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The Computer Ate My Classroom: Assessing Student Interactions, Perceived Learning, and Satisfaction in Online Community College Career Technical Education Courses

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THE COMPUTER ATE MY CLASSROOM: ASSESSING STUDENT
INTERACTIONS, PERCEIVED LEARNING, AND SATISFACTION IN ONLINE
COMMUNITY COLLEGE CAREER TECHNICAL EDUCATION COURSES

by

Jessica Lindsey Miller Lewis

Abstract of a Dissertation
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

May 2011

ABSTRACT

THE COMPUTER ATE MY CLASSROOM: ASSESSING STUDENT INTERACTIONS, PERCEIVED LEARNING, AND SATISFACTION IN ONLINE COMMUNITY COLLEGE CAREER TECHNICAL EDUCATION COURSES

by Jessica Lindsey Miller Lewis

May 2011

Workforce changes, globalization, and increasing use of technology create the need for an increased number of skilled workers. The community college system, through Career Technical Education (CTE), serves as a catalyst for skills training; however institutions must seek innovative ways in which to attract and retain students. Online learning offers flexibility in time and space, the ability to reach a larger student population, and to attract a new generation of digital learners. For these reasons, online learning enables institutions to develop a larger pool of skilled workers through online CTE courses.

Interaction is a key factor in the learning process and draws much attention from those who research online learning. The first hypothesis examines the relationship among student-to-instructor interaction (SII) and student-to-student interaction (SSI) and student satisfaction. The second hypothesis examines the relationship among SII and SSI and perceived learning. Control variables, including gender, age, previous online courses taken, and Internet experience, serve to minimize threats to validity and to isolate the effects of the independent variables.

The research instrument utilized for this study is a survey developed by Sher (2009) and includes survey items from Hiltz (1994), Arbaugh (2000), and Johnson et al.

(2000). The survey measures student satisfaction, perceived learning, student-to-student interaction, and student-to-instructor interaction. The survey was sent to 844 online CTE students with 148 of those surveys completed. Sequential regression analysis was performed to analyze the hypotheses. SII was found to be a significant predictor of student satisfaction. SII and SSI were found to be significant predictors of perceived learning.

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CHAPTER I

INTRODUCTION

The current economic crisis, changes in the labor pool and the technological revolution creates new challenges for workforce development in today's competitive, global market (Dychtwald, Erickson, & Morison, 2006). The United States' competitive advantage relies more on human capital than ever before (Gordon, 2000). The community college system, positioned to aid in the battle of developing and maintaining a world-class workforce serves as a catalyst for human capital development. Tasked with creating a solid foundation for the United States workforce, community colleges enable job seekers to have consistent, high-wage earning jobs throughout their careers (Rephann, 2007). Career-Technical Education (CTE) in the community college serves as a source of workforce training and development, preparing students for work through hands-on, job-specific, vocational training. As online learning becomes more prevalent in postsecondary education and in workforce training, opportunities to incorporate online learning into CTE exist. Limited research on online CTE courses creates a need for a greater understanding of the implications of using educational media with students, institutions, and the workforce.

Background and Conceptual Underpinnings

Workplace changes create a greater need for higher skilled workers. Grubb (1997) suggests that this shift creates a demand for knowledge workers who possess high-level mental skills. As the technological demands of almost all jobs increase, finding labor will not be sufficient for industry success; instead, organizations must seek to find, create, and cultivate skilled labor (Smith, 2003). As the baby boomer generation

reaches retirement age, many organizations will suffer the extensive consequences of “brain drain” derived from the loss of skills and experience (Gordon, 2000, p. 144). The predicted 30 million U.S. educated workers needed in the next ten years greatly exceeds the expected 23 million available (Tapscott, 2009). Gordon reports concern in the U.S. labor shortage stating that technology and globalization have re-written the rules. Based on the U.S. Department of labor in the year 2000, 80% of all jobs require at least 12th grade to first year of college reading, writing, and math comprehension abilities. In turn, the government estimates that more than 90 million current workers fail to meet these standards.

The demands of the workforce have changed over the last 70 years. Previously, employers needed manual laborers and offered numerous opportunities for men and women with minimal education. The onset of technology decreases the need for manual laborers significantly, while creating a greater need for skilled workers. According to Gordon (2000), the United States lacks enough people who have developed the successful critical thinking and technological skills required by a worldwide, high performance workplace. Today employers feel the effects of the skill shortage in their organizations.

Many companies cite a lack of trained employees as a primary barrier to sustaining growth in the competitive global market (Dychtwald, Erickson & Morison, 2006). Employers look for cost-efficient training solutions which offer flexibility for participants and provide a measurable business impact. Research suggests the need for mature, mid-level and new workers to increase flexibility in time and space and indicate a desire to increase skills. Technology can be used to increase flexibility in skills training

with lower costs than traditional methods and serves as a more viable choice as individuals become more technologically skilled (Dychtwald et al., 2006).

According to a study by DiNardo and Pischke (1997), over 50% of the full-time workforce in the United States uses computers regularly in their jobs. By 2001, the number of workers regularly using computers rose to 57% of the 115 million employed workers age 25 years and older with 74% of workers accessing the Internet at work (Benson, 2002). Changes in societal and work environments demand continuous learning in areas such as career development, job security, upward mobility, recareering, and other professional and personal reasons, specifically in regards to technological changes (Eastmond, 1997).

Today's students report familiarity with technology, with 80% owning a computer by the time they are enrolled in college (Dziuban, Shea & Arbaugh, 2005). The majority of students use the Internet, e-mail and other web technologies. Computer savvy and the ability to deal with rapidly changing realities give an intuitive understanding of the importance of continuous learning and adaptation (Ware & Craft, 2006). Taylor (2005) reports entering college students have only known a world with technology and fully expect technology to permeate every aspect of their lives. Competing with comprehensive communication connectivity via cell phones and the Internet, educators face challenges to develop teaching and learning strategies for the present technology rich environment. Educators must capitalize on the strengths of diverse generations of the labor force (Dziuban et al., 2005; Ware & Craft, 2006).

Technology trends remain evident in the education sector, as technology increasingly facilitates flexible, and in some cases, non-traditional instructional methods.

Online learning emerges as a popular new medium for education (Easton, 2003). Online classes deliver course material completely over the Internet. In online classes, instructors post lectures, readings, and assignments to a computer and learners access and download the course material (Tallent-Runnels et al., 2006). The development of new tools, such as podcasts and video conferencing enable increased opportunities for students and faculty to interact and communicate. The Wimba Collaboration Suite serves as one such tool, enabling participants instant messaging, visual chat sessions, podcasting and other capabilities enhancing the learning experience (Pollard, 2006). Community colleges, universities, and industry-based training devote much attention to the development of online courses. Research on online learning effectiveness, development, and assessment continues to increase; however, rigorous theory-grounded research in this area remains sparse; specifically, research focusing on online learning in Career Technical Education (Oliveira & Rumble, 1982; Zirkle, 2003).

In 2002, enrollment in online classes was increasing by 33% per year, with almost 200 institutions offering online graduate degrees in 2002 (Pethodoukis, 2002). The nation's community colleges actively engage in increasing distance education (Benson, 2005). According to a national survey, seventy-three percent of community colleges offer forms of distance learning in career and technical education courses (Johnson & Benson, 2003). Colleges offer online programs for some of the following reasons: aids in reaching non-traditional students (83%), reduces time constraints for students (82%), increases access to new audiences (79.1%), and increases student access by making courses available at convenient locations (74.8%). Additionally, 88.6% of the

community colleges surveyed responded to an expectation of “moderate to large increases in their distance CTE enrollments” (Johnson & Benson, 2003, p. 11).

Despite high use of online learning, criticism exists. Isolation experienced by students consistently occurs as a major critique of online learning. Feelings of isolation may negatively impact a student’s level of motivation (Poellhuber, Chomienne & Karsenti, 2008). The isolation experienced by students correlates to high dropout rates (Dziuban et al., 2005). Distance education drop-out rates reach as high as 68% in online courses. Physical interaction remains a major limitation of distance education (Kirby, 1999). According to Wagner (1994), “an instructional interaction is an event that takes place between a learner and the learner’s environment” (p. 8). Many students of online courses experience a sense of disconnect with classmates and instructors. Student-to-student interaction and student-to-instructor interaction serve as important aspects of online learning (Sher, 2009). Additional criticisms include the intensive commitment of time required by instructors to develop web-based courses and the quality of education relative to classroom-based courses (Arbaugh, 2000a).

In response to criticisms of online learning, Poellhuber et al. (2008) assert the importance of social interaction. Additionally, the researchers report the development of learning communities in online environments and decreased participant feelings’ of isolation. Gordon (2000) reports that online training as a stand-alone system lacks the important social component of learning. Interacting with a machine should not substitute for interacting with engaged instructors and interested peers. While some researchers remain skeptical that web-based instruction can produce robust interactions between participants, others note that computer mediated communication provides new tools and

new opportunities for the potential of increased instructional and social interactivity (Barab & Thomas, 2001). Pollard (2006) cites improved learning experiences resulting from the use of online collaboration tools provided through the Wimba Collaboration Suite (p. 1). Research indicates that high quality interactions can develop in the online environment (Barab & Thomas, 2001; McDonald & Gibson, 1998) and may support learning (Curtis & Lawson, 2001). While little empirical research exists correlating online learning interaction levels with student outcomes, Glenn, Jones and Hoyt (2003) assert that such research could be an invaluable aid in the creation and design of online instruction, especially in light of the communication technologies now available.

Currently, online learning expands to include CTE courses. CTE serves as a source of workforce training and provides students with the opportunity for hands-on, job-specific, vocational training at the community college. Alan Greenspan (2000) lamented the following about technical training:

We need to foster a flexible education system--one that integrates work and training...community colleges, for example, have become important providers of job skills training not just for students who may eventually move on to a 4-year college or university, but for individuals with jobs, particularly older workers seeking to retool or retrain. The increasing availability of courses that can be “taken at a distance” over the Internet means that learning can more easily occur outside the workplace or the classroom. (p. 1)

As the marketplace changes, the demands increase for the community college system to provide up-to-date training that will sustain the United States workforce through the impending skill shortage, technological changes and shifts in the global economy.

Current factors provide incentives for evaluating existing models of delivery and examining new forms of the transfer of knowledge and skills to students. More specifically, a need for increased research in the area of online learning in CTE courses exists.

Statement of the Problem

The present study addresses the lack of research in the area of online community college CTE, specifically for student-to-student and student-to-instructor interactions. The study examines the relationship between interactions to student satisfaction and perceived learning. The driving forces behind the need for postsecondary CTE include current workforce inadequacies, lack of workforce readiness and gaps in skilled labor (Rephann, 2007). The personal thinking skills required for on-the-job applications in the twenty-first century create the need for new approaches to teaching and learning (Gordon, 2000). According to Warwick and Kershner (2007), the use of new technologies in education lack association with an adequate understanding of the pedagogical implications associated with technology implementation. In a study of teachers' professional development, Warwick and Kershner (2007) conclude that the use of technology in the classroom must involve a discussion of learning rather than focusing solely on technical skills.

Limited understanding exists regarding the impact of online learning in postsecondary CTE. Research in this area remains limited and outdated (Oliveira & Rumble, 1982; Zirkle, 2003). However, community colleges offer CTE courses via distance learning with online courses as the most common form of distance learning

(Johnson, 2003). The community college, as a driver of human capital development, provides skilled workers through Career Technical Education (Lannan, 2009).

Web-mediated instruction serves as the fastest growing sector of distance education and continues to become more prevalent in postsecondary education. Research suggests that student performance levels remain equal; however, limited research exists on how the media affects student performance (Glenn, Jones & Hoyt, 2003).

Additionally, little empirical evidence exists to support the design and management of successful web-based courses. The growing popularity and use of such courses produces the need for increased scholarly research (Pethodoukis, 2002). Few studies examine the relationship between student-to-student and student-to-instructor interaction, and student learning and satisfaction. Numerous learning theories emphasize the importance of interaction in the learning process. Likewise, interaction remains a key factor of learning outcomes in online education (Sher, 2009). Further research must explore design principles to accommodate and support learning outcomes in an online setting (Smith, 2003). A need exists for a comparative study within community college CTE to increase the understanding of how interactions relate to student outcomes, specifically satisfaction and perceived learning (Sher, 2009). Increased understanding of the factors promoting satisfaction and learning in online courses drives the creation of environments in which engaged, active learning develops (Arbaugh, 2001).

Purpose of the Study

This study explores the relationship between student-to-student and student-to-instructor interactions and perceived student learning. The study also explores the relationship between student-to-student and student-to-instructor interactions and student

satisfaction. The study focuses on online CTE courses in the fall of 2010. The purpose is to identify relationships among interaction and student outcomes in the online CTE environment.

Limitations

Workforce changes warrant the need for increased research in online CTE programs. The study includes notable limitations. First, the study lacks randomness, as students are not randomly assigned to classes. Students select a college based on personal preference. The self-selections qualify the sample as a non-probability sample (Huck, 2004). This fact cautions the researcher in generalizing, based on the results of the study.

In addition, the study includes one institution, at one point in time, and results may not be widely generalizable to other institutions, particularly to those with a different demographic makeup than that of the community college included in this study. Furthermore, the survey instruments rely on students' self-reported measures of student-to-student interaction, student-to-faculty interaction, student satisfaction and student learning at the end of a semester and may not reflect reactions to the course in its entirety.

Delimitations

The present study focuses on students enrolled in online CTE courses, in a single semester, at one Southeastern community college. Multiple environments were not included. A web-based survey serves as the instrument for data collection. Students surveyed are from the seven programs offering online CTE courses only.

