, Werth, & Kellerer, 2013; Zirkle, 2004). According to a report from the International Association for K-12 Online Learning, effective online instruction reflects a model that is personalized, student-centered, equitable and accessible, technology-

enhanced, affordable, sustainable, flexible, and infused with high academic standards. The report states, "The onus is on national and school-level leaders to tap into the potential that digital learning provides" (Barbour et al., 2011, p. 9). Even with this potential, there exist challenges with online learning. One such challenge is preparing teachers to teach in an online environment.

Adapting to an online environment requires more than a conversion of face-to-face content to an online platform. Online teaching requires teachers to "create a coherent learning experience for students with whom they may not meet face-to-face" (Bennett & Lockyer, 2004, p. 1). Effective online teaching requires changes in both pedagogy and preparation as the role of teaching is transformed (Palloff & Pratt, 1999). The new roles associated with online instruction include facilitating a variety of online activities, providing online feedback, helping students with technology, encouraging student engagement online, providing relevance of content, designing remote learning tasks, and maintaining online records (Bennett & Lockyer, 2004). However, many teachers are not equipped to make that transition, and by default they bring their face-to-face methodologies and practices to an online platform expecting positive results. While many face-to-face teachers are able to make the transition to online, others will better serve students by maintaining their face-to-face presence (Comas-Quinn, 2011).

Other challenges involved in the change to an online platform include quality control, a fast-paced environment of innovation, and copyright issues (Liang & Chen, 2012). As the online learning market grows, ensuring quality of online course materials is quickly becoming a concern for states as they begin to monitor public and private organizations involved in K-12 learning (Watson et al., 2011). While the need for K-12

online learning resources increases, so does the vendor competition to provide these resources. Technology is continually changing, and upgrading the technology used in online courses makes it difficult to commit to one vendor, one curriculum, or one learning management system (LMS), often resulting in additional program costs (Liang & Chen, 2012).

Student-related challenges with online learning may include academic integrity and an increased emphasis given to collaborative versus personalized learning, the latter being necessary to ensure individual acquisition of knowledge (Bell & Federman, 2013; Liang & Chen, 2012). According to McAllister and Watkins (2012), if a student's ability to self-regulate learning (the skill used to manage learning and set one's own learning goals) is lacking, the temptation to engage in academic dishonesty increases. In addition, the collaborative environment highlighted in online learning may prevent teachers from assessing students individually.

Another potential downside to online education and a barrier for many students and families is the digital divide based on socio-economic status (Edwards, 2013). Ragnedda and Muschert (2013) define the digital divide as the "stratification in the access and use of the Internet" (p. 1). This divide may place low socio-economic students at a disadvantage for acquiring online content making access to online learning difficult. Although the issue of the digital divide continues today, closing this divide for low-income children will help to provide greater educational opportunities and enhance their future potential in higher education and the workplace (Edwards, 2013; Epstein, Nisbet, & Gillespie, 2011).

Course design and technology.

According to Berkins and Kritsonis (2007),

> ...vocational, or career and technical, education goes far beyond the specific technical knowledge and skills required for a particular occupation; today, vocational education encompasses not only technical preparation but also sound academic foundations, higher-order thinking skills, and personal qualities needed for success in the workplace. (p. 3)

Course design features that lead to student successes include student engagement within the class, student achievement in and out of the class, and student transition to further education or the workplace (Kotamraju, 2007). Other course design considerations for online CTE courses include the social networking available through the use of technology. Social networking used in online courses can enable students to more easily access information and communicate with fellow students (Wiid, Cant, & Nell, 2013). Additionally, students are able to personalize their learning through the use of technology. Increasing their ability to develop knowledge through technology has become routine for some high school students (Project Tomorrow, 2012). The Project Tomorrow report on digital learning indicates that students are using technology for learning in ways to enhance their educational outcomes. In fact, the report states

> Looking to address what they perceive as deficiencies in classroom experiences, students are turning to online classes to study topics that pique their intellectual curiosity, to message and discussion boards to explore new ideas about their world, or to online collaboration tools to share their expertise with other students they don't even know. (p. 1)

According to a U.S. Department of Education report, *Transforming American Education: Learning Powered by Technology,* school systems must engage "the power of technology to improve learning outcomes" (Atkins et al., 2010, p. 63). In a recent study by the International Association for K-12 Online Learning and the Idaho Digital Learning Academy, self-paced learning has been shown to have positive correlations with the quality of student work, student interest levels, and student perseverance (Werth, Werth, & Kellerer, 2013). Self-paced study is best aligned with the use of technology, and online courses allow students to use technology and their own motivation toward technology to enhance their learning experience (Sansone, Fraughton, Zachary, Butner, & Heiner, 2011).

In addition to the technological considerations for online learners, the instructional strategies may need to be modified when courses are transferred from face-to-face to online (Walker & Fraser, 2005). There is a clear need for social interaction in online learning as "Connections are made through sharing of ideas and thoughts" (Palloff & Pratt, 1999, p. 15). According to Harasim (2012), collaboration and discourse are critical elements to the building of knowledge, and academia and the workplace are recognizing the important role of collaboration for the advancement of learning and the growth of human knowledge. When this collaborative environment is seen as missing, students often perceive the learning environment as less than ideal and their depth of learning suffers as a result (Armstrong, 2011).

Psychosocial learning environment.

The psychosocial learning environment in an online course is represented by the communication and social context developed within the course and among its participants

(Walker & Fraser, 2005). Within any educational environment, certain factors are of primary concern in the discussion of potential for student achievement and school success; these factors include connectedness and support through relationship building, students' expectations for learning, student autonomy, learning activities, and academic motivation (Anderson-Butcher, Amorose, Iachini, & Ball, 2012; Walker & Fraser, 2005). Analyzing how students perceive the factors within the learning environment will help researchers promote more student-friendly, psychosocially-rich learning (Fraser & Fisher, 1982).

Gentry and Owen (2004) describe learning environments in terms of appeal, challenge, meaningfulness, academic self-efficacy, and choice. Their research indicates that these constructs are central to effective learning. Education is most effective when the information presented is challenging, relevant, meaningful, interesting, and sparks the imagination. Consideration of these factors in a learning environment represents "an important aspect of quality education" (Gentry & Owen, p. 21).

According to Walker and Fraser (2005), the psychosocial learning environment can be divided into seven categories or scales. A scale is a composite of survey items that measure the same psychosocial concept (Likert, 1932). The seven scales defined by Walker and Fraser include: (a) instructor support which describes the level of support students receive from an instructor; (b) student interaction and collaboration which describes interactions with other students; (c) personal relevance which describes the relevance of the material taught in the courses; (d) authentic learning which describes the reality of content covered in the class; (e) active learning which describes how actively students manage their own learning; (f) student autonomy which describes how much

control students take for their own learning; and (g) enjoyment which describes how satisfied students are in an online class.

Instructional practices that facilitate the development of personal relevance, communication, and the development of relationships within the psychosocial online learning environment are critical to promoting student success (Walker & Fraser, 2005). The constructivist approach to learning indicates that personal meaning and prior knowledge provide a foundation on which all other learning is balanced (Gazi, 2011). Based on this approach, the learning environment plays an important role in how and why students construct meaning and how effective their learning is (Gentry & Springer, 2002). Constructing knowledge through collaboration, authentic and active learning, personal relevance, autonomy, and instructor support can help students learn more effectively and retain the information (Renzulli, 1994; Walker & Fraser, 2005).

Student Perceptions

Students' perceptions of the psychosocial learning environment and how the environment helps them feel connected impact the way students learn within that environment (Rovai, 2002b). According to Caglar (2013), a feeling of alienation has a considerable impact on a student's ability to learn, and "Considering that all educational activities mainly aim to intentionally change learner behaviors, it is apparent that any negative attitudes like alienation towards schools will considerably obstruct the ability of educational organizations to achieve their goals" (p. 185).

Rodgers (2006) found that students' descriptions of their own learning through student-teacher dialog play an important role in meeting learners' needs and building trust and community. In addition to the sense of community and connectedness, there are a

variety of factors that influence how students perceive the learning environment including technology, communication, learning and teaching styles, and student participation (Fraser, 1998; Leping, 2011). Fraser and Giddings (1992) found that students' perceptions of the psychosocial learning environment may be effective predictors of student success. Greene, Miller, Crowson, Duke, and Akey (2004) established that students' perceptions of their learning environment affected their self-efficacy and ultimately their motivation to learn. A Bill and Melinda Gates Foundation study (2012b) recognized that student feedback of instruction and the learning environment was an important element for improving student achievement outcomes. Other studies have also shown the importance of student perceptions in increasing student achievement (Gentry & Owen, 2004; Moos, 1979). Considering that student perception is a key to establishing student success in any learning environment, understanding student perception of the learning environment is important for further study and improvement of online education (Barbour, 2008; Gates Foundation, 2012a; Walker & Fraser, 2005).

According to Entwistle, McCaune, and Hounsell (2002), learning is affected more by the perception of the instructional practices than by the method of instruction. Moos (1987) proposed a model for learning environment research based on relationships and personal development within that environment. The role of the instructor in online education has expanded from that of a traditional teacher in a face-to-face environment to one that facilitates collaboration, engagement, communication, and relevance within an online setting (Hawkins, Graham, & Barbour, 2012). Rovai (2002b) found that an increase in sense of community in an online environment was directly related to cognitive learning and resulted in greater student persistence.

Studies of middle and high school students suggest that when students have positive perceptions of their communications and connections in school, it correlates to higher grades and graduation rates (Anderson-Butcher et al., 2012; Klem & Connell, 2004; Nasir, Jones, & McLaughlin, 2011). Positive student perceptions of the online psychosocial learning environment may lead to greater persistence and more motivation to pursue additional online courses (Lessick et al., 2013). According to Gentry and Owen (2004), "considering students' perceptions of constructs linked to learning and motivation has the potential to expand the definition of school improvement and enhance student achievement" (p. 26).

Summary

The union of online learning and career and technical education (CTE) constitutes a relatively new direction for both. Recognizing the adaptability of CTE courses and designing curricula to offer online learners the same experience is challenging for many of today's CTE professionals and requires a focus on the epistemology of both. With a reputation for hands-on learning, CTE courses offered in an online environment may require continued research into curriculum and instructional design theories (Liang & Chen, 2012; Means, Toyama, Murphy, & Baki, 2013; Walker & Fraser, 2005). Several states, including Florida and Kentucky, are devoting state resources to the development of online CTE courses (Watson et al., 2011). Their experiences are laying a foundation for other states to dedicate state funding to the implementation and continued improvement of online CTE courses that emphasize rigor, relevance, and relationships that are at the core to the CTE philosophy.

In corporations, the military, and public organizations, online platforms are being used to help mitigate the costs of employee training and to offer employees the advantages of a flexible learning environment (Mackey, Derr, & O'Connor, 2009). As students learn to become productive citizens, online learning plays an important role in helping them make the transition from secondary to post-secondary education and ultimately to the workforce (Sheehy, 2012).

As with any cutting-edge educational shift, there will be hurdles and challenges that must be addressed before CTE is seen as completely viable for an online environment (Metz, 2011). As the workforce and higher education continue to recognize potential of online learning, K-12 organizations will continue to review the benefits and drawbacks of this learning method for younger students. Analyzing student perceptions of an online learning environment and comparing these perceptions to those of students working face-to-face in CTE will help educators to better understand learning environments and their effect on student learning (Barbour, 2008; Gates Foundation, 2012a; Metz, 2011; Walker & Fraser, 2005). Chapter III will discuss the methodology used in this study to analyze student perceptions of the psychosocial learning environment in online and face-to-face high school CTE courses.

CHAPTER III

METHODS AND PROCEDURES

This chapter discusses the methods and procedures utilized for the purpose of conducting this study. It describes the research design and sample of participants including basic demographic information for the school district. In addition, this chapter discusses the research variables, survey, data collection methods and procedures, and the statistical analyses used to address the research questions.

Research Purpose

The purpose of this study was to analyze student perceptions of the psychosocial learning environment in online and face-to-face high school career and technical education (CTE) courses to examine the efficacy of the psychosocial environment from a student's perspective. To address this issue, the following research questions were developed:

RQ_1: How do students perceive the psychosocial environment in face-to-face CTE courses?

RQ_2: How do students perceive the psychosocial environment in online CTE courses?

RQ_3: Do student perceptions of the psychosocial learning environment in career and technical education differ for students in online courses compared with students in face-to-face courses?

Research Questions 1 and 2 aimed to quantify student perceptions of the psychosocial learning environment in online CTE courses and face-to-face CTE courses. Research Question 3 aimed to compare those student perceptions between online and

face-to-face learning environments to identify if differences existed between the two environments.

Population and Sample

The sample for this study was 745 high school students in either online or face-to-face CTE classes in a school district in Washington State. This study used existing survey data from a large school district in Washington State. For confidentiality, the school district was not named in the reporting of this study. The survey participants were high school students in grades 9 through 12 enrolled in either an online or face-to-face CTE course. The variables in this study were defined as the learning environment, face-to-face or online, and the student perceptions of the psychosocial learning environment. Students had the ability to take more than one online class; however, district officials conferred that most students were taking only one or two online classes. The district used in this study was chosen because it hosts an online program within the school district. The district has been operating an online school program for at least five years, and the program is approved through the Washington State Digital Learning Department. According to the Washington State Digital Learning Department,

> An online school program is defined as a school or program that offers a sequential set of online courses or grade-level course work that may be taken in a single school term or throughout the school year in a manner that could provide a full-time basic education program if so desired by the student. (Washington State Superintendent of Public Instruction, 2014, para. 20)

According to district officials, the school district represented in this study had a total high school student population of approximately 8,600 in the 2013/2014 school year

based on current enrollment estimates. Of the total high school student population, there were approximately 5,100 students participating in CTE programs in the district. There were 178 students participating in at least one online CTE course during the timeframe of this study. All students had the opportunity to request enrollment in any of the courses as long as any applicable prerequisites were met. Surveys were distributed online and face-to-face to all CTE students in the courses listed in Table 3.1.

Research Variables

The independent research variable for RQ_1 and RQ_2 is whether respondents took the course in a face-to-face setting or in an online format and their responses to the 42 survey items. The dependent variable consisted of the student perceptions of the psychosocial learning environment.

The first independent variable for RQ_3 was the course format: online or face-to-face. The second independent variable was student perceptions of the psychosocial environment. To determine those perceptions (independent variables), the researcher used the sum of the means score for each of the seven scale areas. The seven scales in the DELES include eight items regarding instructor support, six items related to student interaction and collaboration, seven items related to personal relevance, five items related to authentic learning, three items related to active learning, and five items related to student autonomy. The seventh scale, which included eight items, related to student enjoyment in the class. A description of the seven psychosocial scales can be found in Table 3.2. To determine overall perceptions scores, the sum of the means for each scale was calculated. The dependent variable for RQ_3 was the difference, if any, in perceptions in the seven scale areas between the online and face-to-face students.

Table 3.1

CTE Courses and Career Clusters Offered in School District

Course Title	Career Cluster
Accounting[a]	Finance
AP Computer Programming[a]	Information Technology
AP Studio Art[a]	Arts, A/V Technology & Communications
Biomedical Sciences[a]	Health Science
Business Law[b]	Business Administration and Management
Child Development[a]	Human Services
Criminal Justice[a]	Law, Public Safety, Corrections and Security
Culinary and Hospitality[a]	Hospitality and Tourism
Digital Communication Tools[b]	Information Technology
Digital Photography	Arts, A/V Technology & Communications
Digital Video Productions[b]	Arts, A/V Technology & Communications
Foods and Fitness[a]	Human Services
Foods and Nutrition[a]	Human Services
Forensic Science[b]	Law, Public Safety, Corrections and Security
Graphic Design[b]	Arts, A/V Technology & Communications
Health[b]	Human Services
Human Body Systems[a]	Health Science
IT Academy[a]	Information Technology
Jewelry and Sculpture[a]	Arts, A/V Technology & Communications
Marketing (DECA)	Marketing
Medical Interventions[a]	Health Science
Personal Finance	Finance
Stagecraft[a]	Arts, A/V Technology & Communications
Web Design[a]	Information Technology
Work-based Learning/Careers	Miscellaneous Career Clusters
Yearbook[a]	Arts, A/V Technology & Communications

[a] Course only offered face-to-face

[b] Course only offered online

Note. All courses are one-half credit or one full credit in length.

