

A COMPARISON OF STUDENT LEARNING AND STUDENT SATISFACTION IN AN
ONLINE DISTANCE EDUCATION FORMAT AND A TRADITIONAL FORMAT IN A
TECHNICAL COLLEGE IN GEORGIA

by

GINGER M. SABINE

(Under the Direction of Libby Morris)

ABSTRACT

This study is designed to determine if there are significant differences in learning and satisfaction in students who took computer courses delivered in traditional format or online distance education format at a Georgia technical college. The study first addresses learning in students who took Computer Information Systems (CIS) courses online and those who took the courses in a traditional face-to-face format. The study then examines differences in student satisfaction between the two groups. Finally, the research attempts to uncover differences in student characteristics between students who enrolled in online CIS courses and those students who enrolled in the traditional face-to-face format.

Studies are needed to add to the small body of research in the area of online distance education in technical colleges. Little research is available concerning distance education in two-year technical colleges, and less research still that is specifically related to distance education in technical colleges in Georgia. Research also is needed to improve the experience of technical college students and increase their chances for academic success.

This study found no significant difference in learning outcomes for students in online courses versus face-to-face format. This study indicates that the two groups of students did differ significantly in overall level of student satisfaction, although the findings suggest that the majority of students in both course formats were either satisfied or very satisfied with their course. Student demographic characteristics were not statistically different between the two groups of students tested.

INDEX WORDS: Online education, Distance education, Web-based education, Quality, Effectiveness, Comparison, Traditional, Face-to-face, Satisfaction, Student Learning

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GINGER M. SABINE

B.S., The University of South Alabama, 1987

M.S., Southern Polytechnic State University, 1997

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial
Fulfillment of the Requirements for the Degree

DOCTOR OF EDUCATION

ATHENS, GEORGIA

2005

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GINGER M. SABINE

Major Professor: Libby Morris

Committee: Bradley C. Courtenay
Cameron Fincher
Catherine Finnegan
Edward G. Simpson, Jr.

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
August 2005

DEDICATION

This study is dedicated to the two most precious people in my world, my children, Rich and Rachel. For always believing in me even when I did not believe in myself, loving me unconditionally, and supporting me even through the writing of a dissertation. You two are the greatest blessings of my life.

ACKNOWLEDGEMENTS

The writing of this dissertation was a process that began in May of 2000 due to the encouragement of my mentor and former boss, Dr. Daryl Gilley. He recommended this program of study and encouraged me to give it consideration. Without his prodding and encouragement I never would have embarked on this journey.

Rich and Rachel Sabine, my children, have persevered through this process and have made a number of sacrifices. I want to thank my mother, Wanda, who always called out my spelling words, always had high expectations, and was always in my corner. To my sister Lorie, thank you for assisting with the editing of this document and for your friendship.

A group of special friends and coworker provided assistance and encouragement throughout this program of study which included childcare, reading, editing, listening, and additional support services. To these people I am grateful; Dr. Darryl Harrison, Karen Kwiatkowski, Doug Cooper, Clay Cooper, Kim Norvell, Jan Akins, Tom Norvell, Jean Skates, Carol Shoemaker, Judy Hodge, and Connie Potts. I am blessed to call you friends.

One key person in the writing of this dissertation was my major professor, Dr. Libby V. Morris. Dr. Morris gave freely of her time, advice, and encouragement. Her insight and experience steered me carefully through this process. Lastly, I want to thank the other four members of my committee, Dr. Bradley C. Courtenay, Dr. Cameron Fincher, Dr. Catherine Finnegan, and Dr. Edward G. Simpson, Jr. Your generous support and encouragement are very much appreciated. Thank you for your time and contribution.

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CHAPTER 1

INTRODUCTION

Post-secondary institutions are profoundly impacted by pressure to widen educational access through distance education. However, online education faces a number of challenges to its perceived effectiveness. E-learning's novelty and rapid growth add to the controversy over its quality and effectiveness. Skeptics suggest that quality is being exchanged for quantity in the race to expand online offerings. The debate is further complicated by the limited research into the effectiveness of online education. Research is necessary, therefore, to ensure and improve the quality of distance education.

The effectiveness of online education is an important consideration for the Georgia Department of Technical and Adult Education (GDTAE). GDTAE, in cooperation with the Georgia Virtual Technical College (GVTC), was one of the first technical college systems in the nation to develop online course offerings. GVTC first offered online instruction in 1998 and now lists over 750 courses in the online catalog (Georgia Virtual Technical College, 2004). According to the GVTC website, more than 40,000 students have enrolled in online courses. Because GDTAE and GVTC commit considerable resources to distance education, further research is important to ensure that GDTAE and other technical college agencies continue to develop quality online programs.

Statement of the Problem

E-learning is challenged by skeptics who question the quality and quantity of research regarding the innovative delivery method, as well as the impact it has on a student's social development. The issue of quantity versus quality research was examined in a study by the Institute for Higher Education Policy (Phipps, 2000). The Institute determined that the trend to place courses online hurt higher education by reducing program quality. Thus, increasing the quantity of online course offerings damaged overall quality. Additionally, earlier research into distance education was believed to be of poor quality, and research related to its effectiveness was limited. In fact, distance education research specific to the two-year technical college environment is rare.

Critics also challenge the research methods used in studies of the effectiveness of online education. The report from the Institute for Higher Education Policy (Phipps, 2000) suggested the following shortcomings: (1) much of the research does not control for extraneous variables and therefore cannot show cause and effect; (2) most of the studies do not use randomly selected subjects; (3) the validity and reliability of the instruments used to measure student outcomes and attitudes are questionable; and (4) many studies do not adequately control for the feelings and attitudes of students and faculty.