Assumptions

The present study utilizes a web-based self-administered questionnaire to collect data. Assumptions include student honesty in survey responses, and accurate representation of events of the course. The survey measures student learning by assessing the students' perceived level of learning. A scale to identify perceived student learning measures student learning. The assumption that students have a good sense of their level of learning during participation in an online course supports the use of a perceived learning scale in measuring student learning (McCroskey, Fayer, Richmond, Sallinen, & Barraclough, 1996).

Hypotheses

Hypothesis 1: Student-to-student interaction and student-to-instructor interaction can significantly predict positive student satisfaction in an online postsecondary CTE course, when controlling for the effects of gender, age, number of online courses taken previously, and Internet experience in years.

Hypothesis 2: Student-to-student interaction and student-to instructor interaction can significantly predict positive student perceived learning in an online postsecondary CTE course, when controlling for the effects of gender, age, number of online courses taken previously, and Internet experience in years.

Conceptual Framework

Based on the literature review of the relationship among student-to-student and student-to-instructor interaction and student outcomes, hypotheses were developed (Arbaugh, 2000a; Hiltz, 1994; Johnson et al., 2000; Sher, 2004). The following conceptual framework serves as a map to provide coherence to the empirical inquiry of

the study. Workplace changes, globalization, and technology drive increases in the need for skilled workers (Dychtwald, Erickson, & Morison, 2006; Gordon, 2000; Rephann, 2007). Simultaneously, institutions of higher learning experience an increase in the adoption of online Career Technical Education courses (Johnson & Benson, 2003). The flexibility provided through online courses, as well as the influx of independent and highly networked students, support the increasing adoption of online CTE programs and drive the need for theoretically based research (Dede, 2004; Tapscott, 2009; Ware & Craft, 2003). CTE provides skilled workers and online learning serves as an effective medium for skills training. These factors combine to create the need for research focused on online Career Technical Education.

The theoretical framework of the present study includes socio-cultural theory, social information processing theory, and social constructivism. Socio-cultural theory asserts that learning is facilitated through interaction (Vygotsky, 1978). Likewise, social information processing theory focuses on relationship development in online learning (Walther, 2008). Additionally, social constructivism contends learners collaborate to co-create understandings and achieve learning (Taylor et al., 1999). Learning facilitated through interaction serves as the research focus. The present study examines two types of interaction: student-to-student interaction and student-to-instructor interaction. Student outcomes identified in the literature review, include student satisfaction and perceived learning. The present study seeks to identify the relationship among student-to-student and student-to-instructor interaction, and student satisfaction and perceived learning. Research in the role of interaction in online CTE courses increases the body of knowledge in this area. Decreased feelings of isolation among online CTE students,

increased access to courses, and attraction of a new generation of learners will likely increase retention in CTE courses, leading to the production of a larger pool of skilled laborers. Figure 1:1 depicts the conceptual framework of the study.

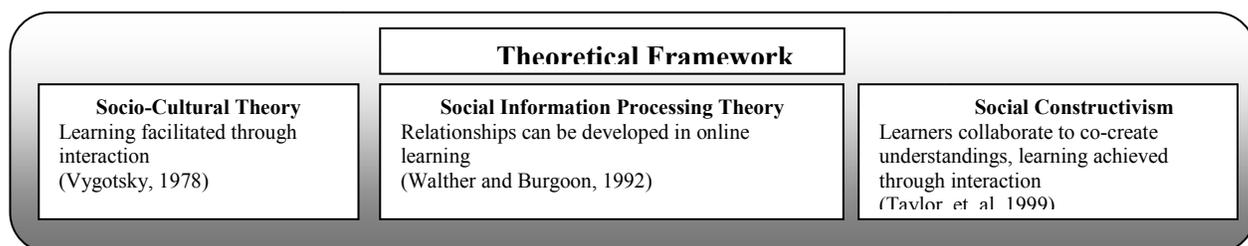
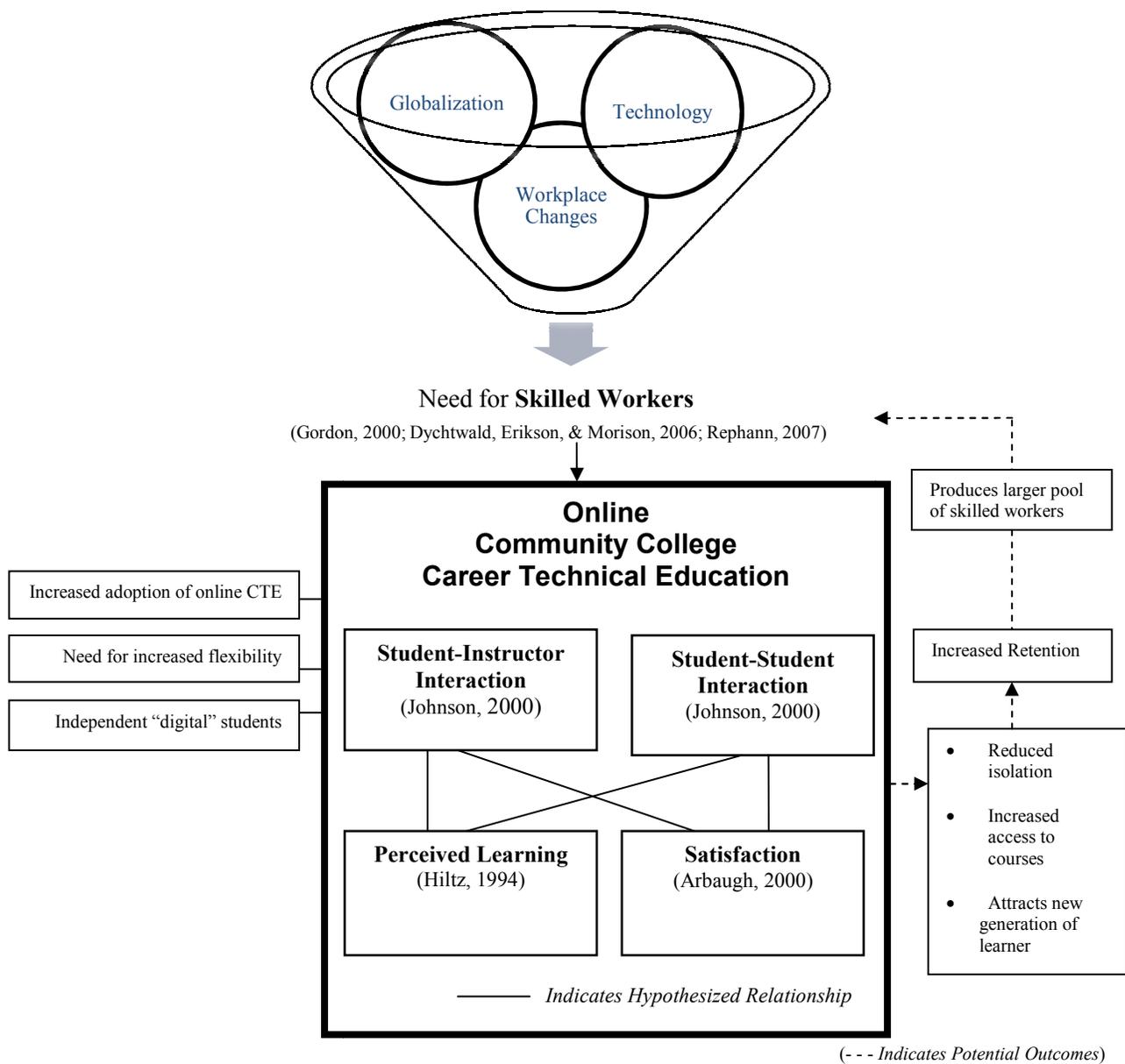


Figure 1:1. Conceptual Framework

Definition of Key Terms

1. *Community colleges*-regionally accredited institutions of education that award associate of arts or associate of science as the highest degree (Cohen & Brawer, 2003).
2. *Online classes/online learning*- courses delivered completely on the Internet (Tallent-Runnels, 2006)
3. *Distance Education*- institution-based, formal education where the learning group is separated (Simonson et al., 2000, p. 7).
4. *E-learning*- used to describe any learning that is electronically mediated or facilitated by transactions software (Zemsky & Massy, 2004).
5. *Asynchronous Learning*-distance learning allowing a student to work on lessons independently, at a time and place and for as long as they wish, with no need to parallel another students pace (Maxfield, 2001).
6. *Career Technical Education*-educational activities that can be applied directly or indirectly to a vocation or occupation specifically relating to the skills needed to accomplish the job (Thornburg, 1992).
7. *Interaction*- mediated communication between student and instructor, or between two or more students, which discusses some aspect of course content, assignment or student progress in the course (Sher, 2004).
8. *Student-to-content interaction*- interaction with content which describes the ability of learners to access, manipulate, synthesize and communicate content. The content may be in the form of text, audio, video, CD-ROM, computer program or online communication (Moore, 1993).

9. *Student-to-instructor interaction*- interaction with instructors which describes the ability of learners to communicate with and receive feedback from instructors. This may include the instructor delivering material, and providing feedback in addition to the learner interacting through question asking or communication in regards to course activities (Moore, 1993).
10. *Student-to-student interaction*- interaction with classmates which describes the ability of learners to communicate with each other to create an active learning community, may take the form of group projects, or group discussion (Moore, 1993).

Summary

Workforce changes combined with globalization and technology create the need for skilled workers (Dychtwald, Erikson, & Morison, 2006; Gordon, 2000; Rephann, 2007). The community college, as a driver of human capital development, provides skilled workers through Career Technical Education (Lannan, 2009). As CTE continues as an important asset in human capital development, the need for new modes of instruction to increase flexibility in time and space develop. Online courses exist as an available mode of instruction in community college CTE programs, increasing flexibility and expanding opportunities for individuals to obtain skills training (Johnson & Benson, 2003).

Little empirical evidence exists to support how online CTE courses support student learning and satisfaction specifically in regards to student-to-student and student-to-instructor interaction (Sher, 2009; Zirkle, 2003). However, according to a national survey, over 76% of community colleges currently offer forms of distance learning CTE

courses (Johnson & Benson, 2003). According to Glenn et al. (2003), research concerning the outcomes of student interactions could be an invaluable tool in the design of online instruction, specifically in regards to the communication technologies currently available.

Interaction plays a primary role in the facilitation of learning (Edwards, 2005; Poellhuber et al., 2008). Interaction in the online environment occurs through student-student interaction, student-instructor interaction and student-content interaction (Moore, 1993). The link between interaction and knowledge construction validates the exploration of these behaviors in the online environment (Shank, 2002.) The following chapter discusses the supporting literature concerning Career Technical Education, online learning and interaction in the online environment.

CHAPTER II

LITERATURE REVIEW

Introduction

The purpose of this literature review includes investigation of the history of online CTE in postsecondary education, specifically the community college system. The literature review examines the history of the community college system from a human capital development perspective, development of CTE and the current state of online learning in CTE. Additionally, the chapter explores the theoretical perspectives supporting the relationship among student-to-student and student-to-instructor interactions to student outcomes, specifically perceived learning and student satisfaction. This chapter provides the reader with an understanding of the current position of online learning in CTE and the importance of interactions in the online environment.

History of the Community College

The development of the community college traces back to the late 19th century when William Rainey Harper modeled a plan after the German “Gymnasium” that would create university-affiliated six-year high schools and two-year colleges. Initially, the schools were designed to increase educational attainment without burdening or compromising the four-year colleges. After World War II the expansion of “junior colleges” occurred when millions of former military personnel enrolled in junior colleges through the help of tuition vouchers provided by the GI Bill (Kane & Rouse, 1999).

Historically, junior colleges provided a transfer function in which students completed two years of college and then transferred to a four-year college to complete a bachelor’s degree. Junior and community colleges still fulfill this role today. The role

now extends to include vocational degree programs, continuing adult education programs, and workforce, economic and community development programs (Kane & Rouse, 1999). Cohen and Brawer (2003) define community colleges as “regionally accredited institutions of education that award associate of arts, or the associate of science as the highest degree” (p. 5).

The community college serves a unique role and appeals to many students because of the lower cost of attendance and flexible delivery options (i.e., night, weekend, online) (Kane & Rouse, 1999). The community college system serves as a provider of adult learning and economic development. Millron and Santos (2004) assert that community colleges serve as essential engines of educational, economic, and social development. The community college system reaches a large percentage of nontraditional students. The term traditional student describes a student under the age of 25, enrolled full-time and residing on campus (Metzner & Bean, 1987). According to statistics provided by the National Center for Higher Education, 27% of full-time community college students work full time while 50% work part-time. In addition, 50% of part-time students work full time, and 33% work part-time. According to the American Association of Community Colleges, which is made up of 1,195 community colleges, the average age for community college students equals 29 years old (National Center for Higher Education, 1999).

The total enrollment of students in the American Association of Community Colleges, as of 2008, totaled 11.5 million. This figure includes students who will transfer to universities to complete a baccalaureate degree, career technical students pursuing one and two-year degrees and students pursuing certificate programs (National Center for

Higher Education, 1999). Since its inception, the role of the community college continues to expand (Cohen & Brawer, 2003). Due to this expansion, the community college serves as a catalyst of the education and training necessary to develop the 21st century workforce positioning the community college as a source of human capital development.