Table 3.2

Psychosocial Scales Descriptions

Scale	No. of Items	Description
Instructor support	8	Level of support received from the instructor
Student interaction and collaboration	6	Level of interactions with other students
Personal relevance	7	Relevance of the material taught in the courses
Authentic learning	5	Reality of content covered in the class
Active learning	3	How actively students manage their own learning
Student autonomy	5	Level of control students take of their own learning
Enjoyment	8	How satisfied students are in the class

Instrument Used

Likert scales were developed by Rensis Likert and were first introduced to the research community through the 1932 article entitled, "A Technique for the Measurement of Attitudes" in *Archive of Psychology* (Edmondson, Edwards, & Boyer, 2012). Likert constructed his namesake scale as a way to capture an infinite number of attitudes in an ordinal scale format (Likert, 1932). According to Likert, a scale is the summation of a combination of multiple items: An individual item itself does not have the properties of the Likert scale (Likert, 1932). Items within a survey are categorized and combined to produce scales. Uebersax (2006) describes the characteristics required to define an instrument as a Likert scale:

1. The scale contains several items.
2. Response levels are arranged horizontally.
3. Response levels are anchored with consecutive integers.

4. Response levels are also anchored with verbal labels which connote more-or-less evenly-spaced gradations.

5. Verbal labels are bivalent and symmetrical about a neutral middle.

6. In Likert's usage, the scale always measures attitude in terms of level of agreement/disagreement to a target statement. (para. 10)

According to Uebersax, even in the absence of the sixth requirement, an instrument may still be viewed as a Likert scale. The current study uses what is referred to as a Likert scale in accordance with Uebersax's description as the DELES survey meets requirements one through five.

The original Distance Education Learning Environment Survey (DELES) was designed to gather information about postsecondary students' perceptions of the online education environment. The survey included six psychosocial scales and a seventh scale for enjoyment. In addition to the scale-related items on the DELES, the district added seven descriptive and demographic items to capture descriptive and demographic factors. Students were asked to identify demographic information including gender, grade level, the name of the CTE course, and the class period (if applicable). In addition to the demographic items, students were asked to identify why they chose to take the course and their anticipated grade in the course.

The instrument offered drop-down menu options for gender and drop-down menu options plus an open response option for the other six items. These additional items were not used for this study; however, the district wanted to retrieve the corresponding demographic and descriptive data for potential future analysis.

The enjoyment scale was part of the original survey as a way to measure students' enjoyment in class as it relates to their perceptions of the psychosocial learning environment. Although the survey was designed to be used with postsecondary online students, Metz (2011) suggested the survey would be suitable for high school students with appropriate modifications. The items were revised slightly to accommodate the differences in commonly used terminology between high school and postsecondary and between online and face-to-face learning environments as shown in Table 3.3. The original DELES survey can be found in Appendix A.

Permission to use the DELES survey was received from the original survey designer, Scott L. Walker (Appendix B.) The survey contains 42 Likert-scale items and seven descriptive and demographic items. The 42 Likert items in the DELES survey focused on seven scale areas with a number of items related to each scale. The results of a factor analysis determined the categories that ultimately defined each of the seven scales.

The reliability and validity for the original survey instrument was gained by a field test with 680 responses from postsecondary participants in 13 countries including the United States. The 680 respondents were a mix of doctoral, master's, and undergraduate students, with the majority being master's students. Following factor analysis and internal consistency reliability analysis, the 56-item survey was reduced to 42 items for the final survey version. The original survey's reliability was tested using Cronbach's alpha coefficient. According to Walker (2005),

Table 3.3

Modified Items in Distance Education Learning Environments Survey (DELES)

Scale	Items
Instructor Support	In this class . . .
	1. If I have an inquiry, the instructor finds time to respond.
	2. The instructor helps me identify problem areas in my study.
	3. The instructor responds promptly to my questions.
	4. The instructor gives me valuable feedback on my assignments.
	5. The instructor adequately addresses my questions.
	6. The instructor encourages my participation.
	7. It is easy to contact the instructor.
	8. The instructor provides me with positive and negative feedback on my work.
Student Interaction & Collaboration	9. I work with others.
	10. I relate my work to others' work.
	11. I share information with other students.
	12. I discuss my ideas with other students.
	13. I collaborate with other students in the class.
	14. Group work is a part of my activities.
Personal Relevance	15. I can relate what I learn to my life outside of school.
	16. I am able to pursue topics that interest me.
	17. I can connect my studies to my activities outside of class.
	18. I apply my everyday experiences in class.
	19. I link class work to my life outside of school.
	20. I learn things about the world outside of school.
	21. I apply my out-of-class experience.
Authentic Learning	22. I study real cases related to the class.
	23. I use real facts in class activities.
	24. I work on assignments that deal with real-world information.
	25. I work with real examples.
	26. I enter the real world of the topic of study.
Active Learning	27. I explore my own strategies for learning.
	28. I seek my own answers.
	29. I solve my own problems.
Student Autonomy	30. I make decisions about my learning.
	31. I work during times that I find convenient.
	32. I am in control of my learning.
	33. I play an important role in my learning.
	34. I approach learning in my own way.
Enjoyment Face-to-Face	35. Online education is stimulating.
	36. I prefer online education.
	37. Online education is exciting.
	38. Online education is worth my time.
	39. I enjoy studying online.
	40. I look forward to learning online.
	41. I would enjoy my education more if all my classes were online.
	42. I am satisfied with this class.
Enjoyment Online	35. Career and technical education is stimulating.
	36. I prefer career and technical education.
	37. Career and technical education is exciting.
	38. Career and technical education is worth my time.
	39. I enjoy studying career and technical education.
	40. I look forward to learning in career and technical education.
	41. I would enjoy my education more if all my classes were career and technical education.
	42. I am satisfied with this class.

Note. Questions for enjoyment scale items are shown for both versions of the survey.

> The alpha reliabilities for the scales of student interaction and collaboration (0.94) and personal relevance (0.92) are considered 'excellent', while reliabilities for the scales of authentic learning (0.89) and Instructor support (0.87) are considered 'good'. The remaining DELES scales of student autonomy (0.79) and active learning (0.75) have 'acceptable' reliability. Likewise, the attitude scale of enjoyment had an alpha of 0.95, which can be considered 'excellent' using this rule-of-thumb. (p. 300)

For this study, the researcher modified the survey items to accommodate high school students (Appendix C). To ensure validity of the modified survey, the researcher replicated Walker and Fraser's validation strategies of internal consistency reliability and exploratory factor analysis with data from the students represented in this study. Table 3.4 outlines the results of the re-validation for this study.

Table 3.4

Internal Consistency Reliability (Cronbach's Coefficient Alpha) for Survey Scales

DELES Scale	Number of items	α reliability
Instructor support	8	0.90
Student interaction and collaboration	6	0.91
Personal relevance	7	0.90
Authentic learning	5	0.86
Active learning	3	0.76
Student autonomy	5	0.82
Enjoyment	8	0.93

Based on the revalidation of the study, the following are the seven psychosocial scales:

Instructor Support. Eight items asked respondents about the level of support they received from the instructor. These items combined to form scale of instructor support.

This scale had high internal consistency with a Cronbach's coefficient alpha of .905. All of the items correlated strongly with the scale, and deletion of any item would have decreased the alpha coefficient. Exploratory factor analysis of this item set extracted only one factor with an eigenvalue of at least 1.0. All of the items loaded onto this factor with loadings of at least .50. Thus, these items appeared to measure only one construct. The composite score for this scale potentially ranged from 8 to 40 so that respondents who scored higher reported a higher level of instructor support than students who scored lower.

Student Interaction and Collaboration. Six items asked respondents about their interactions with other students. These items combined to form a scale of student interaction and collaboration. This scale had high internal consistency (α = .918). All of the items correlated strongly with the scale, and deletion of any item would have decreased the alpha coefficient. Exploratory factor analysis of this item set extracted only one factor with an eigenvalue of at least 1.0. All of the items loaded onto this factor with loadings of at least .50. Thus, these items appeared to measure only one construct. The composite score for this scale potentially ranged from 6 to 30 so that respondents who scored higher reported a higher level of student interaction than students who scored lower.

Personal Relevance. Seven items asked respondents about the relevance of the material taught in the courses. These items combined to form a scale of personal relevance. This scale had high internal consistency (α =.905). All of the items correlated strongly with the scale, and deletion of any item would have decreased the alpha coefficient. Exploratory factor analysis of this item set extracted only one factor with an

eigenvalue of at least 1.0. All of the items loaded onto this factor with loadings of at least .50. Thus, these items appeared to measure only one construct. The composite score for this scale potentially ranged from 7 to 35 so that respondents who scored higher reported a higher level of student interaction than students who scored lower. Seven items combined to form a scale of personal relevance on which a higher value indicates more personal relevance.

Authentic Learning. Five items asked respondents to assess the reality of content covered in the class. These items combined to form a scale of authentic learning. This scale had high internal consistency ($\alpha = .863$). All of the items correlated strongly with the scale, and deletion of any item would have decreased the alpha coefficient. Exploratory factor analysis of this item set extracted only one factor with an eigenvalue of at least 1.0. All of the items loaded onto this factor with loadings of at least .50. Thus, these items appeared to measure only one construct. The composite score for this scale potentially ranged from 5 to 25 so that respondents who scored higher reported a higher level of authentic learning than students who scored lower.

Active Learning. Three items asked respondents how actively they manage their own learning. This scale had somewhat lower internal consistency ($\alpha = .763$). All of the items correlated strongly with the scale, but deletion of one item, "I explore my own strategies for learning", would have increased the alpha coefficient to .772. Exploratory factor analysis of this item set extracted one factor with an eigenvalue of at least 1.0. All of the items loaded onto this factor with loadings of at least .50. Thus, these items appeared to measure only one construct. The composite score for this scale potentially

ranged from 3 to 15 so that respondents who scored higher reported a higher level of active learning than students who scored lower.

Student Autonomy. Finally, five items asked respondents how much control they take of their own learning. This scale had somewhat lower internal consistency (α = .829). All of the items correlated strongly with the scale, and deletion of any item would have decreased the alpha coefficient. Exploratory factor analysis of this item set extracted one factor with an eigenvalue of at least 1.0. All of the items loaded onto this factor with loadings of at least .50. Thus, these items appeared to measure only one construct. The composite score for this scale potentially ranged from 5 to 25 so that respondents who scored higher reported a higher level of autonomy than students who scored lower.

Enjoyment. Eight items asked respondents how satisfied they were in the class. This scale had high internal consistency (α = .941). All of the items correlated strongly with the scale, and deletion of any item would have decreased the alpha coefficient. Exploratory factor analysis of this item set extracted only one factor with an eigenvalue of at least 1.0. All of the items loaded onto this factor with loadings of at least .50. Thus, these items appeared to measure only one construct. The composite score for this scale potentially ranged from 8 to 40 so that respondents who scored higher reported a higher level of student interaction than students who scored lower.

In addition to the scale-related items on the DELES, the district added seven descriptive and demographic items to capture additional factors. Students were asked to identify demographic information including gender, grade level, the name of the CTE course, and the class period (if applicable). The students were also asked to identify why they chose to take the course and their anticipated grade in the course.

Data Collection

For this study, the DELES survey was given in January, 2014, to high school (grades 9-12) career and technical education students in a Washington State school district. Directors from the district contacted online students via email to provide the survey link. Face-to-face students were given the survey link in class by their teachers. All surveys were then administered online via SurveyMonkey®. Student responses were anonymous and no personal identifying information was included in the final survey results.

Students were assured by district administrators that their teachers would not see their completed surveys, and their decision to take the survey or not would in no way impact their grade in the course. With the exception of the seven descriptive and demographic items, each question on the survey required a response.

Data Analysis

The researcher analyzed the means, medians, and standard deviations in each of the scale areas from online and face-to-face CTE student responses to address the first two research questions:

RQ_1: How do students perceive the psychosocial environment in face-to-face CTE courses?

RQ_2: How do students perceive the psychosocial environment in online CTE courses?

The researcher then compared differences in the sum of the means for each of the seven scale areas between face-to-face and online student data to determine if differences exist. A Mann-Whitney *U* test was used to measure variability to compare the sum of the

means for each of the scale scores between online and face-to-face and answer the third research question:

> RQ_3: How do student perceptions of the psychosocial learning environment in career and technical education differ for students in online courses compared with students in face-to-face courses?

The Mann-Whitney *U* test is a non-parametric test used to compare differences between two independent groups when visual inspection of the data reveals a non-normal distribution (Zimmerman, 1987).

Summary

Chapter III described the methods and procedures utilized to conduct this study. The purpose of this study was to determine if a difference existed between the student perceptions of the psychosocial learning environment between online and face-to-face high school CTE courses. The sample for this study was 745 high school students in either online or face-to-face CTE classes in a school district in Washington State. The variables in this study were defined as the learning environment, face-to-face or online, and the student perceptions of the psychosocial learning environment.

The method for collecting data was described. The school district in this study collected survey data from their own students and the resulting data were used in this study. The survey used in this study was the DELES, a validated survey designed for post-secondary online students which was modified for use with high school students. The survey contained 42 Likert items in seven scales that measured student perceptions of the psychosocial learning environment.

Descriptive and demographic data were also collected from the survey respondents. The scales in the original DELES were validated using Cronbach's alpha coefficient. This validation process was duplicated using the data from this research study. Revalidating the original DELES provided evidence of its effective use with high school students. Finally the statistical procedures and computations were outlined. The findings of the data collection and analysis will be reported in Chapter IV.

CHAPTER IV

FINDINGS

The purpose of this study was to analyze student perceptions of the psychosocial learning environment in online and face-to-face high school career and technical education (CTE) courses to examine the efficacy of the psychosocial environment from a student's perspective. The research questions addressed in this study were as follows:

RQ_1: How do students perceive the psychosocial environment in face-to-face career and technical education courses?

RQ_2: How do students perceive the psychosocial environment in online career and technical education courses?

RQ_3: How do student perceptions of the psychosocial learning environment in career and technical education differ for students in online courses compared with students in face-to-face courses?

Response Rate

Career and technical education online and face-to-face versions of the Distance Education Learning Environment Survey (DELES) were distributed to 745 ($N = 745$) students. Of the total 745 students, 179 were online students and 564 were face-to-face students. A total of 586 student responses were collected. Of the 586 total responses, 545 were from students taking a face-to-face class and 41 were from students taking an online class. Two of the original 586 responses were removed due to conflicting data which made it impossible to place the two students in the appropriate sample. A total of 584 ($n = 584$) responses were used in the data analysis for this study. A population of 700 requires a minimum response rate of 341 and a population of 800 requires a minimum

response rate of 363 to indicate a valid sample (Bartlett, Kotrlik, & Higgins, 2001). In addition to the student perception data, descriptive and demographic data were also collected but not used in this study.

Statistical Analyses: Research Questions 1 and 2

The data for this study were obtained using the DELES, which contains 42 items, excluding the descriptive and demographic items, divided into 7 scales. There were eight items included in the instructor support scale, six included in the student interaction and collaboration scale, seven included in the personal relevance scale, five included in the authentic learning scale, three included in the active learning scale, seven included in the autonomy scale, and eight items included in the enjoyment scale. For each individual survey item, students were asked to choose from the following possible responses: never, seldom, sometimes, often, and always. The individual response data are outlined in Tables 4.1 and 4.2. The student survey responses were coded for analysis: 1 = never, 2 = seldom, 3 = sometimes, 4 = often, and 5 = always. Responses for each item were totaled and averaged to arrive at the mean scores. Averages for individual items within each scale were then summed providing an overall sum of the means for each scale.

To address the first and second research questions regarding how students perceive the psychosocial learning environment in face-to-face and online CTE classes, descriptive statistics were analyzed for each scale using IBM SPSS software. Skewness for each scale was analyzed to determine normality of the curve for each of the scales. According to Bulmer (1979), skewness less than -1 or greater than 1 are considered highly skewed; skewness between -1 and -1/2 or between 1/2 and 1 are moderately skewed; and skewness between -1/2 and 1/2 are approximately symmetric.