Another often cited challenge to online learning is inadequate student socialization. This was the topic of discussion during hearings conducted by the Science Subcommittee of the House of Representatives in May 2000 (Carnevale, 2000). The Carnevale study defended higher education as more than the process of obtaining knowledge and skills, and advocated student socialization as an integral part of the experience. Nobel (1998) suggested that students want the traditional face-to-face education and not a "cyber-counterfeit." Advocates of online delivery

countered with the question, does the non-traditional student, who is often older, married or a parent, suffer from a lack of socialization?

The tremendous growth of access to the Internet, increased technical skills in the workplace, and rapid expansion of online programs heighten the need for research into online education. From 2000 to 2003, the United States experienced an 86 percent growth in the number of households with Internet connections, according to the Central Intelligence Agency (2003). Nielsen ratings (Nielsen/NetRatings, 2004) for November 10, 2003 revealed that 63.2 percent of all U.S. households have Internet availability. In other words, almost two in three homes are connected to the Web.

Workplace demands are also fueling the requirements for technical skills and online education. According to the U.S. Department of Education, in a report to the Web-based Education Commission (2001), most business professionals use personal computers, and many industries give employees computers for their homes. Ninety percent of professionals are trained on the job with computer support structures in place. Increasingly, being computer savvy is an important and essential skill set in the workplace.

Access to online education also is increasing due to the increasing availability of online educational programs. The National Center for Education Statistics (U. S. Department of Education, 2003) found that 90 percent of public two and four-year institutions offered distance education programs in 2001-2002. Public two-year institutions had the largest online enrollment with 48 percent of all distance education enrollments occurring in public two-year institutions. The growth of the digital society and specifically access to the Internet will lead to growing demand for and access to online education; consequently, much more needs to be known about this medium to enable effective teaching and learning with this format.

Research is needed to support GDTAE's investment in the creation and continued improvement of online course offerings. Research is inadequate concerning web based learning in two-year technical colleges, and the research concerning quality in online delivery is limited. This study provides GDTAE with detailed information pertaining to a specific set of online courses, including learning outcomes and student satisfaction. This research is important to explore the quality of online education, to support continued funding for courses of this type, to engage public support for technical courses online, and to show accountability to accreditation agencies. This research and similar studies can inform GDTAE's leadership of the challenges and outcomes of online education and can provide findings important to inform decision making concerning online education

Research Design

The purpose of this study was to determine if learning and satisfaction differ significantly in students taking two Computer Information Systems (CIS) courses in traditional and online distance education formats at a technical college in Georgia. The student characteristics that determine success are studied, as are characteristics related to specific learning outcomes and satisfaction levels. This study is intended to build on existing distance education theory and to create research specific to technical colleges. In the process, the study will assist Georgia technical colleges in its efforts to build effective online distance education programs.

This study is comprised of three research questions that are listed below.

- Research question 1.

Based on industry standard assessments, what are the differences in learning outcomes between students who took CIS courses in an online distance education format and students who took CIS courses in a face-to-face format?

- Research question 2.

What are the differences in student satisfaction between students who enrolled in online CIS courses and students who took CIS courses in a face-to-face format?

- Research question 3.

What are the differences in student characteristics between students who enrolled in online CIS courses and students who enrolled in CIS courses in a traditional face-to-face format?

Research Participants

The study participants were enrolled in two Computer Information Systems courses, CIS 2228 and CIS 2229, at Northwestern Technical College (NTC) in Rock Spring, Georgia. Because all technical colleges in Georgia with a CIS program offer these courses, the study results are relevant to technical colleges throughout the state.

One group of study participants was composed of students from three online classes. The other group of students participating in this study was composed of students from three courses offered in a face-to-face format. The online courses did not have a face-to-face component, and the study did not include blended/hybrid-type courses or web-facilitated course delivery. One hundred and two students were asked to participate in the study, and 67 agreed to participate. Of those who participated 27 students were enrolled in online courses and 40 students were enrolled in a traditional format courses. Data collection began April 5, 2004 and ended December 16, 2004, which consisted of spring, summer and fall quarters of 2004.

Instrumentation and Analysis

Multiple instruments were developed and administered to the participants in this study. First, data was collected by using a pretest that measured student skill and knowledge levels before the course. The pretest is an industry-accepted test designed to help students prepare for

the Microsoft Office User Specialist certification exam (Certiport, 2005). The test measures a user's knowledge of the Office XP product and is designed by Certiport, Inc. Certiport is the exclusive administrator of the Microsoft Office Specialist program worldwide. The company develops, markets, and administers certification tests for the Microsoft Office suite.

To assess student satisfaction, student expectations before the course were measured as well as student satisfaction after the course. Satisfaction data were collected using four survey instruments: Online Student Expectation Survey (Appendix A); On Campus Student Expectation Survey (Appendix B); Online Student Satisfaction Survey (Appendix C); On Campus Student Satisfaction Survey (Appendix D). The input and output data are used to determine if significant differences exist between the environments.

Demographic data, including age, gender and ethnic group, were gathered as part of the student expectation survey. The student's grade point average (GPA) and ASSET scores (ACT, 2005) were gathered using the Northwestern Technical College Banner Student Information System. NTC uses the ASSET as an entrance exam to place students. The placement scores were converted to ASSET scores using appropriate score conversion charts.

Data were analyzed using SPSS statistical software version 10.0 to determine if a significant difference exists between the two environments (online and face-to-face). The difference between pretest scores and post-test scores for each student were calculated and independent-samples t tests were used to determine if a statistically significant difference exists between the two groups. Frequency data for ethnicity, gender, and age were calculated. The mean and standard deviation for each group were determined. T tests were performed to analyze student satisfaction between online students and face-to-face students.