Human Capital Development in the Community College

Human capital theory supports the role of the community college. Growing empirical evidence documents the role of community colleges in developing human capital (Lannan, 2009). Some economists regard the community college as a neglected area of study, specifically regarding the economics of human capital development, because the bulk of economic research in postsecondary education focuses on universities (Rephann, 2007). Becker's Human Capital Theory (1993) describes human capital as a person's knowledge gained, skills learned, and values; attributes which cannot be separated from the individual. According to Becker, human capital serves as an essential to growth in the modern world and investments in people serves as an essential ingredient to economic progress. Similarly, Grubb (1997) describes human capital as investment in education for the economic benefits it generates in the future. In this sense, the community college improves the human capital of students seeking general or specialized training. Young (1997) reports community colleges serve as important resources for communities and serve as a source of "intellectual capital" for rural areas, the geographic location for many community colleges (p.74). The community college fosters human capital development through workforce development. Jacobs (2002) defines workforce development as "the coordination of school, company, and governmental policies and

programs such that as a collective they enable individuals the opportunity to realize a sustainable livelihood and organizations to achieve exemplary goals, consistent with the history, culture, and goals of the societal context” (p. 13). According to the author’s definition, workforce development encompasses many diverse forms of training and development programs across many populations.

Gray and Herr (1998) define workforce development in broad terms, illuminating the inclusion of the community college and CTE. The authors define workforce education as follows:

that form of pedagogy that is provided at the pre-baccalaureate level by educational institutions, by private business and industry, or by government-sponsored, community-based organizations where the objective is to increase individual opportunity in the labor market or to solve human performance problems in the workplace. (p. 4)

Workforce education includes education at the pre-baccalaureate level that increases an individual’s usefulness in the labor market or workplace, encompassing CTE offered by the community college (Gray & Herr, 1998).

Workforce development benefits derive from three levels: the individual, organizational and societal. On the individual level, the study of workforce development provides promise for the working poor. Gatta (2005) states:

the integration of individualist and structural approaches will help improve the lives of the working poor and a large number of workers do not possess the high-level skills demanded of well-paid workers and without access to skills training opportunities, these workers will continue to be left behind. (p. 28)

Organizational benefits include increasing the competitive advantage for organizations by increasing the value of employees through workforce development. The community colleges role in organizational development includes contract training for business, industry or public agency. Training includes teaching job-specific skills, performance improvement, and skills for advancement (Kane & Rouse, 1999). Societal benefits emerge through the achievements of greater skill for individuals and a higher standard of living. Increased tax revenues, less required government support and increased buying power include a few of the potential societal benefits of workforce development (Gatta, 2005). Therefore, career-technical education provides a form of workforce education for individual, organizational, and societal benefits. The evolution of CTE reveals heightened awareness of the benefits and policy development promotion of CTE.

The Evolution of Career Technical Education

According to McCaslin (2002), CTE claim its origin in the colonists' apprenticeship programs which include on-the-job training and instruction in the theory of the craft. Skilled workers, tasked with sharing their skills with others, served as apprentices. Passage of the Morrill Act of 1892 established the nation's land grant college system, providing educational pathways for the preparation of individuals schooled in the fields of agriculture and the mechanical trade. The Congressional Commission on National Aid to Vocational Education established in 1914, reported to Congress on the needs of vocational education. This led to the emergence of CTE in the United States with the Smith-Hughes Act of 1917 (Rojewski, 2002). The Act created separate systems of education including separate boards at the state level. An emphasis in the Act was on job-specific skills. Modeled on the goals of Charles Prosser, the Act

aligned vocational education with the needs of industry and excluded traditional academics. Through the Vocational Act of 1963, the focus shifted to support John Dewey who believed vocational education should serve as a means to meet individual needs required for good citizenship and prepare students for a lifetime of learning. The Carl D. Perkins Vocational Education Act of 1984 added a social component to CTE. The 1990 revision includes a third focus, academic education (Rojewski, 2002). During this time, vocational education experienced a time of redefinition. The focus reemphasized workplace basics and included the following themes, as described by Rojewski (2002):

- Integration of academic and vocational education
- Emphasis on developing transferrable work skills, rather than narrow, job-specific skills
- Articulation between secondary and post-secondary vocational programs
- Adjustments to accommodate changing workforce demographics and a workplace that requires high-level academic skills
- Use of technology
- Higher order thinking skills (decision-making and problem-solving).

The focus on academic education promoted the inclusion of CTE in a variety of forms.

The expansion of the term CTE provides evidence of the expanding role of CTE.

The National Association of State Directors of Career Technical Education Consortium report that career and technical education encompasses a variety of settings and levels including secondary programs, postsecondary certificates and degrees, and

customized training for employees in the workplace. The directors also note that Career and Technical Education provides students and adults with three key skill components:

1. the technical skills and knowledge necessary to succeed in occupations and careers;
2. the cross-functional or workplace basics necessary for success in any occupation or career as well as skills for balancing family and work responsibilities; and
3. the context in which traditional academic skills and a variety of more general educational goals can be enhanced (McCaslin, 2002).

CTE serves many diverse roles and is constantly developing and shifting to meet the needs of the workforce. The history of CTE includes a shifting focus from meeting industry needs to training and developing individuals holistically to include individual, organizational (industry) and societal goals (Cohen & Brawer, 2003). The shift positions CTE between the worlds of work and school (Kane & Rouse, 1999). For this reason, CTE serves as a primary source of workforce education for individuals. CTE must also remain current with the needs of the ever-changing industry climate to ensure that students become prepared members of the global, high-skilled job market of the 21st century. Postsecondary CTE, specifically provided through the community college, will remain in a key position to prepare students for specific jobs in the workforce.

One driving force behind the need for postsecondary CTE includes current workforce inadequacies. With the exodus of the baby boomers from the workforce, organizations face a potentially debilitating brain drain of skills and experience. As the gap in skilled labor needs continues to grow, gaps in workforce readiness exist for future

jobs (Dychtwald, Erickson & Morison, 2006). Expanding the capabilities of human capital by amplifying skill levels serves an important workforce strategy for today's market (Dychtwald et al., 2006).

As the need for skilled workers increases, community colleges face the challenge of attracting and retaining more students into CTE. Community colleges search for avenues for students to obtain a technical education. Online learning emerges as an opportunity to increase the CTE student population through flexibility in time and space (Dede, 2004; Ware & Craft, 2006). Historically, the focus of distance learning did not include technical education. Rapidly expanding course offerings, however, serve as evidence of the growth of online CTE. As previously mentioned, Johnson and Benson (2003) report 76% of community colleges use some form of online CTE. Increasing adoption of online CTE courses in addition to opportunities to meet a larger and more diverse student population warrants additional research exploring online CTE.

Online Learning in Career Technical Education

The increase in non-traditional students in the early 1990s encouraged a shift from the traditional classroom setting towards distance learning online (O'Malley & McCraw, 1999). Students over the age of 25, not enrolled full-time or not residing on campus constitute the non-traditional student population. Non-traditional students require increased flexibility because of employment and family obligations. Online learning serves the non-traditional population well through increased access to courses.

While distance learning may pertain to a number of learning experiences away from the college campus (correspondance courses, apprenticeships, etc.), the term "online learning" refers to a specific form of distance education in which class delivery occurs

completely over the Internet (Tallent-Runnels et al., 2006). In distance education courses the web is the medium for instruction (Sher, 2009). Recently, an increasing number of online courses offered at colleges and universities provide increased flexibility in delivery. Technology enhanced learning distributes learning across a variety of geographic settings, across time and across various interactive media. Dede (2004) suggests students need environments they can personalize, which the online community fosters through discussion boards, chats, blogs, wikis, and other online tools. Additional tools include Wimba, a tool that claims to build a stronger sense of community and enables instant collaboration with text and voice chat capabilities (Blackboard, 2011.)

Online learning attracts students who have “grown up digital.” They tend to value individual freedom and decision-making. Students of the digital age appear independent and highly networked, serving the online environment well (Tapscott, 2009). Technology functions not as an occasional tool for students, but permeates every aspect of life (Dychtwald et al., 2006). Students from the digital generation need engagement and collaboration, as well as a more team-based, cognitively challenging work environment. Educational focus must shift to encourage instructors to interact with students, customize education to meet learning styles, and encourage collaboration among students (Tapscott, 2009). The online medium provides students with time for reflection and considered response, in addition to the creation of communities of learning (Browne, 2003). Compared to students in conventionally taught courses, students in well-crafted online courses enjoy their classes more, develop more positive attitudes about the subject matter, and achieve higher scores on examinations (Tapscott, 2009). As a tool for instructional delivery, technology may serve as a teaching tool as well as a

learning process that facilitates self-paced learning and tutorial assistance (McCaslin, 2002). Technology provides numerous alternatives to face-to-face communication, allowing the online environment to serve as an appropriate medium for involvement and learning (Dychtwald et al., 2006).

Although the online environment provides opportunity for engagement and interaction among students, all courses do not achieve successful student outcomes. The differences between the online environment and the traditional classroom environment create challenges for course design and implementation. Online courses differ from traditional courses in the areas of course interaction, content organization, student support and transactional distance (Benson et al., 2005). Furthermore, faculty must adjust teaching methods to accommodate online learning. Instructors must be trained how to use new online mediums (Grosse, 2005). In some cases institutional, logistical, and individual barriers to collaboration exists. Faculty cite support, planning, and funding as major institutional barriers in developing online courses (Zirkle et al., 2006). Additionally, in order to create significant peer interaction, instructors often need to form groups, an initiative that runs counter to the flexibility at the core of the learner-paced model. Instructors must strive to find ways to enable and promote peer collaboration (Poellhuber et al., 2008). The challenges associated with teaching and learning in the online environment produce varied opinions throughout the academic community in regards to the use of online learning.

The academic community both praises and criticizes the online community (Wyatt, 2005). Some critics claim online learning is not as effective as traditional classroom learning due to the lack of face-to-face interactions (Richardson, 2003). For

example, Bullen (1998) conducted a case study examining student participation and critical thinking in an undergraduate course utilizing computer-mediated conferencing. The study revealed some students felt disconnected from others because of a lack of facial expressions and other traditional classroom features. Additional criticisms include barriers to online education including technical problems and isolation from instructor and fellow students (Gatta, 2005). As with any new instructional delivery method, online learning requires increased research to understand how to best accomplish student learning in the online environment. Increased online CTE enrollment drives the need to develop and research CTE online learning.

Eighty-six percent of community colleges surveyed in 2003 reported increases in CTE distance education enrollments. Percentages remain consistent across institution location, region, and size indicating a trend occurring in CTE distance education (Johnson & Benson, 2003). Community colleges also indicate that distance CTE courses attract more working professionals, employed persons, single parents and students outside the college's district (Johnson & Benson, 2003). Drawing from a larger participant pool, institutions promote the expansion of distance learning, with the most emphasis placed on online learning as the source of distance education.

Distance education in CTE remains in the beginning stages of research. Zirkle (2003) provides a review of previous research studies on distance education and CTE. Zirkle reports the majority of studies on distance education and CTE as descriptive in nature. Few studies use correlation methodology; however several use case study methodology. Of the 71 articles reviewed, Zirkle finds no experimental studies. Studies focus on three areas: (a) issues of access to distance education courses; (b) characteristics

and performance of students in distance education; and (c) involvement of instructors/faculty in distance education. The findings reflect similar results to other research syntheses of online education studies (Phipps & Merisotis, 1999; Tallent-Runnels et al., 2006).

Furthermore, Benson et al. (2005) address the lack of systematic studies exploring differences between online and face-to-face CTE training. The study examines how student motivation and learning strategies differ between campus-based students and online students. The study also analyzes differences among courses in the areas of course interaction, content organization, student support, and transactional distance. The author utilizes a mixed method design which includes a quasi-experimental study comparing student achievement in equivalent online and face-to-face courses. Qualitative case studies more fully describe each of the matched sets of courses. The exploratory study yields the following conclusions:

- No common pattern or model exists for the delivery of online CTE programs and courses.
- Online CTE courses do not align with the common view that online courses provide anytime, anyplace, or any pace experiences (due to required synchronous chats and student employment required for 20-30 hours per week in the field).
- Online programs provide unique and flexible options for students.
- CTE students perform equally well in online and face-to-face courses.
- Students enrolled in online CTE courses appear to be as motivated and satisfied as students enrolled in face-to-face CTE courses.

Additional differences among online and traditional courses include the ways in which students interact with one another and with the instructor. Sargeant et al. (2004) explore the perceptions of students and their experiences in interactive online continuing education courses. The study resulted in a clearer understanding of how participants interact in the online environment and the factors that affect satisfaction. The authors conclude that the quality and quantity of interpersonal interactions shape student perceptions of the online environment and impact social comfort. Interpersonal interactions as well as the educational value of interactions and the role of the facilitator each affected participant perceptions of the course. The researchers assert the importance of incorporating the characteristics of effective continuing education into the design and implementation of online programs, this includes grounding the work in learning theory, designing for multiple types of learners, and including opportunities for interaction.

Interaction as it correlates with outcomes warrants additional research because many learning theories focus on the facilitation of learning through interaction. Just as in the traditional classroom environment, learning may be facilitated through interaction in the online environment (Sher, 2009). Numerous researchers consider interaction a key factor to student learning and success (Bruning, 2005; Burnett, Bonnici, Miksa & Kim, 2007; Moore, 1993), prompting additional focus on interaction in the learning process.

Theoretical Framework

The concept of learning facilitated through interaction emerges from the theoretical framework of socio-cultural theory, social information processing theory and social constructivism. Vygotsky's socio-cultural theory asserts that learning is facilitated through interaction referred to as "interpersonal learning," rather than through

intrapersonal learning as cited in Edwards (2005, p. 85). This principle also applies to the online environment. According to An, Kim and Kim (2008), online learning may serve an effective role in facilitating collaborative inquiry within a group including processing information, increasing knowledge, and reflective thinking. According to Lee (1996), the importance of social interaction in the learning process is currently acknowledged by many distance education institutions. However, institutions traditionally rely on a learner-paced individual learning model. Additionally, Lee reports researchers find the establishment of a learning community encourages distance learners to exhibit desired outcomes, such as high retention, increased motivation and satisfaction and better performance.