Table 4.1

Scores for Psychosocial Scales: CTE Face-to-Face

Scale	Question	Always		Often		Sometimes		Seldom		Never		Total
		#	%	#	%	#	%	#	%	#	%	
Instructor Support	1. If I have an inquiry, the instructor finds time to respond.	249	46%	177	33%	94	17%	18	3%	5	1%	543
	2. The instructor helps me identify problem areas in my study.	207	38%	212	39%	90	17%	30	6%	4	1%	543
	3. The instructor responds promptly to my questions.	222	41%	202	37%	96	18%	19	3%	4	1%	543
	4. The instructor gives me valuable feedback on my assignments.	235	43%	171	31%	108	20%	22	4%	7	1%	543
	5. The instructor adequately addresses my questions.	203	37%	205	38%	110	20%	21	4%	4	1%	543
	6. The instructor encourages my participation.	294	54%	158	29%	69	13%	17	3%	5	1%	543
	7. It is easy to contact the instructor.	233	43%	191	35%	96	18%	20	4%	3	1%	543
	8. The instructor provides me positive and negative feedback on my work.	237	44%	196	36%	84	15%	21	4%	5	1%	543
Student Interaction & Collaboration	9. I work with others.	188	35%	188	35%	110	20%	44	8%	13	2%	543
	10. I relate my work to other's work.	95	17%	181	33%	175	32%	60	11%	32	6%	543
	11. I share information with other students.	89	16%	186	34%	194	36%	50	9%	24	4%	543
	12. I discuss my ideas with other students.	101	19%	209	38%	146	27%	61	11%	26	5%	543
	13. I collaborate with other students in the class.	138	25%	204	38%	129	24%	50	9%	22	4%	543
	14. Group work is a part of my activities.	122	22%	183	34%	159	29%	54	10%	25	5%	543
Personal Relevance	15. I can relate what I learn to my life outside of school.	119	22%	182	33%	166	31%	52	10%	24	4%	543
	16. I am able to pursue topics that interest me.	126	23%	209	38%	161	30%	35	6%	12	2%	543
	17. I can connect my studies to my activities outside of class.	82	15%	178	33%	197	36%	59	11%	27	5%	543
	18. I apply my everyday experiences in class.	82	15%	157	29%	202	37%	89	16%	13	2%	543
	19. I link class work to my life outside of school.	69	13%	128	24%	219	40%	78	14%	49	9%	543
	20. I learn things about the world outside of school.	159	29%	191	35%	145	27%	40	7%	8	1%	543
	21. I apply my out-of-class experience.	72	13%	190	35%	200	37%	62	11%	19	3%	543

Table 4.1 Continued

Scale	Question	Always		Often		Sometimes		Seldom		Never		Total
		#	%	#	%	#	%	#	%	#	%	
Authentic Learning	22. I study real cases related to the class.	71	13%	146	27%	197	36%	86	16%	43	8%	543
	23. I use real facts in class activities.	132	24%	208	38%	159	29%	36	7%	8	1%	543
	24. I work on assignments that deal with real-world information.	121	22%	194	36%	177	33%	39	7%	12	2%	543
	25. I work with real examples.	121	22%	213	39%	166	31%	35	6%	8	1%	543
	26. I enter the real world of the topic of study.	76	14%	164	30%	219	40%	64	12%	20	4%	543
Active Learning	27. I explore my own strategies for learning.	112	21%	207	38%	165	30%	51	9%	8	1%	543
	28. I seek my own answers.	97	18%	245	45%	165	30%	30	6%	6	1%	543
	29. I solve my own problems.	121	22%	269	49%	133	24%	17	3%	3	1%	543
Student Autonomy	30. I make decisions about my learning.	157	29%	242	44%	120	22%	19	3%	5	1%	543
	31. I work during times I find convenient.	115	21%	209	38%	165	30%	46	8%	8	1%	543
	32. I am in control of my learning.	202	37%	194	36%	109	20%	29	5%	9	2%	543
	33. I play an important role in my learning.	293	54%	148	27%	82	15%	17	3%	3	1%	543
	34. I approach learning in my own way.	190	35%	195	36%	133	24%	21	4%	4	1%	543
Enjoyment	35. Career and technical education is stimulating.	100	18%	193	35%	171	31%	55	10%	24	4%	543
	36. I prefer career and technical education.	104	19%	168	31%	169	31%	73	13%	29	5%	543
	37. Career and technical education is exciting.	103	19%	163	30%	185	34%	67	12%	25	5%	543
	38. Career and technical education is worth my time.	148	27%	177	33%	142	26%	56	10%	20	4%	543
	39. I enjoy studying career and technical education.	125	23%	179	33%	157	29%	60	11%	22	4%	543
	40. I look forward to learning career and technical education.	121	22%	178	33%	151	28%	65	12%	28	5%	543
	41. I would enjoy my education more if all my classes were career and technical education.	107	20%	121	22%	155	28%	98	18%	62	11%	543
	42. I am satisfied with this class.	235	43%	171	31%	87	16%	30	6%	20	4%	543

Table 4.2

Scores for Psychosocial Scales: CTE Online

Scale	Question	Always		Often		Sometimes		Seldom		Never		Total
		#	%	#	%	#	%	#	%	#	%	
	1. If I have an inquiry, the instructor finds time to respond.	19	46%	15	37%	4	10%	2	5%	1	2%	41
	2. The instructor helps me identify problem areas in my study.	16	39%	11	27%	8	20%	2	5%	4	10%	41
	3. The instructor responds promptly to my questions.	17	41%	16	39%	5	12%	2	5%	1	2%	41
	4. The instructor gives me valuable feedback on my assignments.	15	37%	11	27%	8	20%	7	17%	0	0%	41
	5. The instructor adequately addresses my questions.	22	54%	9	22%	6	15%	3	7%	1	2%	41
	6. The instructor encourages my participation.	19	46%	16	39%	2	5%	1	2%	3	7%	41
	7. It is easy to contact the instructor.	24	59%	9	22%	7	17%	1	2%	0	0%	41
	8. The instructor provides me positive and negative feedback on my work.	19	46%	11	27%	8	20%	1	2%	2	5%	41
	9. I work with others.	6	15%	9	22%	4	10%	7	17%	15	37%	41
	10. I relate my work to other's work.	3	7%	10	24%	5	12%	7	17%	16	39%	41
	11. I share information with other students.	1	2%	7	17%	9	22%	9	22%	15	37%	41
Student Interaction & Collaboration	12. I discuss my ideas with other students.	3	7%	11	27%	7	17%	6	15%	14	34%	41
	13. I collaborate with other students in the class.	3	7%	10	24%	7	17%	4	10%	17	41%	41
	14. Group work is a part of my activities.	0	0%	7	17%	6	15%	5	12%	23	56%	41
	15. I can relate what I learn to my life outside of school.	10	24%	12	29%	13	32%	3	7%	3	7%	41
	16. I am able to pursue topics that interest me.	10	24%	15	37%	7	17%	4	10%	5	12%	41
	17. I can connect my studies to my activities outside of class.	9	22%	15	37%	9	22%	3	7%	5	12%	41
Personal Relevance	18. I apply my everyday experiences in class.	8	20%	11	27%	13	32%	4	10%	5	12%	41
	19. I link class work to my life outside of school.	7	17%	9	22%	15	37%	4	10%	6	15%	41
	20. I learn things about the world outside of school.	14	34%	13	32%	9	22%	1	2%	4	10%	41
	21. I apply my out-of-class experience.	5	12%	16	39%	12	29%	5	12%	3	7%	41

Table 4.2 Continued

Scale	Question	Always		Often		Sometimes		Seldom		Never		Total
		#	%	#	%	#	%	#	%	#	%	
Authentic Learning	22. I study real cases related to the class.	5	12%	9	22%	11	27%	7	17%	9	22%	41
	23. I use real facts in class activities.	9	22%	20	49%	8	20%	1	2%	3	7%	41
	24. I work on assignments that deal with real-world information.	10	24%	20	49%	6	15%	3	7%	2	5%	41
	25. I work with real examples.	7	17%	17	41%	10	24%	5	12%	2	5%	41
	26. I enter the real world of the topic of study.	7	17%	13	32%	14	34%	5	12%	2	5%	41
Active Learning	27. I explore my own strategies for learning.	12	29%	17	41%	8	20%	2	5%	2	5%	41
	28. I seek my own answers.	17	41%	21	51%	1	2%	2	5%	0	0%	41
	29. I solve my own problems.	17	41%	21	51%	2	5%	1	2%	0	0%	41
Student Autonomy	30. I make decisions about my learning.	18	44%	19	46%	3	7%	1	2%	0	0%	41
	31. I work during times I find convenient.	23	56%	12	29%	5	12%	0	0%	1	2%	41
	32. I am in control of my learning.	22	54%	14	34%	2	5%	2	5%	1	2%	41
	33. I play an important role in my learning.	29	71%	9	22%	1	2%	1	2%	1	2%	41
	34. I approach learning in my own way.	22	54%	11	27%	5	12%	1	2%	2	5%	41
Enjoyment	35. Distance education is stimulating.	6	15%	11	27%	12	29%	4	10%	8	20%	41
	36. I prefer distance education.	3	7%	8	20%	18	44%	7	17%	5	12%	41
	37. Distance education is exciting.	2	5%	9	22%	12	29%	9	22%	9	22%	41
	38. Distance education is worth my time.	9	22%	18	44%	6	15%	3	7%	5	12%	41
	39. I enjoy studying by distance.	8	20%	11	27%	10	24%	7	17%	5	12%	41
	40. I look forward to learning by distance.	5	12%	9	22%	9	22%	12	29%	6	15%	41
	41. I would enjoy my education more if all my classes were by distance.	3	7%	1	2%	13	32%	8	20%	14	34%	39
	42. I am satisfied with this class.	15	37%	8	20%	10	24%	3	7%	5	12%	41

Scale results: Face-to-face.

Instructor Support. Eight items combined to form a reliable scale of student perceived level of instructor support. With possible responses to each of the eight items ranging from 1 to 5, the possible sum of the scale scores ranged from 8 to 40 with larger values indicating higher levels of perceived instructor support. The sum of the means for this scale was 33.3 with a standard deviation of 5.6 ($M = 33.3$, $SD = 5.6$). These data show a moderately high skew of -.944.

Student Interaction and Collaboration. Six items combined to form a reliable scale of perceived level of interaction and collaboration among students. The possible sum of the scale scores ranged from 6 to 30 with larger values indicating higher levels of perceived student interaction and collaboration. The sum of the means for this scale was 21.7 with a standard deviation of 5.1 ($M = 21.7$, $SD = 5.1$). These data show a moderate skew of -.542.

Personal Relevance. Seven items combined to form a reliable scale of student perceived level of personal relevance. The possible sum of the scale scores ranged from 7 to 35 with larger values indicating higher levels of perceived personal relevance. The data show a sum mean of 24.6 and a standard deviation of 5.6 ($M = 24.6$, $SD = 5.6$). The skew for the personal relevance scale was -.280 indicating approximate symmetry for this scale.

Authentic Learning. Five items combined to form a reliable scale of perceived authentic learning. The possible sum of the scale scores ranged from 5 to 25 with larger values indicating higher levels of perceived authentic learning. The sum of the means for this scale was 17.8 with a standard deviation of 4 ($M = 17.8$, $SD = 4{,}0$) and a skew of -

.087 indicating a normal distribution for the authentic learning scale for face-to-face students.

Active Learning. Three items combined to form a reliable active learning scale. The possible sum of the scale scores ranged from 3 to 15 with larger values indicating higher levels of perceived active learning. The sum of the means for this scale was 11.3 with a standard deviation of 2.1 ($M = 11.3$, $SD = 2.1$) and moderately low skew of -.482.

Autonomy. Five items combined to form a reliable scale of perceived autonomy. The possible sum of the scale scores ranged from 5 to 25 with larger values indicating higher levels of perceived autonomy. The sum of the means for this scale was 20 and the standard deviation was 3.5 ($M = 20.0$, $SD = 3.5$). Skew for this scale was moderate at -.596.

Enjoyment. Eight items combined to form a reliable scale of perceived enjoyment. The possible sum of the scale scores ranged from 8 to 40 with larger values indicating higher levels of perceived enjoyment. The sum of the means for the enjoyment scale was 28.6 with a standard deviation of 7.4 ($M = 28.6$, $SD = 7.4$). The skew for the enjoyment scale is moderately low at -.441.

Scale results: Online.

Instructor Support. Eight items combined to form a reliable scale of student perceived level of instructor support. The possible sum of the scale scores ranged from 8 to 40 with larger values indicating higher levels of perceived instructor support. The sum of the means for this scale was 32.7 with a standard deviation of 6.5 ($M = 32.7$, $SD = 6.5$). Further, these data show a high skew of -1.174.

Student Interaction and Collaboration. Six items combined to form a reliable scale of student perceived level of interaction and collaboration among online students. The possible sum of the scale scores ranged from 6 to 30 with larger values indicating higher levels of perceived student interaction and collaboration. The sum of the means for this scale was 14.3 with a standard deviation of 7.2 (M = 14.3, SD = 7.2) and skew of .291, indicating approximate symmetry for this scale.

Personal Relevance. Seven items combined to form a reliable scale of student perceived level of personal relevance. The possible sum of the scale scores ranged from 7 to 35 with larger values indicating higher levels of perceived personal relevance. The sum of the means for this scale was 24.2 and the standard deviation was 6.9 (M = 24.2, SD = 6.9) with a skew of -.752, indicating a moderately negative skew for this scale.

Authentic Learning. Five items combined to form a reliable scale of perceived authentic learning. The possible sum of the scale scores ranged from 5 to 25 with larger values indicating higher levels of perceived authentic learning. The sum of the means was 17.4 and the standard deviation 4.4 (M = 17.4, SD = 4.4). Skew for the authentic learning scale was moderate at -.534.

Active Learning. Three items combined to form a reliable scale of perceived authentic learning. The possible sum of the scale scores ranged from 3 to 15 with larger values indicating higher levels of perceived active learning. The sum of the means was 12.5 and the standard deviation 2.2 (M = 12.5, SD = 2.2) with a high skew of -1.241.

Autonomy. Five items combined to form a reliable scale of perceived autonomy. The possible sum of the scale scores ranged from 5 to 25 with larger values indicating somewhat higher levels of perceived autonomy. The sum of the means was 21.8 with a

standard deviation of 3.4 ($M = 21.8$, $SD = 3.4$). Skew for the autonomy scale was high at -1.996.

Enjoyment. Eight items combined to form a reliable scale of enjoyment. The possible sum of the scale scores ranged from 8 to 40 with larger values indicating somewhat higher levels of perceived enjoyment. The sum of the means for the enjoyment scale was 24.1 with a standard deviation of 7.5 ($M = 24.1$, $SD = 8.4$) and a moderately low skew of -.447.

It should be noted that the enjoyment scale showed outlying data in two of the scale items. Although the overall scale mean was 24.1, item number 38 had a mean score of 3.5 and 42 had a mean score of 3.6 which vary relative to the mean scores of the other items in the scale. The mean scores for the other items in this scale were 3.1 for item 35, 2.9 for item 36, 2.7 for item 37, 3.2 for item 39, 2.9 for item 40, and 2.1 for item 41. Each of the seven scales and the resulting scores are outlined in Table 4.3.

Statistical Analyses: Research Question 3

For Research Question 3, the researcher sought to compare online and face-to-face student perceptions within the seven scale areas. Based on Bulmer's principles, the scales of instructor support, student interaction and collaboration, and autonomy showed a moderate skew in the face-to-face student data. The online student data show high skewness levels in the scales instructor support, active learning, and autonomy. The online data also show moderate skew in the scales of personal relevance and authentic learning.

Because of the level of skewness in 8 of the 14 scales, A Mann-Whitney *U* test was applied to determine if there were differences in student perceptions of the

Table 4.3

Mean Scores, Skewness, and Standard Deviations for Psychosocial Scales

		Instructor Support	Student Interaction & Collaboration	Personal Relevance	Authentic Learning	Active Learning	Autonomy	Enjoyment
Face to face	Mean	33.26	21.71	24.56	17.81	11.30	19.99	28.55
	N	543	543	543	543	543	543	543
	Minimum	8	6	7	5	3	5	8
	Maximum	40	30	35	25	15	25	40
	Skewness	**-.944**	**-.542**	-.280	-.087	-.482	**-.596**	-.441
	Kurtosis	.832	.131	-.045	-.070	.692	.123	-.170
	Std. Deviation	5.569	5.115	5.622	3.956	2.125	3.474	7.365
Online	Mean	32.71	14.29	24.20	17.39	12.46	21.78	24.10
	N	41	41	41	41	41	41	41
	Minimum	14	6	7	5	5	5	8
	Maximum	40	27	35	25	15	25	40
	Skewness	**-1.174**	.291	**-.752**	**-.534**	**-1.241**	**-1.996**	-.447
	Kurtosis	1.222	-1.388	.300	.619	2.676	5.222	-.578
	Std. Deviation	6.486	7.198	6.947	4.370	2.181	3.388	8.378
Total	Mean	33.22	21.19	24.54	17.78	11.38	20.12	28.24
	N	584	584	584	584	584	584	584
	Minimum	8	6	7	5	3	5	8
	Maximum	40	30	35	25	15	25	40
	Skewness	-.971	-.674	-.341	-.129	-.507	-.662	-.467
	Kurtosis	.891	.200	.041	.000	.676	.226	-.140
	Std. Deviation	5.634	5.610	5.719	3.984	2.148	3.496	7.519

Note. High and moderate skewness scores are in boldface.

psychosocial learning environment between face-to-face and online students. The Mann-Whitney *U* test makes no assumption about the shape of the distribution and regards the scales as ordinal (rank) rather than interval level of measurement. An alpha level of .05 was used to determine significance with an alpha level less than .05 considered statistically significant ($p < .05$).

Instructor Support. Face-to-face student perceptions showed an average rank of 293.01, and online student perceptions showed an average rank of 285.70. The results of

the Mann-Whitney *U* test indicate there is no significant difference in students' perceived levels of instructor support, $U = 10852.5$, $z = -.268$, $p > .05$.