Related Literature

This study is based on literature in the areas of distance learning, institutional effectiveness, and instructional design. First, distance learning literature central to this study consists of a body of research referred to as the “No Significant Difference” studies. A synopsis of the “No Significant Difference” research will be given as well as an overview of ancillary distance learning literature. A second category of literature to be highlighted in this study is institutional effectiveness research. Institutional effectiveness research is abundant; however, the body of research that looks at effectiveness in e-learning is relatively new and its quality has been questioned. Government agencies funded much of the research to support e-learning’s economical advantages to business and industry. The details of these insufficiencies in the literature will be explained. Astin’s work in the area of institutional effectiveness will be key to this study and the research design utilized in this research. Finally, the area of instructional design is fundamental to this study because this study examines student outcomes as it pertains to student learning and student satisfaction levels. Instructional design research by O’Banion will be used as a literature foundation for this research because this work is specific to the community college and focuses on student learning and achievement as a mechanism of demonstrating effectiveness. In O’Banion’s work the focus is shifted from other traditional measures such as graduation rates, retention, and job placement to student learning and satisfaction.

The first area of research that will be highlighted is the body of research referred to as the “No Significant Difference” studies. Russell (1999) compiled an index of research in “The No Significant Difference Phenomenon” that catalogues distance education research in 355 reports, summaries, and papers. Russell found that the majority of the research indicates no significant difference was found in outcomes for students using either face-to-face instruction or distance

education instruction. However, the index indicates that almost a tenth of the studies indicate a significant difference between delivery formats. Some of these studies reveal that certain disciplines do not have results as favorable as with the traditional mode of delivery. Over 35 of the indexed studies indicate that the online education outcomes are significantly different either in student learning or satisfaction. Similar research in this area since Russell's work has indicated similar results. Studies conducted after Russell's compilations support his findings (Dominguez & Ridley, 1999; Gagne, 2001; Miller, 2000; Ryan, 2000; Johnson, 2002; Jeffries, 2001). Comparing online delivery and traditional face-to-face delivery, the later studies found no significant differences in student achievement, although, some differences were found in student satisfaction levels.

The second category of literature foundational to this study is the body of research concerning institutional effectiveness and assessment. Astin's (2002) model of assessment is fundamental to this research. Astin's model suggested that assessment is a process which includes the gathering of measurable information, followed by evaluation or judgments based on the measurement results. This process identifies areas of improvement with the goal of improvement for the entity being assessed. According to Astin's "I-E-O" model, a student must be assessed using a pretest and post-test design in order to measure learning outcomes. The "I" in Astin's model represents input. A student's skill level, knowledge level, and expectations prior to the course may be assessed as inputs. The "E" in the Astin model represents the environment in which learning takes place. In this study the environment is either courses that were delivered in an online format or course delivered in an on campus format. The "O" in Astin's model represents outputs, or outcomes of the environments as a result of engaging in the environment.

In addition to theory and research in the area of assessment and institutional effectiveness, instructional design methodologies shaped this study, particularly the learning and student-centered approaches to teaching and learning. These approaches are fundamental underpinnings of effective online learning according to current research. Foundational work for this study in the area of instructional design was developed by O'Banion (1997). This research shifts focus from traditional outcome measures to a focus on student learning and student satisfaction as indicators of effectiveness and student success.

O'Banion's work suggested that a transformation took place in the 1990s when colleges emphasized the learning process. O'Banion named this revolution the "Learning College" (p.5) and developed six guiding principles. O'Banion suggested that colleges refocus their mission and values toward the learning process. Learning is the focus of the education process and the institution; therefore, the focus shifts to student needs and the necessities for student success. The student is the center of the institution; teaching, research, student services and other support systems are built around the student.

O'Banion's work in the area of instructional design led to the creation of an advisory team of community college practitioners and assessment industry experts. The League for Innovation in the Community College (2004) used O'Banion's work to develop a structural framework for assessment of institutional effectiveness among community colleges. Prior to the work of the League in 2004, a framework did not exist that could be utilized in the community college online environment. This framework focuses on student learning and development throughout the learning process in both traditional and web-based learning environments. The work is specific to the community college students, which closely represent the population in this study. The framework was developed to measure student learning and achievement as a means

of demonstrating institutional effectiveness. It is intended to be implemented in both traditional and web-based classroom settings.

According to the League for Innovation in the Community College (2004), students attend a community college for a variety of reasons, in particular to “improve skills, increase knowledge, or change attitude” (League for Innovation in the Community College, 2004, p.3). Institutional effectiveness is measured in this framework by focusing on student learning and development. This framework redirects the focus of traditional measures of institutional effectiveness, such as graduation, retention, and job placement, to student learning and satisfaction. Therefore, students become the primary focus in the learning experience.

Finally, demographic data and descriptive research concerning the particular needs of the technical college student are examined. According to Cohen and Brawer (1996), new research on the technical college is necessary because this sector brings a unique set of characteristics to post-secondary education. These characteristics include older age, financial need, and ethnic diversity. Many technical college students work part-time or full-time and a large number of these students have family and economic responsibilities that constrain their time and travel. Childcare issues are barriers for many technical college students as well. This study will examine characteristics of the study population and determine if those characteristics correlate with student success or student satisfaction.

Significance of the Study

This study is important because it will help to give feedback concerning the use of online programs of study and online courses in technical colleges. This research will establish if online courses are an effective and a viable alternative to traditional face-to-face courses for the population being studied, the technical college student. Currently, over 750 courses have been

developed and more than 40,000 students have been enrolled in online courses through GVTC (2004), yet, no research specific to this group of students validates the tremendous efforts that have taken place. As these online programs continue to grow, it is important that students, instructors, administrators, and institutions are confident that online education is a practical delivery means which provides additional access to quality higher education for the technical college student.