Additionally, Billett and Rose (1996) argue that workplace goals require a strong base of knowledge. Close interaction between individuals serves as a source of knowledge that may otherwise be hidden. The authors support a socio-cultural constructivist view describing knowledge as socially mediated and knowledge construction as learner processed (Billett & Rose, 1996).

Knowledge construction serves as the foundation of social constructivism. According to Taylor et al. (1999), social constructivism describes an epistemology in which learners collaborate to co-create understandings. A primary part of collaboration includes the development of communicative competence, which enables students to engage in open and critical communication with teachers and peers. Mannan (2003) explores the learning experiences of students in online courses and discovers that for students able to adapt to the online environment, deep learning experiences were

possible. Mannan proposes further research on the role of instructors' interaction in online classes, grounded in social constructivist learning theory.

As theorized by Taylor et al. (1999), participants in online education must learn to become “reflective and collaborative learners in a social constructivist learning environment”(p.1). Constructivism theory seeks to explain individual differences in communication skill and develops testable propositions about communication competence, which aids in understanding its various forms, determinants, antecedents, and consequences (Burlison & Rack, 2008). In constructivism, communication advances through message production, message processing, interaction coordination, and social perception.

Communication in the online environment can be referred to as Computer Mediated Communication (CMC). The Social Information Processing Theory (SIPT) serves as a specific theory developed to explain the way interaction occurs in CMC (Walther, 2008). The SIPT assumes relationships develop over time and when sufficient time elapses, CMC can be as effective as face-to-face communication in developing impressions and relationships (Walther & Burgoon, 1992). CMC often takes longer to develop, but over time may have positive interaction impacts (Walther, 2008).

Early studies depict CMC as reducing social information and in some cases increasing hostility among participants (Hiltz, Johnson & Turoff, 1986). In stark contrast, research on virtual learning communities suggests that these communities lead to various kinds of learning and may be a community of interest, a goal-oriented community, a learners community or community of practice (Henri & Pudelko, 2003). The SIPT offers a framework for explaining conflicting findings through the assertion

that CMC requires more time in exchanging messages to develop impressions and relationships. When provided with sufficient time, both personal and professional relationships develop. Relationships often function just as those in face-to-face communication (Walther, 2008).

Rather than inhibiting or hindering interaction, the flexibility of computer-mediated communication may enable online groups to achieve relational intimacy comparable to face-to-face groups. As a result, the online class may become a “virtual learning space” supporting student success through interaction and collaborative learning (Arbaugh, 2000b, p. 35). Research highlights the importance of interaction in the online environment indicating that valuable interactions may occur among students.

Additionally, interactions provide opportunities for communicative exchanges with the potential to alter the content and context of learning (Shank, 2002). Interaction serves as a key element in the construction of knowledge in the online environment. The link between interaction and knowledge construction validates the exploration of student-to-student and student-to-instructor interactions in the online environment (Sher, 2004).

Learning Facilitated through Interaction in the Online Environment

The exploration of interactions serves an important role in evaluating student success in the online environment due to the connection between interaction and student learning. Interaction serves to decrease isolation in online environments, encourage collaborative learning and the development of learning communities. Each of these outcomes relates to student learning facilitated through interaction in the online environment.

A major critique of online learning includes the isolation often experienced by students, which correlates to high distance education dropout rates (Dziuban et al., 2005). Feelings of isolation may reduce the student's level of motivation (Poellhuber et al., 2008). Distance education drop-out rates reportedly vary between 30% and 68%. Many students of online courses experience a sense of disconnection with classmates and instructors. Poellhuber et al. (2008) report social interaction and a sense of belonging to a learning community provide participants with decreased feelings' of isolation.

Historically, most distance learning utilizes an individualistic or self-study approach. This prevents student's interactions with other students related to the course (Hiltz, 1994). A collaborative or group learning approach contrasts the individualistic approach and operates under the premise that learning involves the active construction of knowledge. Students interact with their peers and the instructor in this process, with the potential to impact student performance and course satisfaction (Hiltz, 1994).

Furthering the study of group learning in the online environment, Swan (2002) explored the development of learning communities through online discussion. The investigation yielded correlations between 22 course design factors and student perceptions of satisfaction, learning, and interaction with instructors and classmates. The findings from the research relates to the three factors associated with student perceptions of satisfaction and learning in online courses: interaction with course content, interaction with course instructors, and interaction among course participants (Swan, 2002). Similarly, Moore (1993) asserts that learning can be supported in online classes through three kinds of interactivity, essential for learning in distance education:

1. Learner-content interaction: interaction with content which describes the ability of learners to access, manipulate, synthesize and communicate content. Form of content includes text, audio, CD-ROM, computer program or online communication.
2. Learner-instructor interaction: interaction with instructors which describes the ability of learners to communicate with and receive feedback from instructors. Examples include the instructor delivering material, and providing feedback in addition to the learner interacting through question asking or communication in regards to course activities.
3. Learner-learner interaction: interaction with classmates which describes the ability of learners to communicate with each other to create an active learning community, i.e., group projects, or group discussion

Research indicates collaborative learning environments foster learner-learner and learner-instructor interactions. Askov and Simpson (2001) created a collaborative online learning environment that lead to high levels of mastery of course objectives, interaction with instructors and interactions with peers. The researchers state the need for interaction and engagement in online courses can be addressed through course design. Course design must focus on instructor guidance and support as well as other interaction based events such as computer conferencing.

Additionally, Schweizer (2003) uses blended learning as a strategy to improve collaborative task performance. They conclude that while not always necessary for the members of a learning group to meet face-to-face, learners in the blended courses led a much more “coherent discourse” than learners in the fully online class (Schweizer, 2003,

p. 211). The communication setting impacted the interaction among learners, particularly in tasks that involved exchanging knowledge to come to a joint solution (Schweizer, 2003).

By creating electronically based communities of learning, geographically and socially isolated students have the opportunity to establish communicative relationships with each other and to reflectively share and co-construct knowledge through open and critical communication (Maor, 1999; Taylor et al., 1999). While some researchers remain skeptical that web-based instruction can produce robust interactions between participants, others note that computer-mediated communication provides new tools and new opportunities for the potential of increased instructional and social interactivity (Barab & Thomas, 2001). For example, Cox and Cox (2008) report evidence of interaction among students in an asynchronous learning environment lead to a community of learners. The discussion board, in this case, served as a valuable tool in enabling students the opportunity to interact with the instructor and other students. The emergence of new tools encourages additional comparative studies of online versus face-to-face courses.

Differences among face-to-face and online courses provide opportunities for development in both mediums. Mikulecky (1998) examined student discussions in web-based and campus-based adolescent literature classes. He found both courses to have high degrees of participation among other similarities, but also notes differences. “In addition to engaging in lengthier and arguably more thoughtful discussion, web-based students seemed to get to know one another better and treated one another with more warmth and dignity than did students in other contexts” (Mikulecky, 1998, p. 96). The

author hypothesizes that the perceived anonymity of the online environment helps foster high quality interactions among students rather than hinder them.

McDonald and Gibson (1998) explore types of interpersonal communication in an online course and compare this to a face-to-face course. The study includes analyzing computer conferencing transcripts for interpersonal issues. The researchers found people meeting, discussing, and collaborating as a group through online learning. Participants indicated similar interpersonal issues, at similar points in the course, as reported in the literature for face-to-face groups. Interactions were revealed through the development of cohesive, functioning groups with affection, openness and solidarity (McDonald & Gibson, 1998).

Further indicating support for interactional experiences in the online class, a study by Barab and Thomas (2001) reveals online courses can support content learning, open sharing about personal experiences, and a sense of camaraderie among students. Online courses may foster reflective and social environments, implying meaningful interactions occur. The authors emphasize “participants did not interact with computers; they interacted through computers with each other” (p. 35). Additionally, research by Curtis and Lawson (2001) suggests online learning environments can produce successful collaboration and that while the medium influences interactions, interactions occur to support learning. Learning facilitated through interactions in the online environment supports the need for research in online interactions.

Research indicates that learning occurs socially. Richardson (2003) examines the role of social presence in online courses in relation to students’ perceived learning and satisfaction. The study found that students with high overall perceptions of social

presence also scored high in terms of perceived learning and perceived satisfaction with the instructor. According to the author, learning serves as a social activity. Individuals learn more from their interactions with others than from reading materials alone. Likewise, the research from Gunawardena and Zittle's (1997) study demonstrates that approximately 58% of the variance in student satisfaction with the computer-mediated environment accounted for by social presence, indicating that social presence serves as a predictor of satisfaction in text-based computer conferencing. Social presence includes all of the participants' interactions in the online environment including interactions with peers, instructors, and course materials.

As mentioned previously stated, Moore (1993) provides the theoretical framework of three types of interaction essential for learning in the online environment: (a) learner-learner interaction; (b) learner-instructor interaction; and (c) learner-content interaction; also referred to as student-to-student, student-to-instructor interaction, and student-to-content interaction. Research indicates that student-to-student interaction and student-to-instructor interaction relate to student satisfaction and perceived learning (Sher, 2004). The following section explores the types of interactions important to present research in online environments.

Student-to-Student Interaction

Student-to-student interaction also referred to as learner-to-learner interaction; can foster learning through student collaboration and knowledge sharing (Sher, 2004). Tinto (1997) studied a Coordinated Studies Program in a community college in which students were part of interconnected groups and asked the questions, "Does the program make a difference?" and "If it does, how does it (make a difference)?" (p. 609) The results

indicate involvement with faculty, as well as with peers, influenced students' overall perception of the community college experience. Tinto (1999) identifies interactive learning with peers and involvement in the classroom as a few of the guidelines academic institutions should pursue for increasing student success.

The link of student-to-student interaction to student success examined in a study by An, Shin and Lim (2009) compares the impact of three facilitation approaches to interactions. The results indicate voluntary interactions seldom occur between students, however when instructors require students responses to one another, instructor feedback negatively impacts interaction. However, required interaction including limited instructor intervention resulted in increased student expressions of thoughts and opinions. Several factors influence the frequency and quality of student-to-student interactions. Faust and Courenay (2002) assert that interactions between students fell into one of two categories: social interactions or course-focused interactions. Based on their findings, four conclusions pertaining to student-to-student interactions include:

1. The physical structure of the classroom influences student participation and student-to-student interaction.
2. The expectations and teaching style of the instructor influences participation.
3. Discussion patterns established early in the semester hinder some students' participation.
4. The social climate affects participation.

Additionally, students may not be inclined to initiate interactions, however, increased peer interactions boosts student performance. Likewise, Blake (2009) discovered that

participants in a text-based Internet chat environment had significantly higher gains than those in a control environment with no student-to-student interactions.

Bailey and Duarte (2004) explore the influence of perceptions of online and face-to-face interaction on student satisfaction and discovered online interactions with other students influences student satisfaction. The authors suggest that instructors should consider the use of online tools to increase student-to-student interactions and improve student satisfaction and student performance. Student-to-student interactions influence student outcomes, however student-to-instructor interaction also effects student satisfaction and learning. The following section explores research in student-to-instructor interaction.

Student-to-Instructor Interaction

Student-to-instructor interaction, also referred to as learner-instructor interaction includes formal and informal interactions. According to Endo and Harpel (1982), informal interaction between faculty and students relate to personal, social, and intellectual outcomes and have a stronger impact on student outcomes than do formal interactions. Terenzini et al. (1995) indicate the need for a clearer picture of the role of faculty beyond the classroom (including such factors as student-faculty interaction).

Exploring student-faculty interactions, Cotton and Wilson (2006) document the results of a study of the frequency and nature of student faculty interactions. Results indicate that while students generally perceive interactions as beneficial, most interactions relate to seeking help for a specific problem. Rarely did students approach faculty out of intellectual curiosity. Consequently, reported benefits of interaction were only course or career specific. Time constraints and lack of familiarity with faculty

emerged as factors hindering interaction, while interactive teaching styles and active encouragement strengthened interaction. The authors suggest that institutions of higher learning must find ways to stimulate active student interest in learning. They also highlight the need for future work to distinguish between the types of interactions and the potential benefit of each type (Cotton & Wilson, 2006).

Kuh and Hu (2001) discuss the lack of research in the processes that exist between student-faculty interactions and student outcomes, although quantitative measures indicate a relationship. Saba (1999) states that online learning should not ask the question of whether distance education is comparable to a hypothetical “traditional,” or face-to-face instruction, but if enough interaction exists between the learner and the instructor for the learner to find meaning and develop new knowledge. Similarly, Tinto (1997) indicates that faculty should design interaction into the classroom as a means to enhance student learning in what he deems the “community” of the classroom. Arbaugh (2001) concludes that instructors influence student interactions by providing personal examples of the class material, demonstrating a sense of humor about the course materials and inviting students to seek feedback from them and from each other. In addition, he found immediacy behaviors (instructor attempts to reduce the social distance between themselves and the students) serve as a positive predictor of student learning and satisfaction. The results indicate that as students increase interaction with the instructor, outcomes such as learning and satisfaction also increase. Student-faculty contact in online courses rates highly as an indicator of student learning and satisfaction (Curtis & Lawson, 2001).