Student Interaction and Collaboration. Face-to-face student perceptions showed an average rank of 304.04, and online student perceptions showed an average rank of 139.61. The results indicate there is a significant difference in students' perceived levels of interaction and collaboration, $U = 4863$, $z = -6.03$, $p < .05$, with face-to-face students indicating a higher perceived level of interaction and collaboration with classmates.

Personal Relevance. Face-to-face student perceptions showed an average rank of 292.21, and online student perceptions showed an average rank of 296.34. The results of the Mann-Whitney *U* test indicate there is no significant difference in students' perceived levels of personal relevance, $U = 10974$, $z = -.151$, $p > .05$.

Authentic Learning. Face-to-face student perceptions showed an average rank of 293.13, and online student perceptions showed an average rank of 284.17. The results indicate there is no significant difference in students' perceived levels of instructor support, $U = 10790$, $z = -.329$, $p > .05$.

Active Learning. Face-to-face student perceptions showed an average rank of 285.65, and online student perceptions showed an average rank of 383.21. The results of the Mann-Whitney *U* test indicate there is a significant difference in students' perceived levels of this scale, $U = 7412.5$, $z = -3.62$, $p < .05$, with online students indicating a higher level of perceived active learning.

Autonomy. Face-to-face student perceptions showed an average rank of 285.36, and online student perceptions showed an average rank of 387.09. The results of the Mann-Whitney *U* test indicate there is a significant difference in students' perceptions of

this scale, $U = 7253.5$, $z = -3.74$, $p < .05$, with online students indicating a higher level of perceived autonomy.

Enjoyment. Face-to-face student perceptions showed an average rank of 298.61, and online student perceptions showed an average rank of 211.62. The results of the Mann-Whitney *U* test indicate there is a significant difference in students' perceived levels of enjoyment, $U = 7815.5$, $z = -3.187$, $p < .05$, with face-to-face students indicating a higher level of enjoyment in the class environment. Tables 4.4 and 4.5 display the results of the Mann-Whitney *U* test for each of the seven scales for face-to-face and online learning environments.

Table 4.4

Mann-Whitney U *Test Showing Mean Difference in Face-to-Face and Online Student Perceptions*

	Instructor Support	Student Interaction and Collaboration	Personal Relevance	Authentic Learning	Active Learning	Autonomy	Enjoyment
Mann-Whitney *U*	10852.500	4863.000	10974.000	10790.000	7412.500	7253.500	7815.500
Wilcoxon *W*	11713.500	5724.000	158670.000	11651.000	155108.500	154949.500	8676.500
Z	-.268	-6.030	-.151	-.329	-3.618	-3.740	-3.187
Asymp. Sig. (*p*) (2-tailed)	.788	.000	.880	.742	.000	.000	.001

Grouping Variable: Delivery mode

Summary

The purpose of this study was to analyze student perceptions of the psychosocial learning environment in online and face-to-face high school career and technical education (CTE) courses to examine the efficacy of the psychosocial environment from a student's perspective and to analyze the differences, if any, between student perceptions in online and face-to-face environments. To address the research questions, survey data from a total of 584 face-to-face and online CTE students were analyzed.

Table 4.5

Mann-Whitney U *Test Showing Mean Ranks*

	Delivery mode	*N*	Mean Rank	Sum of Ranks
Instructor Support	Face to face	543	293.01	159106.50
	Online	41	285.70	11713.50
	Total	584		
Student Interaction and Collaboration	Face to face	543	304.04	165096.00
	Online	41	139.61	5724.00
	Total	584		
Personal Relevance	Face to face	543	292.21	158670.00
	Online	41	296.34	12150.00
	Total	584		
Authentic Learning	Face to face	543	293.13	159169.00
	Online	41	284.17	11651.00
	Total	584		
Active Learning	Face to face	543	285.65	155108.50
	Online	41	383.21	15711.50
	Total	584		
Autonomy	Face to face	543	285.36	154949.50
	Online	41	387.09	15870.50
	Total	584		
Enjoyment	Face to face	543	298.61	162143.50
	Online	41	211.62	8676.50
	Total	584		

The data for this study were obtained using the Distance Education Learning Environment Survey (DELES) which contains 42 items in 7 scales: instructor support, student interaction and collaboration, personal relevance, authentic learning, active learning, autonomy, and enjoyment. The seven scales were compared using Mann-Whitney *U* tests to identify significant differences in the mean rank scores between online and face-to-face student perceptions. The data analysis showed no significant

difference in student perceptions of the learning environments in three of the seven psychosocial scales: instructor support, personal relevance, and authentic learning.

According to the Mann-Whitney *U* test, there were significant differences in student perceptions between face-to-face and online environments in the scales of student interaction and collaboration, active learning, autonomy, and enjoyment scales with significance levels less than .05 ($p < .05$) in each scale. A detailed analysis of these findings will be presented in Chapter V, Summary, Conclusions, and Recommendations.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This study analyzed and compared online and face-to-face career and technical education (CTE) student perceptions of the psychosocial learning environment in CTE courses. This chapter summarizes the study, offers conclusions based on the findings, and makes recommendations for future studies related to this topic.

Summary

Online courses are becoming more common in secondary schools. Learning online is not a new approach, but advances in technology have made online learning accessible to more students (Hart, 2012). As more education professionals look toward online courses as an option for student learning, designing curriculum to offer online learners the same experiences as face-to-face learners is challenging and requires an analysis of the psychosocial learning in both environments.

Formerly known as vocational education, CTE is offered online by many public school districts, and many high school students have opportunities to take CTE courses in an online format. Data indicate that CTE is an important element for ensuring a well-educated populace, and offering CTE in an online setting gives more students the opportunity to take these career-focused courses (Kotamraju, 2007). This study analyzes the student perceptions of online and face-to-face CTE courses to gain a better understanding of both learning environments from a student's perspective.

According to Fraser (1998), learning environments are "the social, psychological and pedagogical contexts in which learning occurs and which affect student achievement and attitudes" (p. 3). Learning environments that promote problem solving, teamwork,

collaboration, and real-world application can provide students with the capacity and motivation to learn, whether they are involved in an online or face-to-face educational setting (Grier-Reed, Skaar, & Parson, 2009). Social constructivist theorists suggest that supporting students through teacher feedback, student collaboration, problem solving, and active learning can help students construct their own knowledge (Brewer, 2004; Rovai, 2002b). These practices, when considered in the design of high school curricula, may improve student learning in online and face-to-face environments.

Studies conducted by the Bill and Melinda Gates Foundation (2012a, 2012b) suggest that student perceptions are predictive of student success. In fact, these studies have found that student perceptions are more predictive of achievement gains than classroom observations or standardized testing. Surveys designed to identify student perceptions of the learning environment may help educators determine how to modify practices to improve student outcomes.

This study used existing survey data from a school district in Washington State in the 2013/2014 school year. Study participants included a total of 584 students ($n = 584$) whose responses were used in the data analysis for this study. Of the total of 584 student responses, 543 were from face-to-face and 41 were from online CTE students. The instrument used in this study was the Distance Education Learning Environment Survey (DELES), a 42-item, validated survey designed for post-secondary online students, which was modified and revalidated for use with high school students. Factor analysis of the 42 items was conducted to arrive at 7 scales. There were eight items included in the instructor support scale, six included in the student interaction and collaboration scale, seven included in the personal relevance scale, five included in the authentic learning

scale, three included in the active learning scale, seven included in the autonomy scale, and eight items included in the enjoyment scale. For each item, students were asked to choose from never, seldom, sometimes, often, and always.

The student responses were coded for analysis: 1 = never, 2 = seldom, 3 = sometimes, 4 = often, and 5 = always. Responses for each item were totaled and averaged to arrive at the mean scores. Averages for individual items within each scale were then summed providing an overall mean for each scale. Statistical analysis included an examination of the individual items and the means and standard deviations of each of the seven scale areas for face-to-face and online student data. Because the results indicated a non-normal distribution, Mann-Whitney *U* tests were used to measure variability and compare the means of each of the scale scores between online and face-to-face to determine if differences exist. The research questions guiding this study were:

RQ_1: How do students perceive the psychosocial environment in face-to-face career and technical education courses?

RQ_2: How do students perceive the psychosocial environment in online career and technical education courses?

RQ_3: How do student perceptions of the psychosocial learning environment in career and technical education differ for students in online courses compared with students in face-to-face courses?

The study limitations included the relatively small number of online student responses compared with face-to-face students. In addition, existing data from only one school district from Washington State were used in this study.

It is assumed that the online students have limited contact with the teacher, and student and teacher contact was based on Washington State Alternative Learning Experiences (ALE) requirements as appropriate since many online learners fall under the designation of ALE in Washington State. It is also assumed that all students were enrolled in approved CTE courses in Washington State, and all students were taught by appropriately certified CTE teachers. It is assumed that students responded only once to the survey, and it is assumed that appropriate data collection procedures were followed, although the researcher was not able to oversee the collection process.

Conclusions

The following conclusions were drawn following analysis of the findings as they related to Research Questions 1 and 2. For these questions, the researcher sought to identify how students perceived the psychosocial learning environment in face-to-face and online CTE courses.

An analysis of the instructor support scale reveals that students in the face-to-face classes felt their instructors were supportive, responsive, and prompt. Over 75% of students responded with a 5 (always) or 4 (often) indicating the majority of students felt their instructors encouraged participation and provided the students with adequate positive and negative feedback on their work. Research reports that support from instructors is an important course element from a student's perspective (Lemley, Schumacher, & Vesey, 2014; Sahin, 2007). Prompt feedback and the encouragement of participation lead students to perceive the learning environment as more positive, and student performance is enhanced in a positive and supportive environment (Garrett Dikkers, Whiteside, & Lewis, 2013).

As with the face-to-face students, online students felt that they were supported by their instructors. For the items within the instructor support scale, approximately 76% of student scores were 5 (always) or 4 (often). Often assumed to be a missing element in online courses, evidence of instructor support is an important finding for online course developers and those who are skeptical of online courses (Swan, 2001). As a necessary element for student success, instructor support is evident in the perceptions of the online students represented in this study.

Analysis of the student interaction and collaboration for face-to-face students reveals a mean score of 21.7 for this scale where the possible scores ranged from 6 to 30. This result indicates that face-to-face students reported having some opportunities to collaborate with their peers. In particular, students indicated that they frequently work with others in class. Sharing information with other students, however, was less frequent according to most students. Group activities, a hallmark of CTE courses, was cited as occurring "always" by only 22% of students, indicating that some teachers are not yet open to allowing students to collaborate fully and share their work with others. Although an important element for all learners, collaboration and sharing of work may not be a comfortable practice for many traditional face-to-face teachers (Donna & Miller, 2013).

Student interaction and collaboration resulted in a low mean score ($M = 14.3$) for online students with over 50% responding with a score of 2 (seldom) for 5 of the 6 scale items. Group work was perceived as infrequent as was discussion with peers. This indicates that online teachers and course developers must find ways to encourage students to work in teams and communicate during online courses. For online students, interaction and collaboration may seem more challenging, but online course developers can

incorporate strategies to encourage students to work together and communicate about their learning (Beckem & Watkins 2012). This finding should help course developers understand that this is an area that requires particular attention in order for it to become more apparent to students. Allowing students the opportunity to work together without providing specific support and encouragement is not sufficient to change this perception, and instructors and course developers must be more deliberate about creating an online environment that includes rich interaction and collaboration (Lynch, 2004).

According to Croxton (2014), collaboration can enhance the learning environment for students. However, this result indicates that even as social networking and digitally-enhanced collaboration and communication tools are becoming more widely available in schools, there is room for improvement to ensure these opportunities are clearly and intentionally available to students (Pearson, Tobola, & Fowler, 2009).

Although relevance is often viewed as a primary feature of CTE courses, face-to-face student perceptions of relevance earned only moderate marks ($M = 24.56$) from the target population. The possible scores for this scale ranged from 7 to 35. This result indicates that even CTE course designers must be more purposeful in making the content relevant for high school students. Relevance in education is crucial to helping students learn and retain knowledge (Smith, 2013). Helping teachers bring more relevance to their courses is an important step in ensuring the class environment is conducive to learning and retention. Although the importance of relevance is widely known, particularly by CTE educators, integrating relevance is not easily accomplished, and these data show that teachers still need to work on this element so students will begin to better recognize how their course competencies relate to careers and life.

The personal relevance scale result was also moderate ($M = 24.2$) for online students, indicating that students did not perceive a strong personal relevance in the online course content. Course developers and online instructors must provide opportunities for students to find personal meaning within the course material. Having a sense of purpose and meaning within the course content may help students build confidence that will allow them to take responsibility for their education and future success (Smith, 2013).

Authentic learning is also a source of pride for many CTE educators; however, for each of the 5 items in this scale, approximately 35% of face-to-face students responded with a 4 (often) or 3 (sometimes). For the item, "I enter the real world of the topic of study" 40% responded with a 3 (sometimes). This result indicates that, according to student perceptions, the course work did not always reflect the real world of work. Along with relevance, authentic learning is crucial in CTE courses and is often what sets CTE apart from other courses (Brewer, 2004). With workforce advisory committees guiding CTE programs in public education, authentic learning should be a natural outcome of the partnership with business and industry (Leary, 2012). However, advisory committees in many schools are not as functional as they could be, and as a result, relevance and authentic learning opportunities may not be prominent in the perceptions of CTE students (Bartlett, Schleif, & Bowen, 2011).

For the authentic learning scale, where the possible scores ranged from 5 to 25, the mean score was 17.4 ($M = 17.4$) for online students with 50% scoring each item with a 3 or higher. For CTE courses online or face-to-face, authentic learning is a foundation on which 21st century and employment skills are built (Burke, 2011). Ensuring course

content is perceived by students as authentic is imperative, and design elements should ensure that students perceive this feature clearly.

Active learning was rated only moderately by the majority of students in the face-to-face environment as evidenced by the mean score ($M = 11.3$) for this scale where the possible scores ranged from 3 to 15. CTE classes are known for learning strategies that encourage students to solve problems and seek their own answers to questions (Berkins & Kritsonis, 2007). As this scale was rated only moderately by face-to-face students, this is an area that should be further explored by teachers and course developers. Encouraging students to become more active in their own education by seeking their own ways to solve problems may improve CTE courses and help improve student learning.

Active learning was rated moderately high by the majority of students ($M = 12.5$) in the online environment. This mean score indicates that online students feel they explore their own learning strategies, seek their own answers, and solve their own problems in their online courses. As research shows, online students often become independent learners out of necessity, and this important skill will help students through higher education and employment (ACTE, 2010).

With over half of the students reporting 5 (always) and 4 (often) responses, the autonomy scale resulted in a relatively high percentage compared with the previous three scales for face-to-face students. This result indicates that students felt strongly that they were able to approach learning in their own way and they had control over their own learning. In general, student autonomy is an important feature for CTE courses. Independence in work is a key component in 21st century skills, and employers stress the ability for students to work not only in teams but independently when necessary (Renuga,

& Ezhilan, 2014). Having experience in independent thinking and problem solving is important for students as they enter the workplace and become productive employees and citizens (Leary, 2012).

Along with active learning, it is not surprising that the scores for the autonomy scale were relatively high for online students ($M = 21.8$). Possible scores for this scale ranged from 5 to 25. With most or all of the work completed away from an instructor, students' sense of self-reliance is necessarily heightened in an online environment (Seiver & Troja, 2014).

Analysis of data for the enjoyment scale shows that face-to-face students moderately enjoyed their CTE course as approximately 56% of students scored 5 (always) or 4 (often) on the items in the enjoyment scale. The item "I am satisfied with this class" resulted in approximately 75% of students scoring a 4 or 5. This result indicated that most students enjoyed the course and felt it was worth their time. Students indicated that they were satisfied with their face-to-face CTE course.

Although online students indicated they were satisfied with the course, the scores for the enjoyment scale were lower overall for online students ($M = 28.2$) where possible scores ranged from 8 to 40. However, students rated "I am satisfied with this class" high as compared with the other items in this scale with approximately 80% of students rating a 3 or above for this item. This indicates that although student interaction, collaboration, and relevance were not common online, the online environment was still able to meet students' needs. Some of the primary reasons students take online courses are convenience and flexibility, and students may not consider interaction and collaboration as an important component when deciding to take a class online (Barbour et al., 2011).

For Research Question 3, the researcher sought to compare online and face-to-face student perceptions within the seven scale areas. As with earlier studies regarding student satisfaction comparisons in online and face-to-face environments, student perceptions in both environments differed in some key areas, but they were quite similar in other areas. This study compared student perceptions related to instructor support, student interaction and collaboration, personal relevance, authentic learning, active learning, student autonomy, and enjoyment.