Many hours are spent in the development of online courses at Northwestern Technical College, by dedicated faculty members who are attempting to make a difference for students. This study can give feedback and where findings indicate validate the efforts of these faculty members by demonstrating that online courses are an effective delivery method for the students at NTC. The statewide Computer Information Systems Curriculum Consortium will benefit by improved information specific to online delivery of CIS courses and the level of effectiveness of these courses for CIS students on the state level. This study could bolster the continued development of programs of study offered online at both the local and state level if online instructors, course developers, and administrators are confident that online delivery is a feasible delivery method.

Secondly, this study targets the technical college sector which has seldom been studied previously. This study provides GDTAE with specific information pertaining to online education, which is a delivery method that has been afforded generous resources from this agency. The information from this study is necessary to provide feedback that will assist GDTAE leadership in making informed decision on issues such as continued funding and improving the quality of online programs. Results of this study could improve public support of online programs, and satisfy the demands for accountability for accreditation agencies

concerning online offerings. This research and similar studies will better inform teachers and administrators concerning the merit of online education and appropriate uses of this educational delivery method.

Other entities can benefit from this study. Accrediting associations, accountable for quality standards in higher education, require self-monitoring to assess the quality of programs. Distance education is accepted as a standard element of higher education and a focal point of institutional goals. Government policymakers need valid research to substantiate spending and improve educational access. Businesses use research to justify distance education as a means to improve the workforce. Research is needed to examine policy-driven impediments to student progress in a distance learning environment, and to improve the quality and effectiveness of this method of delivery. This study raises awareness of technical college program quality in the community and throughout higher education. This research also educates prospective users about the advantages and disadvantages of online education.

Coupled with the need for research in online education is the need for research pertaining to the technical college student. Research is virtually nonexistent for this population, particularly concerning online education. Technical college students share characteristics that point to the potential for e-learning because of the access and convenience that e-learning can provide. It is essential that post-secondary education adapt program and course offerings to meet the increasing need of the student market.

The huge growth of the online program within GDTAE is evidence of Georgia students' desire for online delivery of programs and courses. Online program offerings translate into substantial growth opportunities for GDTAE, reduced cost for training in business and industry, and improved access to high-quality training and education opportunities. These programs

continue to grow without the benefit of sufficient research in the area of online educational methods, effectiveness, and best practices. This type of research is vital, therefore, to facilitate improvement in online offerings and to raise the awareness of existing technical college programs in the community and state.

Organization of the Dissertation

Five chapters comprise this dissertation. The first chapter introduces the study with a background, statement of the research problem, review of the research design and a review of related literature. The significance of the study is explained. Chapter two reviews the supporting literature. The subject areas are distance learning, institutional effectiveness and assessment, instructional design, and the two-year technical college.

Chapter three describes the research design and begins with a statement of the research questions. The population of the study is described and demographic characteristics presented. A description of the data collection includes an explanation of data fields contained in the statistical database and a complete review of the data collection instruments. The response rate in the study is explained and the time elements used in data collection are outlined. A review of the statistical methods is detailed at the conclusion of chapter three.

The findings in this study are contained in chapter four. Chapter four lists each research question together with the findings pertaining to each question. Chapter five discusses the results and implications of the study. A discussion of the meanings of the findings and how they relate to previous studies is described. Conclusions from the study are described, and further research is recommended.

CHAPTER 2

REVIEW OF THE LITERATURE

A review of the literature used in this study demonstrates that research is rare concerning Web-based learning in two-year technical colleges. The review also discusses the adequacy of the limited distance education research and the questions concerning the quality of the research. The review shows the need for this type of study to provide GDTAE with specific information pertaining to online education. The information is necessary to support the agency's funding of distance education, to assure public support and to appease accreditation agencies. This research and similar studies can better inform GDTAE leadership and guide decisions.

This literature review consists of four major categories: distance learning, assessment of institutional effectiveness, instructional design, and demographic characteristics of the two-year college student and online students. Substantial research in these areas is available as a framework for this study, but research specifically related to technical college web-based learning is scarce.

Effectiveness assessment in education has grown in importance, but research concerning online learning is relatively new. Beginning in 1996, government agencies funded the bulk of the research to encourage web-based learning as a means of helping the economy (*Guiding Principles for Distance Learning in a Learning Society*, 1996).

The literature review begins with a look at research on distance learning, including a historical overview of distance learning and the No Significant Difference literature by Russell. The review also discusses the need for further research on distance learning and addresses the scope of literature pertaining to online learning.

The second section of the review explores two areas of institutional effectiveness: the pivotal research in institutional assessment and assessment research specific to web-based learning. The third part of the review addresses research in learning-centered and student-centered instructional design.

The fourth component addresses the general characteristics of online students, two-year community college students, GDTAE students, and NTC students. Both online students and two-year community college students possess unique characteristics, according to the literature. The review compares these characteristics to specific demographic data collected from the study population.

Distance Learning Literature

Distance learning has received a variety of appraisals. At one extreme, researchers perceive distance learning as an inferior form of educational delivery and a threat to the traditional institution (Kovel-Jardoe, 1997; Moore, 1990; Kuh & Vesper 1999). Meyers (2002) suggested that many educators view distance education as a subordinate threat to traditional education. At the other extreme are those who think distance learning is a “magic bullet, an enabler of reforms that will silence higher education’s critics by making the academy more accessible, more affordable, and more effective” (Van Dusen, 2000, p.1).

An Overview of Distance Learning History

Distance learning encompasses many methods of educational delivery and a variety of learning environments. The term is not new in the educational arena. For centuries, distance learning held a place in education, although not one of prominence. Correspondence courses may have been the earliest form of distance education, according to the literature. From the

historical perspective, the literature provides a basis to compare distance learning to the earliest written communication, including the printing press and the blackboard.