In contrast, Mirakian (2007) found that student satisfaction with the instructor functions as a weakness of online learning. She found significant differences between online and traditional courses in the following areas concerning instructor involvement:

- Displayed personal interest in students and their knowledge;
- Found ways to help students answer their own questions; and
- Asked students to share ideas and experiences with others whose backgrounds and viewpoints differ.

The researcher indicated that these results reflect the lack of personal interactions with the instructor and the lack of face-to-face impromptu open discussion between student and instructor. She concludes, however, that high quality interactions remain possible in the online environment and warrant increased attention. Research pertaining to interactions in online learning includes a focus on the outcomes of interactions.

Student Satisfaction and Perceived Learning

Many researchers investigate student satisfaction and perceived learning as measures of student outcomes. Richardson (2003) explores the role of social presence in online learning environments and its relationship to students' perceptions of learning and satisfaction. Arbaugh (2001) reports immediacy behaviors (instructors' attempts to reduce social distance) as positive predictors of student learning and course satisfaction. Sher (2009) uses perceived learning and satisfaction as dependent variables positively affected by student-to-student and student-to-instructor interactions.

According to Hiltz (1994), "the quality of education provided by a course should be measured by how much a student learns, retains, and later uses as a result of taking the course" (p. 70). Examinations and assignments as well as student reports of impressions

of their learning (perceived learning) function as measures of the mastery of skills. Researchers report using both student course grade and student perceived learning as an indicator of the mastery of skills in courses (Sher, 2009). McCroskey et al. (1996) assert students “generally have a good sense of what they learned;” therefore, it is acceptable to use students’ perception of learning as a measure of learning (p. 203).

Additionally, Arbaugh (2000) determines that characteristics reflecting instructor attempts to create an interactive classroom environment positively affect student learning. The study evaluates the effects of technological, pedagogical, and student characteristics on student learning. The findings suggest that interaction roles of the instructor may serve an important function in promoting student learning (Arbaugh, 2000b).

Additionally, student satisfaction occurs often in the research as a measurable outcome of online courses. Satisfaction with course activities serves as a dependent variable in studies of distance education, computer-mediated communication, and online courses (Alavi, 1994; Arbaugh, 2000; Johnson et al., 2000). Student satisfaction with online courses, given its relative newness will likely determine whether the student takes subsequent courses in the online format. If students experience dissatisfaction, they will likely stop taking courses in this medium (Arbaugh, 2000). Student satisfaction, according to this research, serves as an indicator of retention in online courses.

Another benefit of student satisfaction in the online environment includes increased opportunities for programmatic success. Menchaca and Bekele (2008) indicate participant satisfaction, along with prerequisite skills and faculty and administrative involvement ensure programmatic success in the distance education environment. Johnson et al. (2000) report students in face-to-face courses reveal slightly more positive

perceptions pertaining to course and instructor satisfaction. However both groups provided positive ratings of the quality of instruction. The researchers conclude that no significant difference exists in the quality of the learning (as measured through several learning outcomes). The promotion of interaction through collaborative learning also serves to promote positive student reactions. Alavi (1994) reports that students who engage in collaborative activities, in the online environment, have a more positive evaluation of the classroom experience and thus are more satisfied. The findings reveal interaction as an indicator of student satisfaction and encourages collaborative activities in the online environment.

Sher (2009) further explores the role of interaction in student satisfaction and student learning. The research examines students taking online courses enrolled at a private university. A web-based research instrument assessed students' characteristics, their perceptions of learning, satisfaction, student-to student interactions and student-to-instructor interactions. Student-instructor interaction and student-student interaction serve as significant contributors of student learning and satisfaction, indicating the importance of interaction in producing positive student outcomes. Sher (2009) indicates the need for additional research of interactions in the online environment from different populations. The role of student-to-student interaction and student-to-instructor interaction in satisfaction and learning warrants examination to increase effectiveness for online courses.

This study developed from numerous research studies. The following matrix serves as a summary of the key research studies pertaining to student interaction in online

communities. The matrix includes prevalent authors, theories, key characteristics of pertinent studies and the data analysis procedures utilized.

Table 2:1

Literature Review Matrix

Author	Theory	Characteristics of Study	Data Analysis
Hiltz (1994)	Technological Determinism	Predictors of success in the virtual classroom: relationship of student attitudes, attributes, and behaviors to student learning	Multivariate regression analysis
Arbaugh (2000a)	Technology Acceptance Model (TAM)	Perceived usefulness, flexibility, course interaction, and student satisfaction	Regression analysis
Arbaugh (2000b)	TAM, Social Information Processing Theory (SIPT), Collaborative learning theory	Factors influencing student learning and the effects of interactive teaching on learning	Sequential regression analysis
Arbaugh (2001)	Social constructivism	Relationship of immediacy behaviors (to reduce social distance) to learning and satisfaction	Regression analysis
Johnson et al. (2000)	Learning Environment	Comparison of satisfaction and learning in online and face-to-face courses	Sample t-tests, Mann Whitney U test
Richardson (2003)	Social constructivism	Effect of social presence on student learning and satisfaction in the online environment	Direct entry regression analysis
Sher (2009)	Interaction as key element of student learning	Importance of interaction to student learning within web-based online learning programs	Stepwise regression analysis

Table 2:1 (continued).

Author	Theory	Characteristics of Study	Data Analysis
Sher (2009)	Mediated Communication/ Interaction is key element of student learning	Student-to-student and student-to-instructor interaction and relationship to student perceived learning and satisfaction	Stepwise regression analysis
Sher (2009)	Interaction as key element of student learning	Importance of interaction to student learning within web-based online learning programs	Stepwise regression analysis

Summary

This literature review discusses several areas related to the study of online CTE. First, it explores the history of the community college and its role in the development of Human Capital Development. Secondly, the literature review addresses the evolution of CTE, specifically in regards to CTE in the community college as a means of workforce development.

Current workforce inadequacies heighten the need for skilled labor thus creating a greater demand for CTE. This demand provides community colleges with the incentive to develop flexible, cost efficient modes of instruction for CTE. Online learning serves as a growing mode of instruction. The chapter addresses the rise in online CTE courses. Next, the literature review provides focus on learning facilitated through interaction in the online environment and the two forms of interaction: student-to-student interaction

and student-to-instructor interaction. The literature review concludes with a discussion of research based on student satisfaction and learning in the online environment in relation to interaction.

Research reveals the increased demand for skilled workers prompts interest in expanding CTE programs to include online learning in many cases. This increase in online CTE courses lacks the necessary research to understand factors promoting successful student and course outcomes in online environments. Many learning theorists focus on the importance of interaction with student learning and success. These factors lead to this research on the relationship between student-to-student and student-to-instructor interactions, and student satisfaction and perceived learning.

The following chapter addresses the research methodology, data collection, and analysis techniques for the present study.

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

Introduction

Chapter III provides a detailed explanation of the research design and methodology for the present study. The purpose of the study is to determine if a relationship exists between student-to-student interactions, student-to-instructor interactions, and student satisfaction and perceived learning. This chapter describes the population utilized in the study, as well as the research instrument. A discussion of the data collection techniques is included and the final section describes data analysis used to test the research hypotheses.

Research Design

According to Tallent-Runnels et al. (2006), research in online courses began as descriptive and exploratory in nature, then shifted to more recent quantitative studies which are more experimental and causal-comparative in design. This study utilizes a survey method of data collection providing “a quantitative description of trends, attitudes, or opinions of a population by studying a sample of that population” (Creswell, 2003, p.153). Researcher objectivity throughout the research strengthens quantitative research, providing an additional advantage for the research methodology (Swanson & Holton, 2005).

This study utilizes a non-experimental, correlational design. According to Huck (2004), relationship serves as the key concept behind correlation. Correlational research seeks to determine whether and to what degree, a relationship exists between two or more quantifiable variables (Gay & Dehil, 1992). The study utilizes survey research

methodology to collect data regarding the characteristics of the students and their online learning experiences. This is not a study of comparison between online and traditional face-to-face courses.

The present study determines if a significant relationship exists between student-to-student interaction and student-to-instructor interaction so that student learning and satisfaction in online CTE courses can be predicted. The following hypotheses were analyzed.

Hypothesis 1:

Student-to-student interaction and student-to-instructor interaction can significantly predict positive student satisfaction in an online postsecondary CTE course, when controlling for the effects of gender, age, number of online courses taken previously, and Internet experience in years.

Hypothesis 2:

Student-to-student interaction and student-to-instructor interaction can significantly predict positive student perceived learning in an online postsecondary CTE course, when controlling for the effects of gender, age, number of online courses taken previously, and Internet experience in years.

Population

The data used for this research study were collected from a Southeastern community college offering online CTE courses. The institution offers approximately 110 fully online CTE courses per semester with 844 students enrolled in online CTE courses during the Fall 2010 semester. Courses offered include the following technical degrees: Business Office Technology (BOT), Computer Network Support Technology

(CNT), Computer Programming Technology (CPT), Court Reporting Technology (CRT), Marketing Management Technology (MMT), Fashion Marketing Technology (FMT), and Paralegal Technology (LET). Students enrolled in online CTE courses serve as the population for the study.

In order to assess the minimum number of participants needed to represent the population, sample size calculations were made. Calculations indicate that for a 95% confidence level, and a 5% confidence interval, 264 of the 844 students should be surveyed. Sample size calculations were performed using graphpad.com. Response rate is one of the greatest and most studied disadvantages of using mail questionnaires with an expected response rate of only 20% when surveying the general community (Borque & Fiedle, 2003). The authors assert that online response rates seem to fall below that of mail surveys and may range from 10% to 20% on average. In an attempt to receive the 264 survey responses necessary, all 844 students received the email invitation for the survey. Due to the nature of online surveying and its propensity toward low response rates, the entire population received the survey, however respondents self-selected from the population when choosing to complete the survey.

Additionally, several steps were employed to increase the response rates and are included in the data collection methods. Survey responses were kept confidential and anonymous. Two follow-ups were sent in addition to the first request. Course instructors helped to promote the completion of the survey by including a request for students to complete the survey in their course content (Fink, 2003).

Students under the age of 18 were not included in the study. The web-based nature of the survey instrument does not permit gaining parental permission, thus any

persons not meeting the minimum age requirement (18) were filtered from the sample and did not receive the survey.

Research Instrument

Self-administered online questionnaires served as the form of data collection utilized in the study. The purpose of the study is to determine if a relationship exists between student-student and student-instructor interactions and student perceived learning and student satisfaction. Survey questions adapted from three previously utilized instruments assessed student perceptions of interactions with peers and with instructor, student perceived learning and student satisfaction with learning.

The study variables include student-to-instructor interaction and student-to-student interaction and serve as the independent variables in this study. Study variables were measured by assessing students' perceptions of student-to-student and student-to-instructor interactions using survey items from Johnson et al. (2000). Sher (2009) further shortened the survey to five items after completing a pilot study and using content expert opinion. The present study utilizes the shortened survey used by Sher (2009).

Student perceived learning and student satisfaction serve as the dependent variables of the study. Both student course grade and student perceived learning are utilized in the research as measures of student learning. McCroskey, Fayer, Richmond, Sallinen, and Barraclough (1996) assert, "clearly students generally have a good sense of what they have learned" thus, it is acceptable to use perceived learning in this form of research (p.203). Numerous researchers use perceived learning as a measure of learning in research studies (Alavi, 1994; Arbaugh, 2000; Hiltz, 1994; Sher, 2004). Student course grades would be an appropriate indicator of learning but are not available to the

researcher due to institutional privacy policies; therefore, for the purpose of this research perceived learning is utilized.

Perceived learning is assessed using six items from a reliable and validated scale adapted from Hiltz (1994). A review of literature on learning effectiveness led to the development of the scale and serves to assess the effectiveness of an online course. Alavi (1994), Arbaugh (2000) and Sher (2009) use the scale in addition to Hiltz (1994) in studies of distance learning.

Validity and Reliability

Validity and reliability remain important aspects considered in any research study. Huck (2004) defines reliability as consistency and validity as accuracy. Within this definition, he states that accuracy requires consistency. Reliability serves as a necessary component for validity; however, reliability alone does not indicate validity.

As with all research, inferences drawn from data analysis cannot be conclusively ruled accurate; however, this study includes specific steps designed to reduce threats to the study's validity. First, the survey instrument includes three previously validated surveys. Reliability and validity measures of these instruments are detailed in Table 3:1. The table reviews the individual reliability and validity measures produced by previous researchers utilizing all or part of the instrument. While other researchers assessed the reliability of the individual instruments, additional measures are required to ensure the reliability and validity of the survey instrument as a whole. Creswell (2003) asserts the modification or combination of a survey instrument with other instruments requires original validity and reliability may not hold for the new instrument. It then becomes important to re-establish reliability during data analysis in a survey study.

Reliability

In the present study, scale reliability of the survey instrument will be assessed using coefficient alpha or Cronbach's alpha to assess internal consistency. According to Huck (2004), this is an appropriate measure when using a Likert-type questionnaire.

Internal Validity

According to Shadish et al. (2002) internal validity refers to "inferences about whether observed covariation between A and B reflects a causal relationship from A to B in the form in which the variables were manipulated or measured" (p. 53). Internal validity can only be established when there are no biases leading to the false identification of predictor variables in a study (Boslaugh & Watters, 2008, p. 99). According to Boslaugh and Watters (2008), internal validity may be threatened by systematic biases in selection, intentional bias, self-serving bias. In the present study, participants are self-selected as they choose to complete or not complete the survey. They did not receive any reward or credit for the completion of the survey eliminating the potential of a self-serving bias. However, the lack of randomness presents the potential for a selection bias. Participants choosing to complete the survey may be different than those choosing not to complete the survey. Random assignment, although preferable, is not possible in this study because students are not required to complete the survey.