Because the skewness level was moderately high in 8 of the 14 combined scales for online and face-to-face, Mann-Whitney *U* tests were used to determine if there were differences in student perceptions of the psychosocial learning environment between face-to-face and online students. The results of the Mann-Whitney *U* test indicate there is no significant difference in students' perceived levels of instructor support between online and face-to-face students, $U = 10852.5$, $z = -.268$, $p > .05$. This is an important finding as instructor support is crucial to students' perceptions of satisfaction in any learning environment. When students feel supported they are better able to learn and respond to the instructor's input (Garrett Dikkers, Whiteside, & Lewis, 2013).

The results indicate there is a significant difference in students' perceived levels of interaction and collaboration, $U = 4863$, $z = -6.03$, $p < .05$, with face-to-face students indicating a higher perceived level of interaction and collaboration with classmates. Existing research shows that interaction and collaboration are important factors in student satisfaction in a classroom environment, whether it is online or face-to-face (Yu-Chun, Walker, Belland, Schroder, & Yu-Tung, 2014). Although it is anticipated that students perceive greater interaction and collaboration in a face-to-face environment, it is a factor

that online course developers must strive to improve. Building an interactive and collaborative online environment is possible with the proper techniques and procedures, and the importance of this element to student satisfaction cannot be overstated (Croxton, 2014; Johnson, Cascio, & Massiah, 2014; Sahin, 2007).

The results of the Mann-Whitney *U* test indicate there is no significant difference in students' perceived levels of personal relevance, $U = 10974$, $z = -.151$, $p > .05$. This means that online and face-to-face students perceived the psychosocial environments to have comparable levels of relevance within the course content. Research shows personal relevance is considered a key factor in student engagement and enjoyment in a class (Smith, 2013). When instructors and course developers consider meaningful relevance in their design and instruction, whether online or face-to-face, students report greater satisfaction with the class overall.

The results indicate there is no significant difference in students' perceived levels of authentic learning, $U = 10790$, $z = -.329$, $p > .05$. Along with relevance, authentic learning requires learners to connect their learning to the world outside the classroom. A deliberate attempt to provide authentic learning is crucial for student satisfaction in both online and face-to-face environments (Lemley et al., 2014).

There was a significant difference, however, in the scale of active learning, $U = 7412.5$, $z = -3.62$, $p < .05$. In this scale, online students indicated a higher level of perceived active learning, meaning that online students found more opportunities to explore their own strategies for learning and solve their own problems. Considering this context for active learning, it is understandable that students in an online environment would perceive greater active learning than students in a face-to-face environment.

Active learning and the opportunity to explore their own strategies for learning can help students become more engaged in the learning environment, enhancing their learning potential (Smith, 2013). This result shows that independence necessitates problem solving, and allowing students more opportunities to problem solve and find their own answers in both face-to-face and online environments will ultimately help students become better independent learners.

As with active learning, the autonomy scale result indicates there was a significance difference between face-to-face and online student perceptions, $U = 7253.5$, $z = -3.74$, $p < .05$. In this scale, online students perceived a higher level of autonomy than those in a face-to-face environment. However, the results also suggest that autonomy in a learning environment may actually detract from the overall satisfaction in an online course for high school students. Although autonomy and active learning may help students in their future endeavors in higher education and the workplace, it appears that a larger factor in student satisfaction is the ability for students to interact and collaborate with the instructor and their peers (Johnson et al., 2014).

Data analysis of the final scale of enjoyment indicates there is a significant difference in the perceptions of online and face-to-face students, $U = 7815.5$, $z = -3.187$, $p < .05$. While online students did indicate they are satisfied with their course, face-to-face students perceived a greater level of enjoyment in their courses overall. Instructor support along with interaction and collaboration appear to be major factors in student perceptions of course satisfaction. This finding is consistent with prior studies that show support from the instructor and peer interactions are primary indicators of overall enjoyment within a class environment (Johnson et al., 2014; Wang & Newlin, 2000).

Research Question 1 addressed how students perceive the psychosocial learning environment in face-to-face career and technical education courses. According to the results of the study, face-to-face students perceived the learning environment as strong in terms of instructor support and autonomy. Face-to-face students felt the learning environment was moderately high in the area of active learning, and moderate in the areas of student interaction and collaboration, personal relevance, authentic learning, and enjoyment.

Research Question 2 addressed how students perceive the psychosocial learning environment in online career and technical education courses. According the results of the study, online students perceived the learning environment as strong in instructor support, active learning, and autonomy. However, online students perceived the learning environment as lacking in the areas of student interaction and collaboration and enjoyment. The areas of personal relevance and authentic learning were rated moderately by online students.

Research Question 3 addressed the differences, if any, in the student perceptions of career and technical courses face-to-face and online. The results of the study indicate there is a significant difference in student perceptions of the learning environment in the areas of interaction and collaboration, active learning, autonomy, and enjoyment. Analysis of the survey results show face-to-face students to perceive a stronger sense of student interaction and collaboration and enjoyment in their CTE course. Online students perceive a stronger sense of active learning and autonomy.

Recommendations

Based on the results of this study, it is recommended that school districts and other educational institutions continue to explore the use of an online platform for CTE courses. It is further recommended that CTE professionals review their current delivery methods and investigate options for increasing the opportunities for students to collaborate and communicate with peers as part of the learning environment whether it is online, face-to-face, or a combination of the two. Relevance and authentic learning, two areas where both environments show the need for improvement, should be continually reviewed and evaluated to ensure the learning environment is enriched with real world, authentic content.

For CTE professionals, the results of this study should provide evidence that CTE courses can be delivered effectively in an online environment. Given that some scale areas were perceived more positively by either face-to-face or online students reveals that there are opportunities for improvement in both environments for CTE students. School districts and other educational institutions must explore all the various learning environment options including online, hybrid, blended, and flipped designs in order to provide options for student learning.

Analysis of the data from this study indicates that in the areas of active learning and autonomy students perceive online education as offering more benefit than face-to-face education. In the area of student interaction and collaboration student perceptions favor the face-to-face environment. Therefore, it is recommended that additional research be conducted to examine student achievement in traditional face-to-face courses

compared with hybrid or blended courses that offer students the opportunity to learn in both online and face-to-face environments within the same course.

In addition, this and previous studies of online learning in secondary education find that instructor support along with interaction and collaboration are central to student satisfaction (Johnson et al., 2014). It is recommended that more research be conducted with various psychosocial environments to determine the effect of instructor support along with collaboration and interaction on student satisfaction and achievement as identified by course completion, final grade, or standardized test results.

Considering the evidence that student satisfaction may lead to success, it is further recommended that additional comparison studies for online and face-to-face be conducted to determine if online learning can lead to the same or greater student success in terms of retention and grade outcomes (Seiver & Troja, 2014). Although this study specifically looked at CTE courses in both environments, additional studies looking at other courses would be beneficial to clearly identify the benefits and drawbacks to offering courses both online and face-to-face.

A future study should be undertaken to determine if enhanced instructor communication increases student engagement in an online environment in CTE. Additionally, it is recommended that a study be conducted to determine the impact on student learning of teacher professional development including mentoring and online course delivery instruction.

School districts and state education departments should consider delivering professional development opportunities for online educators that address the areas in this study that showed the need for improvement. Teachers must have training in how to

incorporate online teamwork and encourage interaction and collaboration. Additionally, online CTE teachers must be able to ensure their courses are relevant and authentic in order to help improve student engagement.

Lastly, additional research should be conducted using the demographic and other survey data collected from the survey participants in this study. These data included why students chose to take the course, their anticipated grade, their gender, and their grade level. Analysis of these data may help researchers glean additional insight into student motivations and perceptions concerning online and face-to-face CTE courses.

REFERENCES

Alonso, F. F., Manrique, D. D., Martinez, L. L., & Vines, J. M. (2011). How blended learning reduces underachievement in higher education: An experience in teaching computer sciences. *IEEE Transactions on Education, 54*(3), 471-478.

Alternative Learning Experience Requirements, Wash. Admin. Code. § 392-121-182 (2011).

American Vocational Association. (1998). *The official guide to the Perkins Act of 1998. The authoritative guide to federal legislation for vocational-technical education.* Alexandria, VA. American Vocational Association.

Anderson, J., Boyles, J., & Rainie, L. (2012). *The future impact of the Internet on higher education: Experts expect more efficient collaborative environments and new grading schemes; They worry about massive online courses, the shift away from on-campus life*. Washington, DC: Pew Internet & American Life Project. ERIC Document ED534048.

Anderson-Butcher, D., Amorose, A., Iachini, A., & Ball, A. (2012). The development of the perceived school experiences scale. *Research on Social Work Practice, 22*(2), 186-194. doi:10.1177/1049731511419866

Andrus, W. H. (2009). *The allure of online education for the millennial student.* (Doctoral dissertation). Retrieved from ProQuest LLC. (ED514081)

Aranda, N. (2006). *A brief history of computer based training*. Retrieved from http://ezinearticles.com/?A-Brief-History-of-Computer-Based-raining &id=287273.

Armstrong, D. A. (2011). Students' perceptions of online learning and instructional tools: A qualitative study of undergraduate students' use of online tools. *Turkish Online Journal of Educational Technology, 10*(3), 222-226.

Aslan, S., & Reigeluth, C. M. (2011). A trip to the past and future of educational computing: Understanding its evolution. *Contemporary Educational Technology, 2*(1), 1-17.

Association for Career and Technical Education [ACTE]. (2010). Expanding career readiness through online learning. *ACTE Career Readiness Series.* Retrieved from https://www.acteonline.org/general.aspx ?id=1964#. UdcQlPm1F8E

Asunda, P. A. (2011). Open courseware and STEM initiatives in career and technical education. *Journal of STEM Teacher Education, 48*(2), 6-37.

Atkins, D. E., Bennett, J., Brown, J. S., Chopra, A., Dede, C., & Fishman, B., (2010). *Transforming American education: Learning powered by technology.* Washington, DC: U.S. Department of Education, Office of Educational Technology.

Aviles, M., & Eastman, J. K. (2012). Utilizing technology effectively to improve millennials' educational performance: An exploratory look at business students' perceptions. *Journal of International Education in Business, 5*(2), 96-113. doi.org/10.1108/18363261211281726

Baggaley, J. (2013). MOOC rampant. *Distance Education, 34*(3), 368-378. doi:10.1080/01587919.2013.835768

Bakia, M., Shear, L., Toyama, Y., & Lasseter, A. (2012). *Understanding the implications of online learning for educational productivity.* Jessup, MD: U.S. Department of Education, Office of Educational Technology.

Banas, E. J., & Emory, W. F. (1998). History and issues of distance learning. *Public Administration Quarterly, 22*(3), 365-383.

Barbour, M. K. (2007). Principles of effective web-based content for secondary school students: Teacher and developer perceptions. *Journal of Distance Education, 21*(3), 93-114.

Barbour, M. K. (2008). Secondary students' perceptions of web-based learning. *Quarterly Review of Distance Education, 9*(4), 357-371.

Barbour, M., Brown, R., Waters, L. H., Hoey, R., Hunt, J. L., Kennedy, K., & Trimm, T. (2011). *Online and blended learning: A survey of policy and practice from K-12 schools around the world.* Vienna, VA: International Association for K-12 Online Learning.

Bartlett, J. E., Kotrlik, J. W., Higgins, C. C. Organizational research: Determining appropriate sample size in survey research appropriate sample size in survey research. *Information Technology, Learning, and Performance Journal, 19*(1), 43.

Bartlett, J. E., Kotrlik, J. W., Higgins, C. C. Organizational research: Determining appropriate sample size in survey research appropriate sample size in survey research. *Information Technology, Learning, and Performance Journal, 19*(1), 43.

Bartlett, K., Schleif, N., & Bowen, M. (2011). The use of workforce assessment as a component of career and technical education program evaluation. *Career & Technical Education Research, 36*(2), 105-118.

Beckem, J., & Watkins, M. (2012). Bringing life to learning: Immersive experiential learning simulations for online and blended courses. *Journal of Asynchronous Learning Networks,16*(5), 61-70.

Bell, B., & Federman, J. E. (2013). *E-learning works – Exactly how well depends on its unique features and barriers*. Ithaca, NY: Center for Advanced Human Resource Studies, Cornell University.

Bennett, S., & Lockyer, L. (2004). Becoming an online teacher: Adapting to a changed environment for teaching and learning in higher education. *Educational Media International*, *41*(3), 231-244. doi:10.1080/09523980410001680842

Benson, A. D. (2002). Using online learning to meet workforce demand. *Quarterly Review Of Distance Education*, *3*(4), 443-452.

Benson, A. D., Johnson, S. D., Duncan, J. R., Shinkareva, O. N., Taylor, G. D., & Treat, T. (2005). Online and campus-based CTE courses: What's the difference? *Community College Journal, 76*(2), 12-14.

Benson, A. D., Johnson, S. D., Taylor, G. D., Treat, T., Shinkareva, O. N., & Duncan, J. (2004). *Distance learning in postsecondary career and technical education: A comparison of achievement in online vs. on-campus CTE courses*. (Research Report). St. Paul, MN: National Research Center for Career and Technical Education. ERIC Document ED493603.

Benson, J. (1970). The motives of 19th century colliery owners in promoting day schools. *Journal of Educational Administration & History, 3*(1), 15-18.

Berkins, C. L., & Kritsonis, W. A. (2007). Curriculum leadership: New trends and career and technical education. *The Lamar University Electronic Journal of Student Research.* Retrieved from http://files.eric.ed.gov/fulltext/ED498616.pdf

Berry, R. Q., III, Reed, P. A., Ritz, J. M., Lin, C.Y., Hsiung, S., & Frazier, W. (2004). STEM initiatives: Stimulating students to improve science and mathematics achievements. *The Technology Teacher, 64*(4), 23-29.

Bill & Melinda Gates Foundation. (2012a). *Asking students about teaching: Student perception surveys and their implementation.* (MET Project Policy and Practice Brief). Retrieved from http://www.metproject.org/downloads/Asking_Students_ Practitioner_Brief.pdf

Bill & Melinda Gates Foundation. (2012b). *Gathering feedback for teaching: Combining high-quality observations with student surveys and achievement gains.* Seattle, WA: Bill & Melinda Gates Foundation.

Blackinton, M. (2013). Teaching a "hands-on" profession in an online classroom. *PT in Motion, 5*(10), 16-23.

Boling, E. C., Hough, M., Krinsky, H., Saleem, H., & Stevens, M. (2012). Cutting the distance in distance education: Perspectives on what promotes positive, online learning experiences. *Internet & Higher Education, 15*(2), 118-126. doi:10.1016/ j.iheduc.2011.11.006

Borg,W. R., & Gall, M. D. (1989) . *Educational research: An introduction* (5th ed.). White Plains, NY: Longman.

Brewer, R. L. (2004). CTE in high schools: The formula for success. *Tech Directions, 64*(5), 15-18.

Brown, E. A. (2010). Group: Online learning integral to CTE programs. *Education Daily, 43*(192), 1-4.

Brustein, M. (2006). *Perkins Act of 2006: The authoritative guide to federal legislation for career and technical education*. Alexandria, VA: Association for Career and Technical Education (ACTE).

Bulmer, M. G. (1979). *Principles of statistics*. Mineola, NY: Dover Publications, Inc.

Bunch, J. M. (2009). A constructivist approach to teaching web development in post-secondary vocational settings. *Journal of Information Technology Education, 8*, 257-271.

Burke, S. (2011). Alignmjent with the common core standards: A 21st Century how-to model for successful CTE programs. *Techniques: Connecting Education and Careers, 86*(7), 30-34.

Caglar, C. (2013). The relationship between the perceptions of the fairness of the learning environment and the level of alienation. *Eurasian Journal of Educational Research 50*, 185-206.

Callaway, S. K. (2012). Implications of online learning: Measuring student satisfaction and learning for online and traditional students. *Insights to a Changing World Journal, 2,* 67-94.

Campbell-Kelly, M., & Garcia-Swartz, D. D. (2013). The history of the Internet: The missing narratives. *Journal of Information Technology (Palgrave Macmillan), 28*(1), 18-33. doi:10.1057/jit.2013.4

Caruth, G. D., & Caruth, D. L. (2013). Distance education in the United States: From correspondence courses to the Internet. *Turkish Online Journal of Distance Education, 14*(2), 141-149.

Casey, D. M. (2008). A journey to legitimacy: The historical development of distance education through technology. *TechTrends, 52*(2), 45-51.

Castellano, M., Stringfield, S., & Stone, J. R., III. (2002). *Career and technical education reforms and comprehensive school reforms in high schools: Their impact on education outcomes for at-risk youth.* St. Paul, MN: National Dissemination Center for Career & Technical Education. ERIC Document ED461720.

Chatti, M., Jarke, M., & Frosch-Wilke, D. (2007). The future of e-learning: A shift to knowledge networking and social software. *International Journal of Knowledge and Learning, 3*(4), 404-420.