While unsupported in educational literature, this author believes the history of distance education parallels that of written communication. The first time a teacher told a student to read and contemplate written material -- be it cuneiform, hieroglyphic or papyrus scrolls -- was an occasion of distance education, if learning occurred. According to the definition of distance learning, time and space separate the learner and the teacher. Based on the definition, opponents of distance education who assign reading outside of the classroom are facilitating distance education.

Correspondence courses were the primary means of distance learning beginning in Europe in the 1800s (Imel, 1998; Meyer, 2002; Moore, 1990). Distance learning moved to this country in the 1890s when Pennsylvania State University, Cornell University, and the University of Wisconsin in Madison, among other institutions, incorporated correspondence courses into their programs (Open Universities, 2000). Correspondence courses were the primary means of distance learning until radio and television became popular in the middle 1900s (Imel, 1998).

In the 1950s, the federal government and private sources provided significant funding to develop educational television (Cuban, 1986). In the last two decades of the 1900s, audio and videotaped lectures were the technologies of choice for distance learning delivery. The Internet and compressed video took distance learning in a new direction, allowing it to occur in real time (Valentine, 2002).

The literature compares distance learning to other information delivery methods. The most prominent is Gutenberg's printing press and the creation of movable type in the fifteenth century. With this invention, education once reserved for the elite became available to a larger

sector of the population (Moore, 1990; Myers, 2002; Van Dusen, 2000). The history of distance learning also is comparable to the development of the blackboard in 1841. Few technologies revolutionized learning like the printing press and the blackboard, or had their staying power. Advocates of new learning technologies and distance learning affirm that online delivery is the new synthesis device for an assortment of information (Van Dusen, 2000).

Consequently, video, radio and computer technologies are comparable to the printing press and blackboard in the way they revolutionized the classroom (Cuban, 1986). However, the new technologies created unique problems. For instance, teachers often lack skills in their use, and the equipment upkeep costs may be prohibitive, according to Cuban, early research on the impact of television in the classroom using standardized achievement tests found that “there was not a substantial difference between the amount of information learned from televised lessons and the information conveyed through conventional instructional approaches used by the classroom teacher” (p. 38).

Cuban describes the attempts to adopt technological innovations over the last century. His studies revealed a durability of classroom pedagogy and a resistance from teachers to changes in their environments. According to Cuban, policymakers have very little control over these changes. The technology users determine if a similar revolution occurs. In this case, faculty members have a substantial voice in determining if instructional technology revolutionizes learning in the same way the printing press and the blackboard did.

Government Reports Develop Guiding Principles in E-learning Over Time

The review of the history of e-learning research begins with the American Council on Education (ACE), creators of *Guiding Principles for Distance Learning in a Learning Society* (1996). The ACE report was not meant to be a “how to” handbook, but a statement addressing

the characteristic qualities in the learning society and a guide to the rapid changes in distance education, as the term was used at that time.

In a three-year project, the Western Cooperative for Educational Telecommunications (WCET) developed *Principles of Good Practice for Electronically Offered Academic Degree and Certificate Programs* (WCET, 1999) States, regional accrediting agencies and others adopted the principles as the leading thinking in e-learning assessment. Supported by the U.S. Department of Education's Fund for Improvement of Postsecondary Education, this work includes seventeen principles for improving electronically offered higher education (WCET, 1999).

The next major stride in e-learning assessment came from the American Federation of Teachers (AFT) who published *Distance Education: Guidelines for Good Practice* (AFT, 1999). Based on a survey of two hundred AFT members and distance education practitioners, these guidelines delve deeper than previous guidelines reviewed by the AFT.

The Institute for Higher Education Policy (IHEP) developed pivotal guidelines for the study of assessment in e-learning entitled *Quality on the Line: Benchmarks for Success in Internet-Based Distance Education* (Phipps, 2000). Funded by the National Education Association (NEA), this report reviews all of the existing principles, guidelines, and benchmarks that address best practices in web-based learning and combines them into a single list of 45 benchmarks. IHEP narrowed the list to a set of 24 most necessary benchmarks and broke them into categories: institutional support, course development, teaching and learning, course structure, faculty support, student support, and evaluation and assessment.

Twiggs challenged the IHEP benchmarks (Twiggs, 2001), explaining that they still have problems. First, the IHEP did not mention the level of quality. According to Twiggs, the IHEP

benchmarks more accurately represent principles of good practice on the way to becoming benchmarks because they describe assessment needs, not the level of quality that programs should strive to reach. In addition, some of the benchmarks are not essential to quality e-learning programs, according to Twiggs.

A report developed by the Web-based Education Commission (2001) to the President and the Congress of the United States analyzes the Internet as a tool to create a more educated workforce. The final report by this committee suggested a number of characteristics necessary to make quality e-learning a reality (U.S. Department of Education, 2001). The commission encouraged continued review of e-learning and maintained that e-learning assessment is necessary and absent from the literature. This report encourages researchers in the area to explore and continue to research the effectiveness of web-based learning through effective assessment principles.

The principles continued to evolve as guiding principles, not benchmarks (ACE, 2000). The ACE outlines the key insights obtained from the latest study:

Two obvious key insights have emerged. The first is that the digital revolution has profoundly altered traditional limitations of time and space. In this era, when time and space have only relative existences, we lead new lives—ones in which we are no longer, as Emerson put it, ‘children of time or space.’ The second insight was that learning permeates many sectors of society, therefore principles of good practice must be applied not only to institutions of higher education, but to all those involved in the learning enterprise—individual learners, institutions, corporations, labor unions, associations, and government agencies. Strengthening

one sector will improve the effectiveness of the other sectors and, in turn, address the learning needs of individuals and society as a whole. (p. 2)

The study of this area of assessment is dynamic and difficult to define (Distance Learning in Higher Education, 2001). Opinions differed on the standardization of e-learning assessment in 2001. At that time, a number of major works listed principles essential to effective e-learning. These lists share many common features. Still further research and development of a framework for the evaluation of effectiveness in e-learning was necessary.