External Validity

Shadish et al. (2002) state "external validity concerns inferences about the extent to which a causal relationship holds over variations in persons, settings, treatments and outcome" (p. 53). For the present study, external validity involves the generalizability of data across persons and settings. External validity of the present study is strengthened by

the use of previously validated surveys which have been used to study various populations. Previous researchers used expert opinion and statistical validity measures to evaluate the external validity of the instrument.

Additionally, the content validity of the survey is assessed using subject matter experts who reviewed the survey in order to suggest changes to the survey prior to the implementation of the study. According to Huck (2004), expert review of the research instrument enables researchers to establish the content validity of the instrument. Sher (2009) assessed content validity using subject matter experts to review the survey instrument as a measure of validity in addition to piloting the survey instrument prior to implementing the study. Subject matter experts validated the present study's instrument in regards to readability, conciseness, and clarity of survey questions but did not edit survey content. The subject matter experts did not make any suggestions for change.

Shadish et al. (2002) recommend the use of design controls to minimize threats to validity. The present study includes the following control variables developed by Sher (2009): gender, age, level, Internet experience, and number of online course taken previously. Control variables are included in the research to isolate the effects of the independent variables on the dependent variables.

Table 3:1

Instrument Validity and Reliability

Survey Items	Validity Measures	Reliability Measures
Student-to-student interaction and student-to-instructor interaction (Johnson et al., 2000)	<ul style="list-style-type: none"> a. Content validity established by the opinion of content experts and pilot testing b. Construct validity established through principal component analysis method used to assess the factor structure of items relating to each of the constructs. A .50 cutoff criteria was used to define salient factor loading. Based on the factor analysis, 24 of the 50 items of the original instrument were selected. 	<ul style="list-style-type: none"> a. Reliability measurements were not provided by the author in the article.
Student Satisfaction (Arbaugh, 2000)	<ul style="list-style-type: none"> a. Factor analysis identified one variable called “student satisfaction” with an eigenvalue of 8.17 and a minimum loading of .62, with 11 of the 12 items loading at .75 or higher (Arbaugh, 2000) 	<ul style="list-style-type: none"> a. Measured 5-items from Arbaugh’s scale (2000), coefficient of the satisfaction scale = .93 (Giannousi, et al., 2009) b. Internal reliability measures at .92 (Arbaugh, 2000b)
Perceived Learning (Hiltz, 1994)	<ul style="list-style-type: none"> a. Using scale adapted from Hiltz 1994, Chronbach’s alpha = .92 	<ul style="list-style-type: none"> a. The internal reliability of this measure was 0.91 (Sher, 2008)

Procedures

The procedures for this study were developed for the online environment enabling the entire population the opportunity to participate in the survey. Course access is available to the student population through Blackboard®, a web-based course management system. Students may be located anywhere in the United States, access

course materials through a password protected, web-based system, and complete course requirements at varying times of day. Surveys were administered through the Internet because the courses themselves are Internet based. An administrator at the participating community college of the study forwarded the researchers email invitations to the population. The survey invitations included a link to the survey on the survey site “Survey Monkey.”

Dillman et al. (2009) assert that the Internet serves as a useful mode for conducting surveys targeted at very specific populations such as college students and certain professionals. Benefits of online surveys include flexibility in delivery, speed and timeliness, convenience and ease of data entry and analysis (Evans & Mathur, 2005). Wright (2005) agrees that time and convenience serve as benefits of online surveys, in addition to cost reduction associated with moving to an electronic medium from a paper format. Evans and Mathur (2005), however, warn about the many disadvantages of online surveys. Disadvantages include the possibility of the survey appearing to the recipient as junk mail and the technological variations experienced based on the user’s Internet connection and configuration of the user’s computer. Additionally, differences among Internet users and non-Internet users may affect data (Wright, 2005). Self-selection bias serves as a major limitation of online surveying because in an online community it is likely that some individuals are more likely to complete an online survey. Wright suggests conducting online surveys with the same or similar types of Internet communities as a means to gain a reliable picture of the characteristics of online survey participants.

Although disadvantages in online surveys exist, the population for this study includes students currently enrolled in online courses indicating a level of Internet use and access appropriate for online surveys. The form of dissemination of the survey (online) mirrors that which the course itself utilizes, thus justifying the use of an online survey. The utilization of best practice data collection serves to increase the likelihood of increased response rates and decrease survey error.

Dillman's (2009) "Tailored Design Method" involves the use of various motivational features in mutually supportive ways to encourage the high quantity and quality of survey responses, reducing the four sources of survey error: coverage, sampling, nonresponse, and measurement. Nonresponse error occurs when everyone sampled does not respond to the survey request and those that do not respond are different from those who do respond. Fink (2003) supports Dillman (2009) in reporting that follow-ups serve as the best means of increasing response rate, thus strengthening the credibility of one's study. To maximize participation, recipients received a series of emails prompting survey completion.

Three email messages were sent to the sample of participants. Each message provided the link to the web-based survey and described the time requirement for completion (5-10 minutes). Each email included a statement of confidentiality. The initial email was sent to students on November 1, 2010. Two weeks later a second email was sent. The second follow-up email was sent on November 22, 2010 and the final day for submission of surveys was December 1, 2010.

Data Analysis

Data analysis includes both descriptive and inferential statistics. Descriptive analysis of respondents includes gender, age, number of online courses taken previously, and previous Internet experience in years. Descriptive statistics involve summarizing and describing quantitative information in meaningful ways while inferential statistics serve to make conclusions beyond the data collected and to test hypotheses

Hypotheses testing is achieved through sequential regression analyses. Sequential regression algorithms provide the means to test the significance of several independent variables while controlling for other variables. Several researchers have utilized regression analysis in studies of student outcomes in the online environment. Arbaugh (2000b) utilized multivariate regression analysis in a study of perceived usefulness, flexibility, course interaction, and student satisfaction in online courses. Additionally, Arbaugh (2001) utilized multivariate regression analysis in the study of the relationship of immediacy behaviors to reduce social distance to learning and satisfaction in the online environment. Likewise, Hiltz (1994) analyzed data using multivariate regression analysis in the study of predictors of success in the virtual classroom.

Sequential regression attempts to improve simple regression estimates through the addition of a second-stage to the regression model (Witte, Greenland, Haile & Bird, 1994). Sequential differs from a simultaneous model in that independent variables are entered sequentially according to some specified hierarchy dictated in advance through research. According to Cohen and Brawer (2003), sequential regression analysis adds to the researcher's understanding of the studied phenomena because it requires thoughtful input by the researcher in determining the order of entry of independent variables.

Additionally, the analysis includes successive tests of the validity of the hypotheses that determine the order of entry (Cohen & Brawer, 2003).

Arbaugh (2000a) utilized sequential regression analysis in a study of environment and engagement affects of student learning in online courses. To ensure that the relationships between variables were as direct as possible, Arbaugh used the following control variables: gender, age, and number of previously taken online courses. In the first step regression model, moderate relationships were found between age and perceived learning and gender and perceived learning. However, these effects became non-significant in the full model. Variables found to be associated with learning were three variables for interaction.

This study utilizes sequential regression analysis for data analysis. The hypotheses are tested using the following equation where SSI represents student-to-student interaction, SII represents student-to-instructor interaction, Gender represents gender of respondent, Age represents age of respondent, Exp. Represents years of Internet experience of respondent and Courses represents the number of online courses the respondents have previously taken:

$$\text{Learning} = \alpha + \beta_3\text{Gender} + \beta_4\text{Age} + \beta_5\text{Exp.} + \beta_6\text{Courses} + \beta_1\text{SSI} + \beta_2\text{SII} + \text{Error}$$

$$\text{Satisfaction} = \alpha + \beta_3\text{Gender} + \beta_4\text{Age} + \beta_5\text{Exp.} + \beta_6\text{Courses} + \beta_1\text{SSI} + \beta_2\text{SII} + \text{Error}$$

The Statistical Package for Social Sciences (SPSS) application program was used to perform the sequential regression analysis. The criterion for the rejection of the null hypothesis will be determined at the statistical significance at the $p < .05$ level of probability. The survey instrument will use a 5-point Likert-type scale with 5 representing strongly agree and 1 representing strongly disagree.

Independent Variables

Student-to-student interaction and student-to-instructor interaction serve as the independent variables in this study. Independent variables are measured by assessing students' perceptions of student-to-student and student-to-instructor interactions using survey items from Johnson et al. (2000). These survey items were adapted from the Distance and Open Learning Scales (DOLES) and the Dimensions of Distance Education (DDE).

Using the CISS instrument, Johnson et al. assessed student-to-student interaction using five items that represented “characteristics of a learning environment that supports student communications, shared learning experiences, teamwork, building a sense of community, and promoting an increase in student contacts” (p. 39). Johnson et al. (2000) assessed student-to-instructor interactions using six items pertaining to “teaching style, interaction with the instructor during and outside of the class, instructor feedback on student progress, and the instructor’s treatment of the students” (p. 40). Sher (2009) further shortened the survey to five items after completing a pilot study and using content expert opinion. The present study utilizes the shortened survey used by Sher (2009).

Table 3:2

Independent Variables

Independent Variables	Measure	Source
Student-to-instructor Interaction	1. The instructor encouraged me to become actively involved in the course discussions.	Student Survey (Items from Johnson et al. (2000))

Table 3:2 (continued).

Independent Variables	Measure	Source
Student-to-instructor Interaction	2. The instructor provided me feedback on my work through comments.	Student Survey (Items from Johnson et al. (2000))
	3. I was able to interact with the instructor during the course discussions.	
	4. The instructor treated me as an individual.	
	5. The instructor informed me about my progress periodically.	
	Student-to- student Interaction	
7. I was able to communicate with other students in this course.		
8. Increased contact with fellow students helped me get more out of this course.		
9. A sense of community existed with fellow students taking this course.		
10. This course encouraged me to work in small groups/teams.		

Note. (Sher, 2009).

Independent Variables Used as Control Variables

According to Creswell (2003), control variables are a unique type of independent variable “measured in a study because they potentially influence the dependent variable” (p. 95). Control variables play an active role in quantitative studies and researchers can use statistical procedures to control for these variables (Creswell, 2003). Control variables are included in this study to isolate the effects of the independent variables.

The control variables chosen for the present study emerged from literature regarding online courses. Arbaugh (2001) utilizes several control variables in the study of how instructor immediacy behaviors affect student satisfaction and learning in online courses. Control variables used by Arbaugh (2001) include student age, gender, number of international students, number of prior web-based courses taken by student, student attitude toward the delivery technology, class section size, number of prior web-based courses taught by the instructor, the course’s number of credit, and number of audio clips. The results of Arbaugh’s study indicate a positive relationship among instructor experience and course satisfaction. Additionally, Arbaugh reports a negative association among prior student experience and course satisfaction. Instructor experience levels are not available for this study, however prior student experience in online classes is measured and serves as a control variable. Arbaugh (2000c) also uses gender, age, and number of prior online courses taken as control variables in an assessment of classroom environment and student engagement in the online environment. Additionally, prior studies indicate a relationship among Internet usage experience and course satisfaction (Hiltz, 1994; Ridley & Sammour, 1994). Internet usage may increase course participation and serves as an indicator of students’ likelihood of taking additional online

courses (Hiltz, 1994). For these reasons, the control variables for the present study include age, gender, prior experience in online courses, and Internet experience.

Table 3:3

Control/Intervening Variables

Variables	Measure
Gender	Student Survey Question# 23
Age	Student Survey Question #24
Number of Online Courses Taken Previously	Student Survey Question #25
Internet Experience in Years	Student Survey Question #26

Dependent Variables

Both student course grade and student perceived learning are assessed in the research as measures of student learning. McCroskey et al. (1996) assert, “clearly students generally have a good sense of what they have learned” thus, it is acceptable to use perceived learning in this form of research (p. 202). Numerous researchers have successfully used perceived learning as a measure of learning in research (Alavi, 1994; Arbaugh, 2000; Hiltz, 1994; Sher, 2004).

Perceived learning was assessed using six items from a reliable and validated scale adapted from Hiltz (1994). The reliability and validity measures of the scale are detailed in Table 3:1. A review of literature on learning effectiveness led to the development of the scale and serves to assess the effectiveness of an online course. Alavi (1994), Arbaugh (2000) and Sher (2009) use the scale in addition to Hiltz (1994) in

studies of distance learning. Table 3:4 exhibits the dependent variables used in the study and the questions used to measure these variables.

Table 3:4

Dependent Variables

Research Variable	Measure	Source
Perceived Learning	11. I learned to interrelate the important issues in the course material.	Student Survey adapted by Sher (2009) from Hiltz (1994)
	12. I gained a good understanding of the basic concepts of the material.	
	13. I learned to identify the central issues of the course.	
	14. I developed the ability to communicate clearly about the subject.	
	15. I improved my ability to integrate facts and develop generalizations from the course material.	
	16. I learned concepts and principles in the course.	
Satisfaction	17. The quality of the course compared favorably to my other courses.	Student Survey adapted by Sher (2009) from Arbaugh (2000)
	18. I was very satisfied with this course.	
	19. If I had another opportunity to take another course via this mode I would gladly do so.	
	20. I gained more interest in the subject matter of this course.	
	21. I feel that this course served my needs well.	
	22. I would recommend this course to another student.	

Note. (Sher, 2004).

Summary

Chapter III describes the research design of the present study. A non-experimental correlational design is utilized. The study seeks to find a relationship between student-to-student and student-to-instructor interaction and student learning and satisfaction in online learning environments for CTE courses.