Comas-Quinn, A. (2011). Learning to teach online or learning to become an online teacher: An exploration of teachers' experiences in a blended learning course. *ReCALL, 23*(3), 218-232.

Cooper, P. A. (1993). Paradigm shifts in designed instruction: From behaviorism to cognitivism to constructivism. *Educational Technology, 33*(5), 12-19.

Cox, S. M. (1999). An assessment of an alternative education program for at-risk delinquent youth. *The Journal of Research in Crime and Delinquency, 36*(3), 323-336.

Croxton, R. (2014). The role of interactivity in student satisfaction and persistence in online learning. *Journal of Online Learning & Teaching, 10*(2), 314-324.

Cunningham, D., & Duffy, T. (1996). Constructivism: Implications for the design and delivery of instruction. In Jonassen, D. H. (Ed.), *Handbook of Research for Educational Communications and Technology* (170-198). New York, NY: Simon and Schuster.

Dabbagh, N., & Bannan-Ritland, B. (2005). *Online learning: Concepts, strategies, and application.* Upper Saddle River, NJ: Pearson Merrill Prentice Hall.

Daniels, B. M. (2009). *Motivation, academic success, and learning environments: Comparing high school face-to-face and online courses.* (Doctoral dissertation). Retrieved from http://proquest.umi.com/pqdweb?did= 1674096401&Fmt =7&clientId=3505&RQT=309&VName=PQD

De Houwer, J., Barnes-Holmes, D., & Moors, A. (2013). What is learning? On the nature and merits of a functional definition of learning. *Psychonomic Bulletin & Review, 20*(4) 631-642. doi:10.3758/s13423-013-0386-3

Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education.* NY: Macmillan.

DiRienzo, C., & Lilly, G. (2014). Online versus face-to-face: Does delivery method matter for undergraduate business school learning? *Business Education & Accreditation, 6*(1), 1-11.

Dobbins, T. R. (1999). *Clinical experiences for agricultural teacher education programs in North Carolina, South Carolina, and Virginia.* Unpublished doctoral dissertation, Virginia Polytechnic Institute and State University, Virginia.

Doolittle, P. E., & Camp, W. G. (1999). Constructivism: The career and technical education perspective. *Journal of Vocational and Technical Education, 16*(1), 23-46.

Donna, J. D. & Miller, B.G. (2013). Using cloud-computing applications to support collaborative scientific inquiry: Examining pre-service teachers' perceived barriers to integration. *Canadian Journal of Learning & Technology, 39*(3), 1-17.

Dorman, J. P. (2001). Associations between classroom environment and academic efficacy. *Learning Environments Research, 4*(3), 243-257.

Duffey, D. R., & Fox, C. (2012). *National educational technology trends: 2012. State leadership empowers educators, transforms teaching and learning.* Washington, DC: State Educational Technology Directors Association. ERIC Document ED536746.

Dunleavy, J., & Milton, P. (2008). Student engagement for effective teaching and deep learning. *Education Canada, 48*(5), 4-8.

Edmondson, D. R., Edwards, Y. D., & Boyer, S. L. (2012). Likert scales: A marketing perspective. *International Journal of Business, Marketing, & Decision Science, 5*(2), 73-85.

Edwards, E. A. (2013). *Every child, every day: A digital conversion model for student achievement.* Upper Saddle River, NJ: Pearson.

Entwistle, N., McCune, V., & Hounsell, J. (2002). *Approaches to studying and perceptions of university teaching-learning environments: Concepts, measures and preliminary findings* (Occasional Report 1). Edinburgh, Scotland: Enhancing Teaching-Learning Environments in Undergraduate Courses.

Epstein, D., Nisbet, E. C., & Gillespie, T. (2011). Who's responsible for the digital divide? Public perceptions and policy implications. *Information Society, 27*(2), 92-104. doi:10.1080/01972243.2011.548695

Fletcher, E. C. Jr. (2006). No curriculum left behind: The effects of the No Child Left Behind legislation on career and technical education. *Career & Technical Education Research, 31*(3), 157-174.

Floyd, D. L. (2003). Distance learning in community colleges: Leadership challenges for change and development. *Community College Journal of Research and Practice, 27*(4), 337-347.

Fraser, B. J. (1998). The birth of a new journal: Editor's introduction. *Learning Environments Research, 1*(1), 1.

Fraser, B. J., & Fisher, D. L. (1982). Predicting students' outcomes from their perceptions of classroom psychosocial environment. *American Educational Research Journal, 19*(4), 498-518.

Fraser, B. J., & Giddings, G.J. (1992). *Assessing the climate of science laboratory classes.* Perth, Australia: Curtin University of Technology: National Key Centre for Science and Mathematics.

Friedel, J. N. (2011). Where has vocational education gone? *American Educational History Journal, 38*(1), 37-53.

Gagne, R. M., Briggs, L. J., & Wagner, W. W. (1992). *Principles of instructional design.* Orlando, FL: Harcourt Brace Jovanovich.

Garrett Dikkers, A., Whiteside, A., & Lewis, S. (2013). Virtual high school teacher and student reactions to the social presence model. *Journal of Interactive Online Learning, 12*(3), 156-170.

Garrison, D. & Shale, D. (1987). Mapping the boundaries of distance education: Problems in defining the field. *The American Journal of Distance Education 1*(1), 4-13.

Garrison, J. W., Neubert, S., & Reich, K. (2012). *John Dewey's philosophy of education: An introduction and recontextualization for our times.* NY: Palgrave Macmillan.

Gazi, Z. A. (2011). A step for evaluating constructivist approach integrated online courses. *Turkish Online Journal of Educational Technology 10*(3), 13-20.

Gentry, J. W. (1990). What is experiential learning. *Guide to Business Gaming and Experiential Learning*, 9-20. East Brunswick, NJ: Nichols/GP Publishing.

Gentry, M., & Owen, S. V. (2004). Secondary student perceptions of classroom quality: Instrumentation and differences between advanced/honors and nonhonors classes. *Journal of Secondary Gifted Education, 16*(1), 20-29.

Gentry, M., & Springer, P. M. (2002). Secondary student perceptions of their class activities regarding meaningfulness, challenge, choice, and appeal: An initial validation study. *Journal of Secondary Gifted Education, 13*(4), 192.

Githens, R., Sauer, T. M., Crawford, F. L., & Wilson, K. B. (2012). Online occupational education in community colleges: Prevalence, programming, and connection with workforce development needs. *Career & Technical Education Research, 37*(1), 35-56. doi:10.5328/cter37.1.35

Gordon, H. R. D. (2014). *History and growth of career and technical education in America* (4th ed.). Long Grove, IL: Waveland Press Inc.

Greene, B. A., Miller, R. B., Crowson, H., Duke, B. L., & Akey, K. L. (2004). Predicting high school students' cognitive engagement and achievement: Contributions of classroom perceptions and motivation. *Contemporary Educational Psychology, 29*(4), 462-482.

Greener, I., & Perriton, L. (2005). The political economy of networked learning communities in higher education. *Studies in Higher Education, 30*(1), 67-79. doi:10.1080/0307507052000307803

Greenwood, J. D. (1999). Understanding the "cognitive revolution" in psychology. *Journal of the History of the Behavioral Sciences, 35*(1), 1-22.

Grier-Reed, T. L., Skaar, N. R., & Parson, L. B. (2009). A study of constructivist career development, empowerment, indecision, and certainty. *Career and Technical Education Research, 34*(1), 3-20.

Hager, P. (2008). Vocational education. In N.Salkind (Ed.), *Encyclopedia of educational psychology* (pp. 1004-1010). Thousand Oaks, CA: SAGE Publications, Inc. doi:http://dx.doi.org /10.4135/9781412963848.n278

Hamat, A., & Embi, M. A. (2010). Constructivism in the design of online learning tools. *European Journal of Educational Studies, 2*(3), 237-246.

Hampel, R. L. (2010). The business of education: Home study at Columbia University and the University of Wisconsin in the 1920s and 1930s. *Teachers College Record, 112*(9), 2496-2571.

Harasim, L. (2000). Shift happens: Online education as a new paradigm in learning. *Internet and Higher Education, 3,* 41-61.

Harasim, L. (2012). *Learning theory and online technologies*. New York, NY: Routledge.

Hart, C. (2012). Factors associated with student persistence in an online program of study: A review of the literature. *Journal of Interactive Online Learning, 11*(1), 19-42.

Hawkins, A., Graham, C. R., & Barbour, M. K. (2012). Everybody is their own island: Teacher disconnection in a virtual school. *International Review of Research in Open and Distance Learning, 13*(2), 123-144.

Heck, R. H. (2004). *Studying educational and social policy*. Mahwah, NJ: Lawrence Erlbaum Associates.

Herrington, J., Reeves, T. C., & Oliver, R. (2014). *Authentic learning environments* (pp. 401-412). Springer, New York: Information Science Publishing.

Hickman, L. A., Neubert, S., & Reich, K. (2009). *John Dewey between pragmatism and constructivism*: Bronx, NY: Fordham University Press.

Holmberg, B. (1986). *Growth and structure of distance education*. London: Croom Helm.

Holmberg, B. (Ed.). (2005). *The evolution, principles and practices of distant education*. Oldenburg, Germany: Carl von Ossietzky Universitat Oldenburg, Center for Lifelong Learning (C3L).

Horne, M. (2010). A new role for CTE. *Techniques: Connecting Education and Careers, 85*(4), 10-11.

Howe, D. W. (2011). Classical education in America. *The Wilson Quarterly, 35*(2), 31-36.

Hyslop-Margison, E. J. (1999). An assessment of the historical arguments in vocational education reform. *Journal of Career and Technical Education, 17*(1), 23-30. Retrieved from http://scholar.lib.vt.edu/ejournals/JCTE/v17n1/hyslop.html.

International Association for K-12 Online Learning [iNACOL]. (2011). *National standards for quality online courses*: *Version 2.* Vienna, VA: International Association for K-12 Online Learning. ERIC Document ED537339.

Johnson, Z. S., Cascio, R., & Massiah, C. A. (2014). Explaining student interaction and satisfaction: An empirical investigation of delivery mode influence. *Marketing Education Review, 24*(3), 227-238. doi:10.2753/MER1052-8008240304

Johnston, S. (2007). Developing quality virtual courses: Selecting instructional models. In C. Cavanaugh & R. Blomeyer (Eds.), *What works in K-12 online learning* (pp. 21-31). Eugene, OR: International Society for Technology in Education.

Keeler, C., Richter, J., Anderson-Inman, L., Horney, M., & Ditson, M. (2007). Exceptional learners: Differentiated instruction online. In C. Cavanaugh & R. Blomeyer (Eds.), *What works in K-12 online learning* (pp. 125-141). Eugene, OR: International Society for Technology in Education.

Kerka, S. (1997). *Constructivism, workplace learning, and vocational education.* (ERIC Report No. EDO-CE-97-181). Washington, DC: Office of Educational Research and Improvement (ED).

Kirby, D., Sharpe, D., Bourgeois, M., & Greene, M. (2010). Graduates of the new learning environment: A follow-up study of high school distance e-learners. *Quarterly Review of Distance Education, 11*(3), 161-173.

Klem, A. M., & Connell, J. P. (2004). Relationships matter: Linking teacher support to student engagement and achievement. *Journal of School Health, 74*, 262-273.

Knoll, M. (2009). From Kidd to Dewey: The origin and meaning of 'social efficiency'. *Journal of Curriculum Studies, 41*(3), 361-391. doi:10.1080/00220270801927362

Kosloski, M. F., Jr. (2010). *Relationship between membership in DECA, an Association of Marketing Students, and grade point average as an indicator of academic success.* (Unpublished doctoral dissertation). Old Dominion University, Norfolk, VA.

Kotamraju, P. (2007). Researching CTE student success: A new conceptual framework. *Techniques: Connecting Education & Careers, 82*(4), 49.

Kozlowski, S. J., & Bell, B. S. (2007). A theory-based approach for designing distributed learning systems. In S. M. Fiore, E. Salas (Eds.). *Toward a science of distributed learning* (pp. 15-39). Washington, DC: American Psychological Association. doi:10.1037/11582-002

Kronholz, J. (2011). Getting at-risk teens to graduation: Blended learning offers a second chance. *Education Next, 11*(4), 24-31.

Kuchinke, K. P. (2013). Education for work: A review essay of historical, cross-cultural, and disciplinary perspectives on vocational education. *Educational Theory, 63*(2), 203-220. doi:10.1111/edth.12018

Kuruvilla, A., Norton, S., Chalasani, S., & Gee, M. (2012). Best practices in initiating online programs at public institutions. *Business Education Innovation Journal, 4*(2), 121-127.

Lachman, S. J. (1997). Learning is a process: Toward an improved definition of learning. *Journal of Psychology, 131*(5), 477.

Langenhorst, D. G. (2011). *Effectiveness of online instruction: Differences in measured student outcomes online versus face-to-face instruction at the high school level.* Doctoral dissertation. Retrieved from ProQuest LLC. (ED538099)

learning. 2014. In *Merriam-Webster's Dictionary and Thesaurus Online*. Martinsburg, WV: Merriam-Webster, Inc. Retrieved from http://www.merriam-webster.com/dictionary/learning

Leary, W. (2012). Building tomorrow's workforce. *Diverse: Issues in Higher Education, 29*(23), 28-30.

Lemley, J. B., Schumacher, G., & Vesey, W. (2014). What learning environments best address 21st-century students' perceived needs at the secondary level of instruction? *NASSP Bulletin, 98*(2), 101-125. doi:10.1177/0192636514528748

Leping, L. (2011). Factors influencing students' preference to online learning: Development of an initial propensity model. *International Journal of Technology in Teaching & Learning, 7*(2), 93-108.

Lessick, S., Rumsey, E., Pearson, D. S., Roksandic, S, Gillum, S., Garcia-Milian, R., & Samsundar, D. R. (2013). Moving beyond the bookshelves. *Journal of the Medical Library Association, 101*(4), 239-243. doi:10.3163/1536-5050.101.4.002

Lewis, J. (2011). *The computer ate my classroom: Assessing student interactions, perceived learning, and satisfaction in online community college career technical education courses*. (Doctoral dissertation). Retrieved from ProQuest LLC. (ED529212)

Liang, R., & Chen, D. V. (2012). Online learning: Trends, potential and challenges. *Creative Education, 3*(8), 1332-1335. doi:10.4236/ce.2012.38195

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology, 22*(140), 1–55.

Liu, F., & Cavanaugh, C. (2011). High enrollment course success factors in virtual school: Factors influencing student academic achievement. *International Journal on E-Learning, 10*(4), 393-418.

Lowes, S. (2007). Professional development for online teachers. In C. Cavanaugh & R. Blomeyer (Eds.), *What works in K-12 online learning* (pp. 161-178). Eugene, OR: International Society for Technology in Education.

Lucking, R. A., Christmann, E. P., & Wighting, M. J. (2009). Podcasts and blogs. *Science Scope, 33*(3), 64-67.

Lynch, M. M. (2004). *Learning online: A guide to success in the virtual classroom.* New York, NY: RoutledgeFalmer.

MacKeracher, D. (2004). *Making sense of adult learning.* Toronto, Canada: University of Toronto Press.

Mackey, T. M., Derr, D. R., & O'Connor, E. (2009). Cost-effective strategies for developing formative assessments in online workplace training. *International Journal of Advanced Corporate Learning, 2*(4), 44-49. doi:10.3991/ijac.v2i4.992

Manley, A. R. (2011). The decentralization of Perkins: History, impact, and recommendations for future CTE legislation. *Career & Technical Education Research, 36*(2), 1190-152. doi:10.5328/cter36.2.119

McAllister, C., & Watkins, P. (2012). Increasing academic integrity in online classes by fostering the development of self-regulated learning skills. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, *85*(3), 96-101.

McComb, M. (1993). Augmenting a Group Discussion Course with computer mediated communication in a small college setting. *Interpersonal Computing and Technology: An Electronic Journal for the 21st Century, 1*(3).

Means, B., Toyama, Y., Murphy, R., & Baki, M. (2013). The effectiveness of online and blended learning: A meta-analysis of the empirical literature. *Teachers College Record, 115*(3) 1-47.

Menchaca, M., & Bekele, T. (2008). Learner and instructor identified success factors in distance education. *Distance Education, 29,* 231-252. doi:10.1080/01587910802395771

Metz, K. (2010). Benefits of online courses in career and technical education. *Techniques: Connecting Education and Careers, 85*(6), 20-23.

Metz, K. (2011). *Predictors of secondary students' achievement and satisfaction in online courses.* (Doctoral dissertation). Retrieved from ProQuest LLC. (ED534061)

Moore, J. (2011). Behaviorism. *Psychological Record, 61*(3), 449-465.

Moos, R. H. (1979). *Evaluating educational environments.* San Francisco, CA: Jossey-Bass Publishers.