Problems with Online Learning Research

In recent years, researchers and educators questioned the legitimacy of the limited research regarding web-based learning. The IHEP report (Phipps, 2000) examined the process of e-learning and the elements essential for successful e-learning. Phipps identified a number of areas of concern with regard to the effectiveness of online learning in the literature prior to 2000. The findings are reviewed in detail later in the literature review. On a positive note, since the issuance of the report, a number of new studies support the validity of the one-time lacking body of research.

According to the Phipps' study (2000), the recent trend of building large online offerings at many higher education institutions raised questions about the quality of these offerings. The report states, "quantity seems to have superceded quality in this heated race to be the first institutions with online offerings" (p. viii). Research holds that the focus has shifted from student learning. The Phipps (2000) study suggested a number of problems:

Major findings indicate, first, there is a paucity of truly original research dedicated to explaining or predicting phenomena related to distance learning; and, second, although most studies indicate that distance-learning courses compare

favorably with classroom-based instruction, the overall quality of the research is questionable and thereby renders the findings inconclusive (p.5).

Phipps found shortcomings, including (1) much of the research does not control for extraneous variables and therefore cannot show cause and effect; (2) most of the studies do not use randomly selected subjects; (3) the validity and reliability of the instruments used to measure student outcomes and attitudes are questionable; and (4) many studies do not adequately control for the feelings and attitudes of students and faculty.

The report (Phipps, 2000) identifies additional research gaps concerning online learning and its effectiveness. The report recommends studies of outcomes of complete programs rather than individual courses as is done in most of the literature. Phipps also advocates investigation of the high dropout rates in distance courses. These and other implications draw attention to a number of student-centered concerns, such as, what the phrase "access to college" means, the importance of human contact in education, and the relatively limited importance of technology.

Similar to Phipps' research, Wagner (2001) found a clear deficiency in thorough and complete studies of assessment and effectiveness in Web-based education. Both Phipps (2000) and Wagner posit that research in the area of distance online education has a number of gaps and faces challenges as to the quality in many areas, including the area of assessment. Wagner (2001) explained that:

[D]etermining the efficacy of online learning begins by defining learning and proceeds to explore the new learner and teacher responsibilities; assessment of student outcomes and attitudes; gaps in the research on distance and online learning efficacy; methods of assessing courses, teachers, and programs; and the relationship between online learning and business education. (p. 9)

While the literature is questionable as to quality, depth and breadth, the existing research on e-learning demonstrates that it can be effective in fostering student learning. According to Bennet and Green (2001), student learning is the most important part of the educational process, regardless of the course dissemination or delivery method. Bennet and Green and others found that both traditional learning and e-learning are effective, but in different ways. With Bennet and Green's findings, this literature review turns to an analysis of a large body of research called the "No Significant Difference Research".

No Significant Difference Research

Research indicates that the instructional format has little effect on student achievement as long as the delivery technology is appropriate. Russell (1999) compiled an index of research in "The No Significant Difference Phenomenon" as is reported in 355 research reports, summaries and papers from 1928 to 1998. The bulk of this research shows no significant difference for students engaged in face-to-face instruction versus distance instruction. Only a small number of studies, 35 of 355, showed a link between the choice of educational delivery and a significant difference in student satisfaction or achievement.

Some of the early studies review correspondence courses, but most compare instruction over videotape, interactive video, or satellite with traditionally delivered courses. The studies compare student satisfaction, test scores, grades, or other performance measures unique to the study. Consistently, researchers found no significant difference between the comparison groups.

After No Significant Difference Research

A point of concern in the No Significant Difference research is that only 40 of the 355 studies pertain to computer-based instruction. However, computer based training studies conducted after Russell's compilations support his findings (Dominguez & Ridley, 1999; Gagne,

2001; Johnson, 2002; Jeffries, 2001; Miller, 2000; Ryan, 2000). Comparing online and traditional deliveries, the studies found no significant differences in student achievement. The review will address three of the studies similar to this research in paragraphs below.

The first example found no significant difference in outcomes for students, whether in a traditional classroom setting or in an online delivery mode (Johnson, 2002). The study provides evidence that certain types of students can learn as much biology content, develop their reasoning skill set, and have similarly positive attitudes toward biology in the online delivery mode as in the traditional delivery mode.

A study with slightly different outcomes by Jeffries (2001) found no significant baseline differences between the online and lecture groups by education or computer skills, however, results show significant differences between the two groups in cognitive gains and student satisfaction, with the computer group demonstrating higher student satisfaction and more cognitive gains than the lecture group. According to Jeffries, the groups were similar in their ability to demonstrate the skill correctly.

A similar finding to that of Jeffries was established by Gange (2001). In the Gange study the performance of students in distance courses was similar to that of students in on-campus courses for an introductory accounting graduate course. However, just as Jeffries discovered significant student satisfaction differences, the Gange study indicates less satisfaction with regard to instructor availability in the distance delivery course than in the traditional classroom. In the Gange study students appreciated more convenience in the distance delivery method than the traditional format. Nevertheless, the key finding is that learning was not impacted.

A number of studies indicate there are no significant differences in learning based on delivery method. Carnevale (2001) found that delivery mode does not affect learning and reports

that the instructional design is the significant factor in learning. Works by Carnevale, those indexed by Russell, and hundreds of other studies indicate that the delivery mode of education is not the determining factor in quality.

Institutional Effectiveness Literature

The study of institutional effectiveness in education was a hot topic in the 1980s and 1990s as distance educators attempted to achieve a greater degree of accountability with the public. After reaching into every facet of business, institutional effectiveness was thrust into the forefront of educational research. According to Deming (2000), the quality management movement in the business sector led to the questioning of the previously unchallenged education sector. Tennessee was a leader in the movement to award funding to institutions based on student achievement (Bogue & Brown, 1982). Historically, this altered state and public officials' beliefs about holding academia accountable for student success (Astin, 1993). It also motivated higher education administrators to take a close look at the assessment of the institution. From that time until the present, government and accrediting agencies and the public have pushed for accountability and research in institutional effectiveness.