Population and data collection for the study is reviewed. The population for the study includes students enrolled in online CTE courses at a specific Southeastern community college. The required sample size to achieve a 5% confidence interval includes 264 of the 844 students in online CTE courses. Therefore, the survey was provided to the entire population. The data collection process employed includes an online survey invitation. Online surveying can ensure confidential submission of surveys through a web-based survey tool.

The chapter also includes a review of the survey instrument utilized in the analysis of the research hypotheses. The survey instrument, developed by Sher (2009), includes survey items from Hiltz (1994), Arbaugh (2000), and Johnson et al. (2000).

Finally, validity and reliability measures for the study are addressed. Internal reliability measures as well as internal and external validity are discussed. This chapter serves as the outline for the research methodology and implementation of the study, providing a framework for the quality of the research.

CHAPTER IV

RESULTS OF ANALYSIS

Chapter IV presents the statistical results of this study. Students enrolled in online CTE courses at a Southeastern community college during the fall 2010 serve as the population for this study. The online CTE student population of 844 students was surveyed. A total of two hundred and five (24.3%) of the students emailed began the survey. The number of students who completed the survey in its entirety was 148 (17.5%). The study explores student-to-student interaction and student-to-instructor interaction in online community college CTE courses. The analysis attempts to determine if a relationship exists among student-to-student interaction and student-to-instructor interaction and student satisfaction and perceived learning in the online CTE courses. Sequential regression analysis is used to test the following hypotheses:

Hypothesis 1:

Student-to-student interaction and student-to-instructor interaction can significantly predict positive student satisfaction in an online postsecondary CTE course, when controlling for the effects of gender, age, number of online courses taken previously, and Internet experience in years.

Hypothesis 2:

Student-to-student interaction and student-to-instructor interaction can significantly predict positive student perceived learning in an online postsecondary CTE course, when controlling for the effects of gender, age, number of online courses taken previously, and Internet experience in years.

Demographic Data

In this study, descriptive statistics describe the population. Statistical tests are used to make conclusions about populations based on results from the sample or to determine the probability that results are not due to random chance.

The survey included questions of gender, age, number of online courses taken previously and Internet experience in years. The analysis of reported gender revealed that 90% (n=133) were female and 10% (n=15) were male. Table 4:1 expresses the division of respondents among age groups.

Table 4:1

Age of Survey Respondents

Age Groups	Respondents	Percent of Respondents in Category
18-20	11	7.4%
21-30	61	41.2%
31-40	38	25.7%
41-50	32	21.6%
51-60	4	2.7%
60+	2	1.4%

Number of online distance education courses previously taken was assessed with a mean score of 5.31 and a standard deviation of 4.431. Likewise, years of Internet experience was determined and had a mean score of 10.42 and a standard deviation of 5.040. The

participants were mostly female and ranged in age from 18 to 60, with the majority of students being between 18-40 years of age.

Preparation of the Data

The focus of this study was to examine if a relationship exists among student-to-student and student-to-instructor interaction and student satisfaction and perceived learning. The sum of survey questions 1, 2, 3, 4, and 5 created the composite variable student-to-instructor interaction (SII). The sum of survey questions 6,7,8,9 and 10 composed the composite variable student-to-student interaction (SSI) The sum of survey questions 11, 12, 13, 14, 15 and 16 composed the composite variable perceived learning (learning). The sum of survey questions 17, 18, 19, 20, 21, and 22 composed the composite variable student satisfaction (satisfaction). The researcher utilized sum variables rather than averaging in an effort to retain variability. In addition, the researcher dummy coded the nominal variables of gender and age groups. Gender was converted into a dummy variable, Male. Age was converted into dummy variables eighteen_twenty, thirtyone_forty, fortyone_fifty, fiftyone_sixty, and sixtyplus. The researcher excluded the levels female and twentyone_thirty when dummy variables were entered into the analysis.

Next, the researcher addressed four assumptions in regression for each of the dependent variables. Assumptions for the data must be met in order to apply a valid regression model (Wonnacott & Wonnacott, 1981). For the testing of hypothesis 1, normality was assessed through the Durbin-Watson statistic test and casewise diagnostics. The Durbin-Watson statistic test = 1.88, which is a reasonable range (between 1.5 and 2.5), indicating normality (Mendenhall & Cincich, 1996). Case-wise

diagnostics showed one outlier, case number 189. The standard deviation of the outlier was -3.071. Although, this is out of the 3 standard deviation range, the case was not excluded from the analysis because of the small sample size. The researcher made the decision to include the case so as to not forfeit an additional respondent. Collinearity diagnostic showed notable absence of multicollinearity present because Tolerance $> .01$ (SII tolerance = .924; SSI tolerance = .937; SII VIF = 1.082; SSI VIF = 1.068).

For the second dependent variable, SSI, normality was assessed through the Durbin-Watson statistic test and casewise diagnostic. The Durbin-Watson statistic test = 2.18, which is a reasonable range (between 1.5 and 2.5), indicating normality of the data (Mendenhall and Sincich, 1996). There were no outliers in this analysis. Collinearity diagnostic upheld the absence of multicollinearity because Tolerance $> .01$ (SII tolerance = .924; SSI tolerance = .937; SII VIF = 1.082; SSI VIF = 1.068).

A scatter plot was used to determine if the assumption of linearity was met. The scatter plot of the residuals showed they were evenly distributed around a mean of zero. Additionally, a normal probability plot of both SSI and SII, expressed linearity based on the proximity of the points on the line. To assess the assumption of homoscedasticity, a histogram of the residuals was created to provide visual assessment that the measurement errors in the response variable are normally distributed. The histogram was randomly scattered, therefore the assumption of homoscedasticity was supported.

Analysis of Hypotheses

During the sequential regression, the variables enter into the regression equation one block at a time (Keith, 2006). For the current study, the control variables age, gender, number of online courses taken previously and Internet experience in years, entered into the equation in the first step or block. The second block included the

independent variables student-to-student interaction (SSI) and student-to-instructor interaction (SII).

Hypothesis 1: The purpose of this research was to determine whether SII and SSI have a positive effect on satisfaction while controlling for age, gender, number of online distance education courses previously taken and Internet experience in years. To accomplish this purpose SII and SSI were regressed on student satisfaction using sequential multiple regression. The results of the analysis are shown in table 4:1. Control variables entered in the first block of the regression did not result in a statistically significant increase in explained variable ($\Delta R^2 = .068$, $F[8, 139] = 1.270$, $p = .264$). Of greater interest are the results of the second block of the sequential regression. In this step, the variables of SSI and SII were entered as a block. As shown in the table, these variables explained a statistically significant increase in student satisfaction ($\Delta R^2 = .564$, $F[10,137] = 23.53$, $p < .001$). The two independent variables, SSI and SII, explained 63.2% of variance while the control variables explain only 6.8 % of variance. Coefficients revealed SII as having a positive effect on student satisfaction ($p < .001$), however SSI did not have a significant positive relationship to student satisfaction ($p = .840$). These findings suggest that the SII variable may increase student satisfaction in the online environment.

Table 4:2

Results of Sequential Regression Models of Student Satisfaction

Variables	Student Satisfaction	
	Block 1	Block 2
Gender	2.491	.009
Eighteen to twenty years old	-1.993	-1.947+
Thirtyone to forty years old	-1.132	.052
Fortyone to fifty years old	-1.901+	-.082
Fiftyone to sixty years old	.002	1.506
Sixtyyears plus	-4.731	.725
Number of distance courses previously taken	.191+	.103
Prior Experience with Internet Courses	-.106	-.047
Student-to-instructor interaction		.887***
Student-to-student interaction		-.015
F	1.270	23.528***
Degrees of Freedom	8	10
Adj. R-squared	.014	.605
Change in R-squared		.564***

Note. Standardized coefficients reported

n=148

+p<.10

*p<.05

**p<.01

***p<.001

Hypothesis 2: The purpose of this research was to determine whether SII and SSI have a positive effect on student perceived learning while controlling for age, gender, number of online distance education courses previously taken and Internet experience in

years. To accomplish this purpose SII and SSI were regressed on perceived learning using sequential multiple regression. The results of the analysis are shown in table 4:2. Control variables entered in the first block of the regression did not result in a statistically significant increase in explained variable ($\Delta R^2 = .055$, $F[8, 139] = 1.015$, $p = .428$). Of greater interest are the results of the second block of the sequential regression. In this step, the variables of SSI and SII were entered as a block. As shown in the table, these variables explained a statistically significant increase in perceived learning ($\Delta R^2 = .601$, $F[10,137] = 26.125$, $p < .001$). The two independent variables, SSI and SII, explained 60.1% of variance while the control variables explain only 5.5 % of variance. Coefficients revealed both SII and SSI as having a positive effect on student perceived learning (SII, $p < .001$; SSI, $p < .001$). These findings suggest that the SII and SSI variables may increase student perceived learning in the online environment.

Table 4:3

Results of Sequential Regression Models of Student Perceived Learning

Variables	Student Learning	
	Block 1	Block 2
Gender	2.702+	.551
Eighteen to twenty years old	-.386	-.431
Thirtyone to forty years old	-1.077	-.006
Fortyone to fifty years old	-1.173	.424

Table 4:3 (continued).

Variables	Student Learning	
	Block 1	Block 2
Fiftyone to sixty years old	-2.109	-.615
Sixtyyears plus	-5.938+	-.849
Number of distance courses previously taken	.091	.008
Prior Experience with Internet Courses	-.017	.050
Student-to-instructor interaction		0.694***
Student-to-student interaction		.135*
F	1.015	26.125***
Degrees of Freedom	8	10
Adj. R-squared	.001	0.631
Change in R-squared		.601***

Note. Standardized coefficients reported

n=148

+p<.10

*p<.05

**p<.01

***p<.001

Cronbach's Alpha was utilized to assess internal consistency of the survey instrument (Huck, 2004). SII included five items rated on a 5-point Likert scale, from 1 *strongly disagree* to 5 *strongly agree*. The Cronbach's Alpha for SII was .88 in this

study. SSI also included five items on the 5-point Likert scale and had a Cronbach Alpha of .90. Learning and Satisfaction each included six items rated on the 5-point Likert scale and had a calculated Cronbach's alpha of .95 and .95.

Threats to Validity

During data analysis a potential threat to internal validity emerged. This was due to the low percentage of male survey respondents. Only 10% of respondents identified themselves as male. This is a threat to internal validity because the population is not representative of the entire online CTE community and results may not reflect the population. Gender differences in the online environment are further discussed in Chapter V.

Summary

This chapter summarized the statistical results of this study. Surveys were gathered using the online survey software Survey Monkey during the Fall of 2010. The student population included students enrolled in online CTE courses at a Southeastern community college. The analysis examined the relationship among student-to-instructor interaction (SII) and student-to-student interaction (SSI) and student satisfaction and perceived learning. The data indicated statistical significant relationship among SII and student satisfaction. The data also indicated a statistically significant relationship among both SII and SSI and student perceive learning. The hypotheses were supported with the exception of SSI, which did not reveal a significant relationship with student satisfaction. Chapter V will discuss the implications of the results of the study and provide recommendations for policy and practice in addition to recommendations for future research.

CHAPTER V

SUMMARY, DISCUSSION, AND RECOMMENDATIONS

Summary

The current demand for skills training drives industries and institutions alike to search for cost-effective, time-efficient, modes for delivering training. Limited research on online CTE courses produces the need for a greater understanding of the implications of using educational media with students, institutions, and the workforce.

Sequential regression was used to test the Hypotheses of the study.

Hypothesis 1: The purpose of this research was to determine whether SII and SSI have an effect on satisfaction while controlling for age, gender, number of online distance education courses previously taken and Internet experience in years. The researcher regressed student satisfaction on SSI and SII while controlling for age, gender, number of online courses taken previously and Internet experience in years. SSI and SII variables explained a statistically significant increase in student satisfaction ($\Delta R^2 = .564$, $F[10,137] = 23.53$, $p < .001$). The two independent variables, SSI and SII, explained 63.2% of variance while the control variables explain only 6.8 % of variance. Coefficients revealed SII as having a positive effect on student satisfaction ($p < .001$); however, SSI did not have a significant relationship to student satisfaction ($p = .231$).

Hypothesis 2: The purpose of this research was to determine whether SII and SSI have an effect on student perceived learning while controlling for age, gender, number of online distance education courses previously taken and Internet experience in years. SSI and SII variables explained a statistically significant increase in perceived learning ($\Delta R^2 = .631$, $F[10,137] = 26.125$, $p < .001$). The two independent variables, SSI and SII,

explained 60.1% of variance while the control variables explain only 5.5 % of variance. Coefficients revealed both SII and SSI as having a positive effect on student perceived learning (SII, $p < .001$; SSI, $p < .001$). These findings suggest that the SII and SSI variables may increase student perceived learning in the online environment.

The results of this study may help organizations and higher educational institutions create more meaningful and successful online courses for CTE through the increased understanding of what drives student outcomes. The study examines the relationship among interaction in online CTE courses and student outcomes. Specifically, the study focuses on student-to-student and student-to-instructor interactions and the relationship to student satisfaction and perceived learning in online CTE courses.

Conclusions and Discussion

The results of the study indicate that SSI and SII affect student satisfaction and perceived learning. Specifically, student-to-instructor interaction significantly affects student satisfaction. Both student-to-instructor and student-to-student interaction have a significant relationship with student perceived learning. The results have implications for online instructors, potential benefits for skills training and add to the current body of knowledge in online instruction.