Moos, R. H. (1987). *The social climate scales: A user's guide.* Palo Alto, CA: Consulting Psychologists Press.

Muilenburg, L. Y., & Berge, Z. L. (2005). Student barriers to online learning: A factor analytic study. *Distance Education, 26*(1), 29-48. doi:10.1080/01587910500081269

Nasir, N. S., Jones, A. & McLaughlin, M. W. (2011). School connectedness for students in low-income urban high schools. *Teachers College Record, 113*(8), 1755-1793.

National Association of State Directors of Career and Technical Education Consortium. (2014). *The 16 Career Clusters®.* Retrieved from http://www.careertech.org/career-clusters/glance/careerclusters.html

National Association of State Universities and Land-Grant Colleges. (2008). *The land-grant tradition.* Washington DC: National Association of State Universities and Land-Grant Colleges. Retrieved from http://www.aplu.org/document.doc?id=780

Nemanich, L., Banks, M., & Vera, D. (2009). Enhancing knowledge transfer in classroom versus online settings: The interplay among instructor, student, content, and context. *Decision Sciences Journal of Innovative Education, 7*(1), 123-148. doi:10.1111/j.1540-4609.2008.00208.x

Nesler, M. S., Hanner, M. B., Melburg, V., & McGowan, S. (2001). Professional socialization of baccalaureate nursing students: can students in distance nursing programs become socialized? *The Journal of nursing education, 40*(7), 293-302.

O'Dwyer, L., Carey, R., & Kleiman, G. (2007). A study of the effectiveness of the Louisiana Algebra I online course. *Journal of Research on Technology in Education 39*(3), 289-306.

Oravec, J. (2002). Bookmarking the world: Weblog applications in education. *Journal of Adolescent and Adult Literacy, 45*(7), 616-621.

Ornstein, A. C., & Hunkins, F. P. (2012). *Curriculum—Foundations, principles, and issues* (6th ed.). Boston, MA: Allyn and Bacon.

Paily, M. U. (2013). Creating constructivist learning environment: Role of "web 2.0" technology. *International Forum of Teaching & Studies, 9*(1), 39-50.

Palloff, R. M., & Pratt, K. (1999). Building *learning communities in cyberspace: Effective strategies for the online classroom.* San Francisco, CA: Jossey-Bass Publishers.

Pange, A. & Pange, J. (2011). Is e-learning based on learning theories? A literature review. *World Academy of Science, Engineering and Technology, 56,* 62-66.

Partnership for 21st Century. (2010). *Up to the challenge: The role of career and technical education and 21st Century skills in college and career readiness:*. Washington, DC: Pearson Foundation.

Patrick, S., & Powell, A. (2009). *A summary of research on the effectiveness of K-12 online learning*. Vienna, VA: International Association for K-12 Online Learning. ERIC Document ED509626.

Pautler, A. J. (1999). *Workforce education: Issues for the new century.* Ann Arbor, MI : Prakken Publications.

Pearson, J. C., Carmon, A., Tobola, C., & Fowler, M. (2009). Motives for communication: Why the millennial generation uses electronic devices. *Journal of the Communication, Speech & Theatre Association of North Dakota, 22,* 45-55.

Pituch, K., & Lee, Y. (2006). The influence of system characteristics on e-learning use. *Computers & Education, 47*(2), 222-244.

Plank, S. B. (2001). A question of balance: CTE academic courses, high school persistence, and student achievement. *Journal of Vocational Education Research, 26*(3), 279-327.

Potkonjak, V., Jovanovic, K., Holland, O., & Uhomoibhi, J. (2013). Distance learning and skill acquisition in engineering sciences: Present state and prospects. *Multicultural Education & Technology Journal, 7*(1), 64-88.

Pritchard, A. (2009). *Ways of learning: Learning theories and learning styles in the classroom*. NY: Routledge.

Project Tomorrow. (2012). *Mapping a personalized learning journey: K-12 students and parents connect the dots with digital learning.* Irvine, CA: Project Tomorrow.

Retrieve from: http://www.tomorrow.org/speakup/pdfs/SU11_PersonalizedLearning_Students.pdf

Ragnedda, M, & Muschert, G. W. (2013). *The digital divide: The Internet and social inequiality in international perspective.* New York, NY: Routledge.

Reese, S. (2008). Career Clusters implementation in the states. *Techniques: Connecting Education and Careers, 83*(6), 16-21.

Reeves, T. (2003). Storm clouds on the digital education horizon. *Journal of Computing in Higher Education, 15*(1), 3-26.

Renuga, M., & Ezhilan, S. (2014). Soft skills: A professional development curriculum to enhance the employability of engineering students. *Language in India, 14*(4), 82-130.

Renzulli, J. S. (1994). *Schools for talent development: A comprehensive plan for total school improvement.* Mansfield Center, CT: Creative Learning Press.

Rodgers, C. R. (2006). Attending to student voice: The impact of descriptive feedback on learning and teaching. *Curriculum Inquiry, 36*(2), 209-237.

Rojewski, J. W. (2002). Preparing the workforce of tomorrow: A conceptual framework for career and technical education. *Journal of Vocational Education Research, 27*(1), 7-34.

Rossing, J. P., Miller, W. M., Cecil, A. K., & Stamper, S. E. (2012). iLearning: The future of higher education? Student perceptions on learning with mobile tablets. *Journal of the Scholarship of Teaching and Learning, 12*(2), 1-26.

Rovai, A. P. (2002a). Development of an instrument to measure classroom community. *The Internet and Higher Education, 5*(3), 197-211. doi:10.1016/s1096-7516(02)00102-1

Rovai, A. P. (2002b). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *The Internet and Higher Education, 5*(4), 319-332. doi:10.1016/s1096-7516(02)00130-6

Rovai, A. P. (2003). In search of higher persistence rates in distance education online programs. *The Internet and Higher Education, 6*(1), 1-16. doi:10.1016/s1096-7516(02)00158-6

Rovai, A. P. (2004). A constructivist approach to online college learning. *Internet and Higher Education, 7*(2), 79-93.

Ruth, L. (2006). Converting my course converted me: How reinventing an on-campus course for an online environment reinvigorated my teaching. *Teaching Theology & Religion, 9*(4), 236-242.

Sahin, Ismail. (2007). Predicting student satisfaction in distance education and learning environments. Online submission: ERIC database.

Sansone, C., Fraughton, T., Zachary, J., Butner, J., & Heiner, C. (2011). Self-regulation of motivation when learning online: The importance of who, why and how. *Educational Technology Research & Development, 59*(2), 199-212. doi:10.1007/s11423-011-9193-6

Savery, J. R. (2006). Overview of problem-based learning: Definitions and distinctions. *Interdisciplinary Journal of Problem-based Learning, 1*(1), 3.

Schunk, D. H., & Pajares, F. (2004). Self-efficacy in education revisited. In D. McInerney & S. Van Etten (Eds.), *Big theories revisited* (pp. 115-138). Charlotte, NC: Information Age Publishing, Inc.

Scott, J. L., & Sarkees-Wircenski, M. (2004). *Overview of career and technical education.* Homewood, IL: American Technical Publishing.

Scott, S. (2011). Contemplating a constructivist stance for active learning within music education. *Arts Education Policy Review, 112*(4), 191-198. doi:10.1080/10632913.2011.592469

Seiver, J., & Troja, A. (2014). Satisfaction and success in online learning as a function of the needs for affiliation, autonomy, and mastery. *Distance Education, 35*(1), 90-105. doi:10.1080/01587919.2014.891427

Sheehy, K. (2012, October 24). States, districts require online ed for high school graduation. *U.S. News and World Report*. Retrieved from http://www.usnews.com/education/blogs/high-school-notes/2012/10/24/states-districts-require-online-ed-for-high-school-graduation

Smith, N. B. (1999). A tribute to the visionaries, prime movers and pioneers of vocational education 1892 to 1917. *Journal of Vocational and Technical Education, 16*(1), 67-76.

Smith, P. (2013). Psychosocial learning environments and the mediating effect of personal meaning upon satisfaction with education. *Learning Environments Research, 16*(2), 259-280. doi:10.1007/s10984-013-9135-9

Stefl-Mabry, J., Radlick, M., & Doane, W. (2010). Can you hear me now? Student voice: High school & middle school students' perceptions of teachers, ICT and learning.

International Journal of Education & Development Using Information & Communication Technology, *6*(4), 64-82.

Strayer, J. (2012). How learning in an inverted classroom influences cooperation, innovation and task orientation. *Learning Environments Research, 15*(2), 171-193. doi:10.1007/s10984-012-9108-4

Stone, M. R. (2007). E-learning applications for career and technical education. *Techniques: Connecting Education & Careers, 82*(5), 44.

Streiffert, K. (2010). Online high school courses. *Foreign Service Journal, 87*(12), 73-94.

Sumner, J. (2000). Serving the system: A critical history of distance education. *Open Learning, 15*(3), 267-285. doi:10.1080/026805100750036881

Swan, K. (2002). Building learning communities in online courses: The importance of interaction. *Education, Communication & Information, 2*(1), 23-49. doi:10.1080/1463631022000005016

Swan, K. (2003). Learning effectiveness online: What the research tells us. *Elements of quality online education, practice and direction, 4*, 13-45.

Symonds, W. C., Schwartz, R. B., & Ferguson, R. (2011). *Pathways to prosperity: Meeting the challenge of preparing young Americans for the 21st century.* Report issued by the Pathways to Prosperity Project. Cambridge, MA: Harvard Graduate School of Education. Retrieved from http://dash.harvard.edu/bitstream/handle/1/4740480/Pathways_to_Prosperity_Feb2011-1.pdf?sequence=1

Threeton, M. D. (2007). The Carl D. Perkins Career and Technical Education (CTE) Act of 2006 and the roles and responsibilities of CTE teachers and faculty members. *Journal of Industrial Teacher Education, 44*(1), 66-82.

Tunks, K. W. (2012). An introduction and guide to enhancing online instruction with web 2.0 tools. *Journal of Educators Online, 9*(2), 1-16.

U.S. Department of Education. (2007). *Carl D. Perkins Career and Technical Education Act of 2006*. Retrieved from: http://www2.ed.gov/policy/sectech/leg/perkins/index.html

U.S. Department of Education. (2013). *Educating every student for college and career success: Remarks of U.S. Secretary of Education Arne Duncan at the Association for Career and Technical Education (ACTE) CareerTech VISION 2013 awards banquet* [Speech Transcript]. Retrieved from https://www.ed.gov/news/speeches/educating-every-student-college-and-career-success

Uebersax, J. S. (2006). Likert scales: Dispelling the confusion. Retrieved from http://john-uebersax.com/stat/likert.htm

Van Meer, E. (2003). PLATO: From computer-based education to corporate social responsibility. *Iterations: An Interdisciplinary Journal of Software History*, 5, 1-22. Retrieved from http://www.cbi.umn.edu/iterations/vanmeer.pdf

Walker, S., & Fraser, B. (2005). Development and validation of an instrument for assessing distance education learning environments in higher education: The Distance Education Learning Environments Survey (DELES). *Learning Environments Research, 8*(3), 289-308. doi:10.1007/s10984-005-1568-3

Wang, A. Y., & Newlin, M. H. (2000). Characteristics of students who enroll and succeed in psychology web-based classes. *Journal of Educational Psychology*, *92*(1), 137-43.

Wang, C., Shannon, D. M., & Ross, M. E. (2013). Students' characteristics, self-regulated learning, technology self-efficacy, and course outcomes in online learning. *Distance Education, 34*(3), 302-323. doi:10.1080/01587919.2013.835779

Wang, V. C. X. (2010). *Definitive readings in the history, philosophy, theories and practice of career and technical education*: Hershey, PA: Information Science Reference.

Washbon, J. (2012). Learning and the new workplace: Impacts of technology change on postsecondary career and technical education. *New Directions for Community Colleges, 2012*(157), 43-52.

Washington State Superintendent of Public Instruction. (January 8, 2014). *Digital Learning Department*. Retrieved from http://digitallearning.k12.wa.us

Washington State Superintendent of Public Instruction. (May 10, 2013). *Digital Learning Department*. Retrieved from http://digitallearning.k12.wa.us

Watson, J. F., Winograd, K., & Kalmon, S. (2004). Education evolution: The need to keep pace with development of K-12 online learning. *Learning Point Associates*. Retrieved from http://www.projectsocrates.org/elearning/downloads/pivol17.pdf

Watson, J., Murin, A., Vashaw, L., Gemin, B., & Rapp, C. (2010). *Keeping pace with K-12 online learning 2010: An annual review of policy and practice.* Evergreen, CO: Evergreen Education Group.

Watson, J., Murin, A., Vashaw, L., Gemin, B., & Rapp, C. (2011). *Keeping pace with K-12 online and blended learning: An annual review of policy and practice.* Mountain View, CA: Evergreen Education Group.

Watson, J., Murin, A., Vashaw, L., Gemin, B., & Rapp, C. (2012). *Keeping pace with K-12 online and blended learning: An annual review of policy and practice.* Mountain View, CA: Evergreen Education Group.

Webb, H. W., Gill, G., & Poe, G. (2005). Teaching with the case method online: Pure versus hybrid approaches. *Decision Sciences Journal of Innovative Education, 3*(2), 223-250. doi:10.1111/j.1540-4609.2005.00068.x

Werth, E., Werth, L., & Kellerer, E. (2013). *Transforming K-12 rural education through blended learning: Barriers and promising practices.* Vienna, VA: International Association for K-12 Online Learning [iNACOL].

Wicks, M. (2010). *A national primer on K-12 online learning* (2nd ver.). Vienna, VA: International Association for K-12 Online Learning

Wiesenberg, F., & Hutton, S. (1996). Teaching a graduate program using computer-mediated conferencing software: Distance education futures. *Journal of Distance Education, 11*(1), 83-100.

Wiid, J., Cant, M. C., & Nell, C. (2013). Open distance learning students' perception of the use of social media networking systems as an educational tool. *International Business & Economics Research Journal, 12*(8), 867-882.

Willms, J. D., Friesen, S., & Milton, P.(2009). *What did you do in school today? Transforming classrooms through social, academic, and intellectual engagement* (First national report). Toronto, Canada: Canadian Education Association.

Wirth, A. G. (1975). Historical and social contex of career education. *Journal of Career Education, 2*(2), 5-20.

Wolfe, M. L. (1978). *The Vocational Education Act of 1963, as amended: A background paper*. Washington, DC: Congressional Research Service.

Wonacott, M. E. (2003). *History and evolution of vocational and career-technical education. A compilation*. Columbus, OH: Center on Education and Training for Employment, The Ohio State University.

Yilmaz, K. (2011). The cognitive perspective on learning: Its theoretical underpinnings and implictaions for classroom practices. *The Clearing House, 84*(5), 204-212. doi:10.1080/00098655.2011.568989

Yu-Chun, K., Walker, A. E., Belland, B. R., Schroder, K. E., & Yu-Tung, K. (2014). A case study of integrating interwise: Interaction, Internet self-efficacy, and satisfaction in synchronous online learning environments. *International Review of Research in Open & Distance Learning, 15*(1), 161-181.

Zimmerman, D. W. (1987). Comparative power of student t test and Mann-Whitney U test for unequal sample sizes and variances. *The Journal of Experimental Education, 3*, 171-174.

Zirkle, C. (2004). Distance education programming barriers in career and technical teacher education in Ohio. *Journal of Vocational Education Research, 29*(3), 157-179.

APPENDIX A

ORIGINAL INSTRUMENT

Distance Education Learning Environments Survey (DELES)

Actual Form

This survey contains 34 statements about practices that take place in this class, followed by eight statements regarding your opinion about distance education.

There are no 'right' or 'wrong' answers. Your opinion is what is wanted on each item. Please think about how well each statement describes what this class is like for you.