A number of researchers studied assessments of institutional effectiveness (Adelman, 1985; Angelo, 1995; Astin, 1993; Erwin, 1991; Ewell, 1985; Pascarella & Terezini, 1991; Ratcliff, 1992). This literature review discusses findings of these researchers and focuses on four areas: assessment defined, assessment of student learning, Astin model of assessment, and assessment particular to online education.

Assessment Defined

Alexander Astin (1985), a key researcher in the area of assessment, argues that the assessment of excellence in education must look at the primary purpose of the institution --

educating students and cultivating knowledge. He suggested that excellence focus on talent development. He also emphasizes the importance of analyzing factors that make a difference in the student's educational experience. Astin (1993) distinguishes between the gathering of information, which he calls measurement, and the use of information in an effort to improve the institution, which he calls evaluation.

Erwin's (1991) study of institutional effectiveness and assessment in the late 1980s and 1990s focuses on student development. Erwin saw the assessment of student learning and development as keys to the process. The process includes: definition, selection, design, collection, analysis, interpretation, and use of information to improve student development and learning.

Angelo (1995) defines assessment as "an ongoing process aimed at understanding and improving student learning" (p. 7). He developed practical examples to assess student learning and recommends a look at faculty involvement in assessment as essential. Angelo discusses the intimidating aspects of assessment for faculty and describes techniques to use to facilitate institutional assessment despite these barriers.

Assessment of Student Learning

Examining the learning method through the eyes of the students appears to be an excellent method to assist in the assessment of an institution's effectiveness. Angelo (1999), the author of *10 Guidelines for Assessing As If Learning Matters Most*, said "most of us think assessment should be first and foremost about improving student learning and secondarily about determining accountability for the quality of learning produced. In short: though accountability matters, learning still matters most" (p. 1).

According to Angelo, assessment is fundamentally a process of determining the effectiveness of education by examining student learning. Research on learning outcomes, development and cognition strongly supports engaging students in interactive, collaborative learning communities, Angelo discovered. He also lists important practical reasons for creating learning communities, which include workforce training and citizenship education.

In 2003, the American Association for Higher Education recommended nine principles of good practice for assessing student learning (2003). Leading researchers in the area of assessment collaborated to develop these principles. The nine principles are as follows:

- The assessment of student learning begins with educational values.
- Assessment is most effective when it reflects an understanding of learning as multidimensional, integrated, and revealed in performance over time.
- Assessment works best when the programs it seeks to improve have clear, explicitly stated purposes.
- Assessment requires attention to outcomes but also and equally to the experience that leads to those outcomes.
- Assessment works best when it is ongoing, not episodic.
- Assessment fosters wider improvement when representatives from across the educational community are involved.
- Assessment makes a difference when it begins with issues of use and illuminates questions that people really care about.
- Assessment is most likely to lead to improvements when it is part of a larger set of conditions that promote change.
- Through assessment, educators meet responsibilities to students and to the public.

In 2004, an advisory team of community college practitioners and assessment industry experts, building on previous assessment efforts in the community college, developed another evolving framework for demonstrating institutional effectiveness. The collaborative work of the League for Innovation in the Community College (2004) creates a structural framework for assessment of institutional effectiveness among community colleges. The framework focuses on student learning and student development throughout the learning process in traditional and Web-based learning environments. These findings support the works of Astin and Angelo.

The framework is specific to the community college, whose population closely represents the population in this study. The League reported that students attend a community college for a variety of reasons, “yet at the heart of these reasons is the desire to improve skills, increase knowledge, or change attitude” (League for Innovation in the Community College, 2004, p. 3).

The League’s work was influenced by O’Bannon’s (1997) studies concerning student-centered learning. The advisory team developed the framework to measure student learning and achievement as a means of demonstrating institutional effectiveness in both traditional and Web-based classroom settings. The framework redirects the focus of traditional measures of institutional effectiveness such as graduation, retention, and job placement rates. Because the framework centers on student learning and student opinion, students become the primary focus.

Astin’s Conceptual Model for Assessment

Astin’s (1993) work in the area of institutional effectiveness is a key to this research. Astin developed a conceptual framework for the design of assessment activities. Astin’s model of instructional assessment suggested that assessment is a process that includes the gathering of information, which is measurable, followed by evaluation or judgments based on the measurement results. This demonstrates areas of improvement with the resulting goal of

improvement for the assessed entity. Astin developed the I-E-O model, which proposes using both pretests and post-tests to assess learning outcomes.

The “I” in Astin’s model represents input. Inputs refer to personal qualities that the student brings to the educational program or, as Astin implies, the initial level of the student’s talent. This includes the student’s skill, knowledge level, and expectations prior to the experiences. The “E” in the Astin model represents the learning environment. The environment is the student’s actual experiences during the educational program under assessment. The “O” represents outputs of the collected environments. Astin holds that it is a measure of the outcomes as relates to the talents that were to be developed.

According to Astin’s model, relationships exist between the three classes of variables: input, environment, and output. The assessment and evaluation relationship between inputs and environments are the effects of the environmental variable on the outcome variable. He indicates that input variables are related to both output variables and environments, which can affect the relationship between the environment and the outputs. Astin suggested that assessment must look at all three factors, inputs, outputs, and environment, to assess accurately any educational experience.