The analysis of Hypothesis 1 focused on the ability of student-to-instructor interaction and student-to-student interaction to predict student satisfaction. The results of the study reveal student-to-instructor interaction as being a significant predictor of student satisfaction; however student-to-student interaction was not a significant predictor of student satisfaction. This is contrary to Sher's (2004) research findings in which student-instructor interaction and student-student interaction was found to be a

significant predictor of satisfaction. Additionally, Arbaugh (2000a) found student-to-instructor and student-to-student interaction are strong predictors of student satisfaction. These results indicate that students may not be satisfied with peer interactions in the online environment. Students may have experienced conflict with other students, disagreements or issues when working in teams. Just as in face-to-face instruction, online instruction often requires conflict management from the instructor. Other potential causes of the lack of satisfaction with peer interactions include the ease of interaction. Students may not have the same access to other students as they do with their instructor. These issues can be explored further through additional data collection pertaining to student-to-student interactions in the online environment.

Hypothesis 2 focused on the ability of student-to-student interaction and student-to-student interaction to predict student perceived learning. Results of the study revealed student-to-instructor interaction and student-to-student interaction are both significant predictors of student perceived learning. Likewise, Arbaugh (2000a) found instructor emphasis on interaction, ease of interaction, and classroom dynamics to be significantly associated with student perceived learning. Additionally, Sher (2009) observed both instructor and peer interactions to be significant predictors of student perceived learning. This indicates that interaction among instructors and peers support student learning in online CTE courses. Interestingly, while students did not attribute peer interaction with satisfaction, they did attribute peer interaction to learning. Perhaps student interactions resulted in disagreements or conflict, contributing to a lack of satisfaction. This may explain why interaction did not contribute to satisfaction; however, students were able to see the value of the experiences through learning. In face-to-face courses, students may

experience positive or negative responses to team work and the same seems to be true of the online environment. Because students feel student-to-student interaction contributes to learning, educators must explore how to best develop and utilize relationships to increase learning in the online environment.

The analyses of hypotheses emphasize the importance of the role of the online instructor. The instructor may positively affect student satisfaction and learning through interaction, responsiveness, encouragement and the development of a community of learners (Sher, 2004). Swan and Shea (2005) assert that moderators of online environments must possess managerial, social, pedagogical and technical skills. In addition, organizational and intellectual skills remain important for the online instructor. The results have important implications for those employing, training or managing online instructors. Improvements in online training for online instruction must include learning, collaboration and management techniques rather than technical skills alone. More broadly, organizations and institutions must recognize that successful courses do not consist solely of content, but include opportunities for interaction facilitated through an instructor skilled in the art of the online facilitation of learning.

Improved instruction serves as one area of implication for this research. The role of the student and the benefit of the interactive online environment also need consideration. According to Palloff (2001), interactive skills learned in the online environment can be carried over to the face-to-face setting. Once instructors recognize students for their contributions in class, thinking skills and ability to interact, students are likely to gain confidence and discover skills in other settings. This serves as an increased incentive for increasing interaction in online courses. Likewise, Palloff (2001) asserts

that students may find that the most profound learning in online courses come through interaction. Palloff (2001) also states students that believe education happens through exposure to “the sage on the stage” as many might describe the traditional academic world (p. 108). In contrast, in the online environment, the instructor acts as a facilitator, or a “guide on the side,” enabling students to learn collaboratively from one another (p. 108). For many students, this is a significant shift, and one for which they need to be adequately prepared. The paradigm shift occurring when one becomes an active participation in their own learning is a valuable lesson that applies across all fields of study.

The potential of online learning environments to support the social construction of knowledge, although not yet fully realized in most cases, suggests a real paradigm change and clearly warrants serious investigation (Swan & Shea, 2005). Research suggests that the emergence of virtual learning communities in which students actively engage and interact with instructors and peers, may improve student satisfaction and perceived learning. The present study supports this research and suggests that both instructor and peer interaction may increase learning in the online environment.

Another area of analysis is that of the control variables utilized in the study. Control variables were included in this study based on research indicating that individual student characteristics can predict outcomes in the online environment (Swan & Shea, 2005) and to increase the validity of the study by eliminating potential alternative explanations (Arbaugh & Hiltz, 2005). The effects of age, gender, number of online distance education courses taken and the years of previous Internet experience were controlled in this study. The control variables did not have a significant relationship to

either of the dependent variables, indicating that these variables are not major determinants of outcomes in the online environment. This supports previous research by Hiltz and Shea (2005) which reports that while some students may be more likely to thrive in the online environment than others, major determinants of outcomes include student and faculty support, as well as course design and instructor behavior.

Limitations

Upon analysis, a few ancillary limitations were revealed. Gender differences in the online environment emerged as a potential limitation of the study. In the present study, 84.4% of survey completers selected female as their gender, while only 8.8% selected male. This group was primarily female, which may affect the results of the research. Hiltz and Shea (2005) reviewed several studies focusing on gender differences in the online environment and report several consistent findings. For example, females tended to communicate more with the instructor and other students than their male counterparts (Hiltz & Shea, 2005), female students participated at higher levels, learned more, and were more satisfied with their specific courses than male students (Hiltz & Shea, 2005). The lack of male survey completers hinders the researcher's ability to fully analyze whether similar differences exist in the present survey. While this study did not seek to expose a difference among genders, the lack of male participants may affect the overall results. The online CTE programs surveyed have primarily female students and additional research is necessary to understand the implications of gender on satisfaction, perceived learning and interaction. The potential exists to expose a larger population, with more male participants to this survey for more broad understanding. This study did not expose a difference among genders. Additional research is necessary in this area to

further understand the effect of gender on student outcomes and its implications for SSI and SII.

A second ancillary limitation includes the number of participant responses. Of the 844 students surveyed, 205 (24.3%) began the survey, but only 148 (17.5%) completed the survey. While the initial response falls within the expected response rate of only 20% when surveying the general community (Borque & Fiedle, 2003), the study lacked 116 responses in gaining the 264 respondents to achieve a 95% confidence interval. Borque and Fiedle (2003) assert that online response rates seem to fall below that of mail surveys and may range from 10% to 20% on average. The current research study supports this assertion. Additional respondents would serve to increase the strength of the survey. Perhaps direct encouragement from instructors would increase response rates. Incentives may also encourage participation in the online survey.

Recommendations for Policy or Practice

The rising demand for skilled labor produces an increased need for flexible, cost efficient training delivery. With the increased use of online learning in both higher education and industry, skills training delivered through online courses will become more prevalent. CTE online courses serve as an example of this form of training. Increased understanding of contributors to student outcomes in this environment enables learning developers to produce quality online programs to prepare a skilled workforce. Just as the chalkboard disappears from classrooms, classrooms are disappearing from courses. Instructors often find that the computer has eaten their classroom and the time has come to adapt and learn how to facilitate learning in a new environment.

Based on the results of this research, online CTE courses should be developed with SSI and SII as a focus. Instructors must strive to increase their interaction with students during the course and must create an environment in which students may interact with one another. SSI and SII are predictors of satisfaction and learning and may serve to increase retention and success in online CTE courses. This research warrants additional attention to interactive opportunities in the online class. Just as in face-to-face courses, interaction is a key element in satisfaction and learning. Courses must be designed to foster interaction among students and instructors.

Recommendations for Future Research

The relatively small group of students surveyed in this study provides opportunities to replicate the study using a larger population. Due to the much larger female population, additional research is necessary in a more gender equal population to increase generalizability of the results and to determine what effect gender has on student outcomes in the online environment.

In order to fully capture the role of interaction in online environments, qualitative research must be added to the current quantitative studies. These studies may serve to assist researchers in understanding the specific interactive behaviors that increase student satisfaction and perceived learning in the online environment. Focus groups, interviews and studies analyzing best practices may lead researchers and practitioners to the necessary pedagogical changes to increase positive student outcomes. It would also be beneficial to compare different types of interactive tools and their effectiveness in increasing positive student outcomes.

The results of this study provide a basis upon which additional research in online Career Technical Education may occur. CTE in the community college serves as a source of workforce training, preparing students for work through hands-on, job-specific, vocational training. Institutional and industry needs for cost efficient and time effective forms of delivering skills training necessitates further research to determine how interaction may be fostered in online environments to improve student outcomes. Institutions may increase the effectiveness of online CTE courses and industry may use this research to develop online continuing skills training for employees.

The study may be replicated in different populations such as organization or company specific online skills training, university skills training courses, and potentially high school CTE online programs. Additional research in what behaviors and activities specifically contribute to positive interactive behaviors is necessary. Qualitative measures may be combined with quantitative efforts to provide a more complete picture of the role of interaction in student outcomes and how to best produce quality, learning interactions for students.

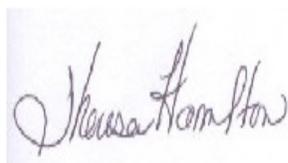
APPENDIX A
SOUTHEASTERN COMMUNITY COLLEGE
INSTITUTIONAL REVIEW BOARD LETTER OF APPROVAL

Dear Mrs. Lewis,

I have reviewed your application to The University of Southern Mississippi's Institutional Review Board to perform survey research at [REDACTED]. You have my permission to survey online Career and Technical Education students enrolled at [REDACTED] as detailed in your application. Institutional research such as this can provide valuable insight into educational practices, specifically in the areas of online Career and Technical Education.

The administration of the College feels that the probability and magnitude of harm or discomfort anticipated in performing this survey research are not greater in and of itself than any normal classroom activities ordinarily encountered in the student's daily routine. Mrs. Lewis has my full support submitting the surveys to our Department of Institutional Research who will disperse the email containing survey link to online CTE students.

Sincerely,

A handwritten signature in blue ink that reads "Keasa Hamilton". The signature is written in a cursive style and is positioned on a light blue rectangular background.

APPENDIX B

UNIVERSITY OF SOUTHERN MISSISSIPPI INSTITUTIONAL REVIEW
BOARD LETTER OF APPROVAL



THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
Fax: 601.266.5509
www.usm.edu/irb

**HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE
NOTICE OF COMMITTEE ACTION**

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **10100501**
PROJECT TITLE: **Career and Technical Education Online Survey**
PROPOSED PROJECT DATES: **11/01/2010 to 11/27/2010**
PROJECT TYPE: **Dissertation**
PRINCIPAL INVESTIGATORS: **Jessica Lindsey Lewis**
COLLEGE/DIVISION: **College of Science & Technology**
DEPARTMENT: **Workforce and Economic Development**
FUNDING AGENCY: **N/A**
HSPRC COMMITTEE ACTION: **Exempt Approval**
PERIOD OF APPROVAL: **10/21/2010 to 10/20/2011**



Lawrence A. Hosman, Ph.D.
HSPRC Chair

10-27-2010
Date

APPENDIX C

PARTICIPANT EMAIL # 1

Dear Student,

I am a doctoral candidate at The University of Southern Mississippi. As part of my dissertation, I am conducting a study to better understand students' learning experiences and the relationship between interaction and student learning and satisfaction in online Career Technical Education courses. Participation in this study is completely voluntary and participation may be discontinued at any time without penalty. Completion of the survey will indicate your consent to participate in the research.

The survey will take about 5-10 minutes to complete. To access the survey, click on the following link: <http://www.surveymonkey.com/s/OnlineCTESurvey>

By completing this survey you will help further research in the area of online learning in Career Technical Education. This assessment is for research purposes only and your responses will be kept strictly confidential. Your participation in this study will not affect your academic standing. Please feel free to email me at llewis@prcc.edu if you have questions or wish to receive a copy of the final report.

This project has been reviewed by the Human Subjects Protection Review Committee, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about the rights as a research subject should be directed to the chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820.

Thank you for your help and participation in this scholarly effort.

Sincerely,

Lindsey Miller Lewis

Doctoral Candidate

The University of Southern Mississippi

APPENDIX D

PARTICIPANT EMAIL # 2

Dear Student,

This email serves as a reminder to complete the Career Technical Online Survey, if you have not already completed the survey. As part of my doctoral dissertation, I am conducting a study to better understand students' learning experiences and the relationship between interaction and student learning and satisfaction in online Career Technical Education courses. Participation in this study is completely voluntary and participation may be discontinued at any time without penalty. Completion of the survey will indicate your consent to participate in the research

The survey will only take about 5-10 minutes to complete and will help to further research in the area of online learning in Career Technical Education. To access the survey, click on the following link:

<http://www.surveymonkey.com/s/OnlineCTESurvey>

Remember, your responses will be kept strictly confidential and your participation in this study will not affect your academic standing. Please feel free to email me at llewis@prcc.edu if you have questions or wish to receive a copy of the final report.

This project has been reviewed by the Human Subjects Protection Review Committee, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about the rights as a research subject should be directed to the chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820.

Thank you for your time and cooperation,

Sincerely,

Lindsey Miller Lewis

Doctoral Candidate

The University of Southern Mississippi

APPENDIX E

PARTICIPANT EMAIL # 3

Dear Student,

Time is running out! This email serves as your final reminder to complete the Career Technical Online Learning Survey. Participation in this study is completely voluntary and participation may be discontinued at any time without penalty. Completion of the survey will indicate your consent to participate in the research. To complete the survey, click on the following link:

<http://www.surveymonkey.com/s/OnlineCTESurvey>

The survey will take between 5 and 10 minutes to complete and will be used to learn more about online Career Technical Education. Remember, your responses will be kept strictly confidential and your participation in this study will not affect your academic standing. Please feel free to email me at llewis@prcc.edu if you have questions or wish to receive a copy of the final report.

This project has been reviewed by the Human Subjects Protection Review Committee, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about the rights as a research subject should be directed to the chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820.

Thank you for contributing to this scholarly effort,

Sincerely,

Lindsey Miller Lewis

Doctoral Candidate

The University of Southern Mississippi

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