In this class	Never	Seldom	Sometimes	Often	Always
1. If I have an inquiry, the instructor finds time to respond.	●	●	●	●	●
2. The instructor helps me identify problem areas in my study.	●	●	●	●	●
3. The instructor responds promptly to my questions.	●	●	●	●	●
4. The instructor gives me valuable feedback on my assignments.	●	●	●	●	●
5. The instructor adequately addresses my questions.	●	●	●	●	●
6. The instructor encourages my participation.	●	●	●	●	●
7. It is easy to contact the instructor.	●	●	●	●	●
8. The instructor provides me positive and negative feedback on my work.	●	●	●	●	●

In this class	Never	Seldom	Sometimes	Often	Always
9. I work with others.	●	●	●	●	●
10. I relate my work to other's work.	●	●	●	●	●
11. I share information with other students.	●	●	●	●	●
12. I discuss my ideas with other students.	●	●	●	●	●
13. I collaborate with other students in the class.	●	●	●	●	●
14. Group work is a part of my activities.	●	●	●	●	●

15. I can relate what I learn to my life outside of university.	●	●	●	●	●
16. I am able to pursue topics that interest me.	●	●	●	●	●
17. I can connect my studies to my activities outside of class.	●	●	●	●	●
18. I apply my everyday experiences in class.	●	●	●	●	●
19. I link class work to my life outside of university.	●	●	●	●	●
20. I learn things about the world outside of university.	●	●	●	●	●
21. I apply my out-of-class experience.	●	●	●	●	●

In this class...	Never	Seldom	Sometimes	Often	Always
22. I study real cases related to the class.	●	●	●	●	●
23. I use real facts in class activities.	●	●	●	●	●
24. I work on assignments that deal with real-world information.	●	●	●	●	●
25. I work with real examples.	●	●	●	●	●
26. I enter the real world of the topic of study.	●	●	●	●	●

In this class...	Never	Seldom	Sometimes	Often	Always
27. I explore my own strategies for learning.	●	●	●	●	●
28. I seek my own answers.	●	●	●	●	●
29. I solve my own problems.	●	●	●	●	●

In this class...	Never	Seldom	Sometimes	Often	Always
30. I make decisions about my learning.	●	●	●	●	●
31. I work during times I find convenient.	●	●	●	●	●

32. I am in control of my learning.	●	●	●	●	●
33. I play an important role in my learning.	●	●	●	●	●
34. I approach learning in my own way.	●	●	●	●	●

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
35. Distance education is stimulating.	●	●	●	●	●
36. I prefer distance education.	●	●	●	●	●
37. Distance education is exciting.	●	●	●	●	●
38. Distance education is worth my time.	●	●	●	●	●
39. I enjoy studying by distance.	●	●	●	●	●
40. I look forward to learning by distance.	●	●	●	●	●
41. I would enjoy my education more if all my classes were by distance.	●	●	●	●	●
42. I am satisfied with this class.	●	●	●	●	●

APPENDIX B

SURVEY PERMISSION LETTER

Scott L. Walker, ScEdD
397 S. Willow Ave.
New Braunfels, TX 78130
USA
walkstx@gmail.com

DELES Permission Letter

Diane Carver has been granted permission to use the Distance Education Learning Environments Survey (DELES) for the purpose of the proposed doctoral study:

AN ANALYSIS OF PSYCHOSOCIAL ENVIRONMENTAL FACTORS IN ONLINE AND FACE-TO-FACE CAREER AND TECHNICAL EDUCATION COURSES

through Old Dominion University, with the following usage rights being granted.

- One time U.S. rights for e-mail distribution of the Preferred, Actual, and Instructor forms of the DELES.
- One time U.S. rights for Web posting of the Preferred, Actual, and Instructor forms of the DELES to be removed from the Web no later than August 31, 2014.

The DELES and its versions and derivatives are copyright protected. When the DELES is published or presented in non-commercial use, you must mention Scott L. Walker as the copyright holder of the instrument in this format:

© 2004-2014 Scott L. Walker used with permission

Scott L. Walker
ScEdD

June 12, 2013

APPENDIX C

MODIFIED SURVEYS

Career and Technical Education Learning Environment Survey 2014

As a CTE student, you are part of an exciting revolution in education. As we continue to look for new ways to improve CTE, we need your help! Your opinions will help shape the future of career and technical education!

Information from this survey will be used by research professionals to analyze the quality of CTE courses and compare CTE online and face-to-face. Your responses will be confidential, but together with other students, your answers will be extremely valuable for current and future educational research.

This survey will take approximately 10-15 minutes to complete. Thank you very much for your feedback!

In this class...

***1. If have an inquiry, the instructor finds time to respond.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***2. the instructor helps me identify problem areas in my study.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***3. the instructor responds promptly to my questions.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***4. the instructor gives me valuable feedback on my assignments.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***5. the instructor adequately addresses my questions.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

In this class...

***6. the instructor encourages my participation.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***7. It is easy to contact and communicate with the instructor.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

Page 1

Career and Technical Education Learning Environment Survey 2014

*8. the instructor provides me positive and negative feedback on my work.

Never Seldom Sometimes Often Always

*9. I work with others.

Never Seldom Sometimes Often Always

*10. I relate my work to others' work.

Never Seldom Sometimes Often Always

In this class...

*11. I share information with other students.

Never Seldom Sometimes Often Always

*12. I discuss my ideas with other students.

Never Seldom Sometimes Often Always

*13. I collaborate with other students in the class.

Never Seldom Sometimes Often Always

*14. group work is a part of my activities.

Never Seldom Sometimes Often Always

*15. I can relate what I learn to my life outside of school.

Never Seldom Sometimes Often Always

In this class...

*16. I am able to pursue topics that interest me.

Never Seldom Sometimes Often Always

*17. I can connect my studies to my activities outside of class.

Never Seldom Sometimes Often Always

Career and Technical Education Learning Environment Survey 2014

*18. I apply my everyday experiences in class.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

*19. I link class work to my life outside of school.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

*20. I learn things about the world outside of school.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

In this class...

*21. I apply my out-of-class experience.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

*22. I study real cases related to the class.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

*23. I use real facts in class activities.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

*24. I work on assignments that deal with real-world information.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

*25. I work with real examples.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

In this class...

*26. I enter the real world of the topic of study.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

*27. I explore my own strategies for learning.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

Career and Technical Education Learning Environment Survey 2014

***28. I seek my own answers.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***29. I solve my own problems.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***30. I make decisions about my learning.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

In this class...

***31. I work during times I find convenient.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***32. I am in control of my learning.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***33. I play an important role in my learning**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***34. I approach learning in my own way.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

The following questions refer to your satisfaction with your learning exper...

***35. Career and Technical education is stimulating.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***36. I prefer Career and Technical education.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***37. Career and Technical education is exciting.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

Career and Technical Education Learning Environment Survey 2014

***38. Career and Technical education is worth my time.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***39. I enjoy studying through Career and Technical Education.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

The following questions refer to your satisfaction with your learning exper...

***40. I look forward to learning in Career and Technical Education.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***41. I would enjoy my education more if all my classes were Career and Technical Education.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***42. I am satisfied with this class.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

Please answer the following questions related to you and this class.

43. You are...

☐ Male
☐ Female

***44. What grade do you anticipate receiving in this class?**

☐ A
☐ B
☐ C
☐ D
☐ F
☐ Incomplete
☐ Other (please specify)

Page 5

Career and Technical Education Learning Environment Survey 2014

***45. What grade are you in?**

- ○ Freshman
- ○ Sophomore
- ○ Junior
- ○ Senior
- ○ Fifth year / Other

***46. Why are you taking this class?**

- ☐ Graduation requirement
- ☐ I am interested in this topic
- ☐ I am interested in a career in this field
- ☐ My counselor or teacher recommended it

Other (please specify)

***47. Please enter the name of this class.**

***48. Please enter the class period.**

***49. From which site are you taking this class?**

- ☐ Option 1
- ☐ Option 2

Distance (Online) Education Learning Environment Survey (DELES) 2014

As an online CTE student, you are part of a new generation of learners. Since online learning is fairly new for high schools, we really need your help so we may continue to offer and improve online courses. Your opinions will help shape the future of online education!

Information from this survey will be used by research professionals to analyze the quality of online courses and compare online and face-to-face CTE. Your responses will be confidential, but together with other students, your answers will be extremely valuable for current and future educational research.

This survey will take approximately 10-15 minutes to complete. Thank you very much for your feedback!

In this class...

***1. If have an inquiry, the instructor finds time to respond.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***2. the instructor helps me identify problem areas in my study.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***3. the instructor responds promptly to my questions.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***4. the instructor gives me valuable feedback on my assignments.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***5. the instructor adequately addresses my questions.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

In this class...

***6. the instructor encourages my participation.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***7. It is easy to contact and communicate with the instructor.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

Distance (Online) Education Learning Environment Survey (DELES) 2014

***8. the instructor provides me positive and negative feedback on my work.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***9. I work with others.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***10. I relate my work to others' work.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

In this class...

***11. I share information with other students.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***12. I discuss my ideas with other students.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***13. I collaborate with other students in the class.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***14. group work is a part of my activities.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***15. I can relate what I learn to my life outside of school.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

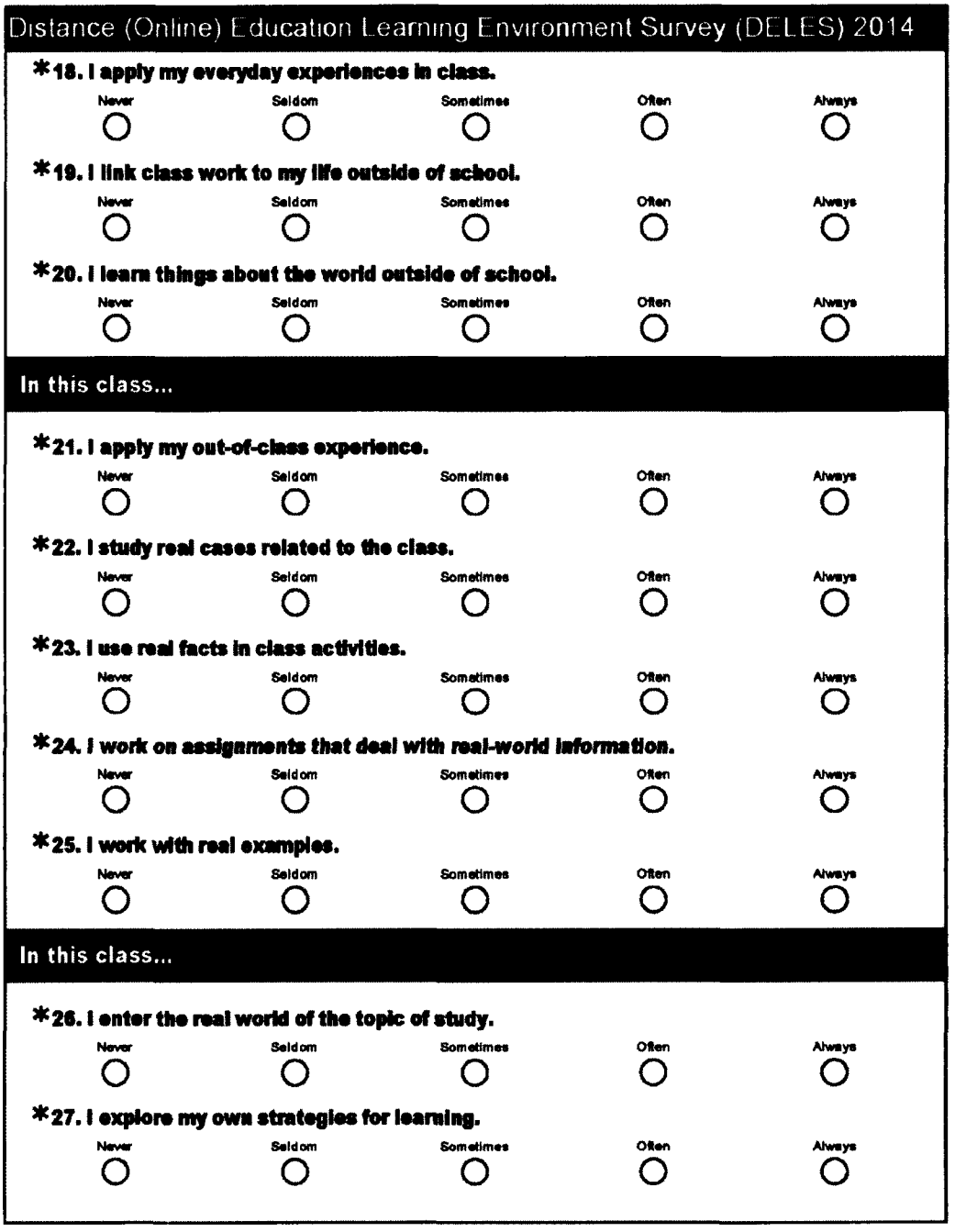
In this class...

***16. I am able to pursue topics that interest me.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○

***17. I can connect my studies to my activities outside of class.**

Never ○ Seldom ○ Sometimes ○ Often ○ Always ○



Distance (Online) Education Learning Environment Survey (DELES) 2014

*18. I apply my everyday experiences in class.

Never | Seldom | Sometimes | Often | Always

*19. I link class work to my life outside of school.

Never | Seldom | Sometimes | Often | Always

*20. I learn things about the world outside of school.

Never | Seldom | Sometimes | Often | Always

In this class...

*21. I apply my out-of-class experience.

Never | Seldom | Sometimes | Often | Always

*22. I study real cases related to the class.

Never | Seldom | Sometimes | Often | Always

*23. I use real facts in class activities.

Never | Seldom | Sometimes | Often | Always

*24. I work on assignments that deal with real-world information.

Never | Seldom | Sometimes | Often | Always

*25. I work with real examples.

Never | Seldom | Sometimes | Often | Always

In this class...

*26. I enter the real world of the topic of study.

Never | Seldom | Sometimes | Often | Always

*27. I explore my own strategies for learning.

Never | Seldom | Sometimes | Often | Always

Page 3

Distance (Online) Education Learning Environment Survey (DELES) 2014

*28. I seek my own answers.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

*29. I solve my own problems.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

*30. I make decisions about my learning.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

In this class...

*31. I work during times I find convenient.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

*32. I am in control of my learning.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

*33. I play an important role in my learning

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

*34. I approach learning in my own way.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

The following questions refer to your satisfaction with your learning exper...

*35. Online education is stimulating.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

*36. I prefer online education.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

*37. Online education is exciting.

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

Distance (Online) Education Learning Environment Survey (DELES) 2014

***38. Online education is worth my time.**

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

***39. I enjoy studying online.**

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

The following questions refer to your satisfaction with your learning exper...

***40. I look forward to learning online.**

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

***41. I would enjoy my education more if all my classes were online.**

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

***42. I am satisfied with this class.**

Never	Seldom	Sometimes	Often	Always
○	○	○	○	○

Please answer the following questions related to you and this class.

43. What is your gender?

- ○ Female
- ○ Male

***44. What grade do you anticipate receiving in this class?**

- ☐ A
- ☐ B
- ☐ C
- ☐ D
- ☐ F
- ☐ Incomplete

Other (please specify)

☐

Page 5

Distance (Online) Education Learning Environment Survey (DELES) 2014

***45. What grade are you in?**

- ○ Freshman
- ○ Sophomore
- ○ Junior
- ○ Senior
- ○ Fifth year / Other

***46. Why are you taking this class?**

- ☐ Graduation requirement
- ☐ I am interested in this topic
- ☐ I am interested in a career in this field
- ☐ My counselor or teacher recommended it
- ☐ Other (please specify)

***47. Please enter the name of this class.**

48. Please enter the class period. (Enter NA if this question is not applicable.)

***49. From which site are you taking this class?**

- ☐ Option 1
- ☐ Option 2

VITA

Diane L. Carver
Occupational and Technical Studies
Old Dominion University, Norfolk, VA

Current Position: Director of Career and College Readiness, Bethel School District, Spanaway, Washington.

Academic Degrees

University of Akron	1993, BS Business Education
City University of Seattle	2001, MBA Technical Communications

Professional Experience

2014-present	Bethel School District, Director of Career and College Readiness. Spanaway, WA
2008-2014	Bethel School District, Assistant Career and Technical Education Director, Spanaway, WA
2005-2008	Office of Superintendent of Public Instruction, Business, Marketing and IT Supervisor, Olympia, WA
2001-2008	Orting High School, Business Teacher, Orting, WA

Publications

Carver, D. (2012). Digitools: Hi-tech for the digital generation. *Techniques: Connecting Education and Careers, 87*(5), 40-41.

Carver, D., Wetterauer, L., & Shanafelt, D. (2012). Pierce County equivalency project. *Techniques: Connecting Education and Careers, 87*(5), 10-13.

Carver, D. (2012). Core academic alignment and business education. *Business Education Forum, 66*(4), 40-43.

Carver, D. (2012). Book Review - Learning theory and online technologies. *International Review of Research in Open & Distance Learning, 13*(4), 324-326.

Presentations

"Close Reading Strategies". MBA Conclave Curriculum and Teaching Conference, Cincinnati, OH, October, 2014.
"Shared Advisory Committees". Washington Association of Career and Technical Education Summer Conference, Yakima, WA, August 2013
"Pierce County Equivalency Project". NCLA Best Practices Conference, Atlanta, GA, October, 2012.
"Microsoft Pilot". WAVA: An Association for Career and Technical Education Administrators Spring Conference, Richland, WA, March 2011.
"Washington State Career and Technical Education Standards". WAVA: An Association for Career and Technical Education Administrators Spring Conference, Richland, WA, March 2011.
"Digitools". Washington Association of Career and Technical Education Summer Conference, Yakima, WA, August 2011.

Honors and Awards

Washington State Business Education Association Scholarship, 2011 and 2012
National Business Education Association Scholarship, 2013
Summa Cum Laude, University of Akron, 1993