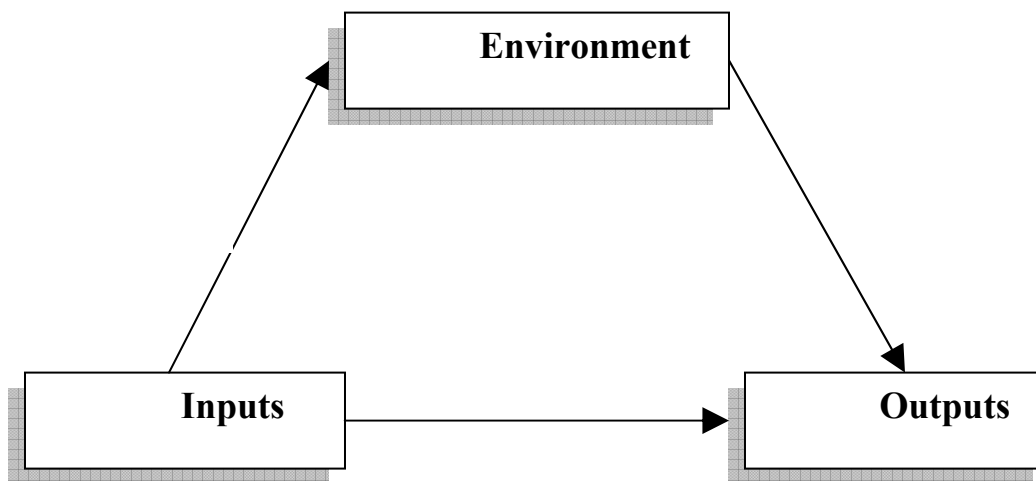


Figure 2.1
Astin's I-E-O Assessment Model

Assessment Literature Specific to Online Learning

Ehrmann (2000) asserts that e-learning should focus on aspects that improve the educational process using the online format. Instructional computer technologies do not improve learning by their natures, according to Ehrmann. He suggested that there are ways to apply instructional technologies effectively to increase faculty productivity and student learning. In similar research, Frye (2002) recommends using student learning outcomes and faculty productivity as the measures of effectiveness of educational systems to assure the adoption of cost and learning-effective education technologies.

According to Frye (2002), a number of colleges have programs to assess quality and effectiveness, but these models of assessment have not been standardized, appropriately studied, or thoroughly challenged in the literature. Effectiveness systems typically are developed and

adopted locally, and educators do not agree on a standard for assessing online institutional effectiveness.

Research points to the need for e-learning principles effective as those in other delivery types. According to Discenza (2002), distance learning has the potential to be as powerful an instructional method as conventional classroom learning. To accomplish the goal of quality e-learning, educators created effective principles for developing e-learning programs. The study and revision of these principles continues. Discenza suggested that good pedagogical e-learning principles must be developed and researched with the typical e-learning student in mind.

While the literature clearly supports the effectiveness of online education, Frye alleged that technology alone does not improve or reduce learning. He stated that the appropriate use of technology together with the appropriate educational methods would determine if technology has improved education as its potential suggests. Frye (2002) suggested using student learning outcomes and faculty productivity as the measures of effectiveness of new technologies to assure the use of appropriate technologies based on cost and learning effectiveness.

In a report for the American Council on Education Center for Policy Analysis, Eaton (2002) said:

...the reputation and seriousness of higher education are at risk, and as accreditors, we have a responsibility to reach beyond the institutions we serve to respond to public need. Distance learning creates pressure to reposition accreditation as a source of information about quality. (p. 6)

Online Learning Policy Issues

Policymakers and administrators understand that distance education is a standard element of higher education at the center of institutional goals. The awareness that distance education provides both social and economic advantages fuels this interest. For this reason, a call has been made for research that examines the value and effectiveness of this method of educational delivery. Educators need research to explore why current policy may impede progress of students in a distance-learning environment. Furthermore, research allows educators to improve distance education's quality and effectiveness.

Many interest groups have their eyes on Web-based research. Federal and state policymakers must substantiate spending and improve educational access to citizens based on this research. Accrediting bodies, held accountable for quality standards, also demand further research. The business sector wants research to improve the delivery method and allow them to take advantage of a tool to improve the workforce. Faculty wants research to support their efforts in distance education. Students and the public want accountability from educational institutions in every sector, including distance education. Community perceptions are the key to enrollment and ultimately the success of the institution.

Federal and State Government Policy Issues

Federal and state governments have a huge investment in distance education as in every aspect of education. Distance education plays a role in economic and social progress. In the report to the Commission on Technology and Adult Learning, the National Governors Association (2001) stated "For governors, e-learning's promise rests in its potential as a driver of value-added economic growth...and can contribute to the income growth and improved lives for Americans and a more informed and contributing citizenry"(p. 2). The commission calls for

action to “implement new measures and methods for assessing and certifying what individuals know and are able to do” and to “ensure broad and equitable access to e-learning opportunities” (p. 5).

In its report from the Web-Based Commission (2001), the U.S. Congress supported the modification of policy to support this method of delivery. “The legacy of the one-room schoolhouse is holding back the potential of the one-world classroom,” (p. 87) the report states. Examples of restrictions that hold back distance education via federal policy are the “12-hour rule,” the “50 percent rule,” and the prohibition on providing incentive compensation in college admissions (p. 90). The United States Department of Education’s National Center for Educational Statistics (2003) reported that the legal and regulatory framework has not adjusted to this new form of learner-centered teaching due to the legal system. Downes (2000) stated, “Law is by its nature a slow and deliberative process,” (p. 238) and technology-based educational delivery is bringing rapid changes that are colliding with the legal system.

The “50 percent rule” (Web-Based Commission, 2001, p. 91) enacted in the 1992 Higher Education Amendments requires that institutions eligible for Title IV funds offer at least 50 percent of their instruction in a classroom-based environment. The “12-hour rule” issued by the U.S Department of Education in 1994, defined a week of instructional time as twelve hours of instruction. Lawmakers designed these rules to address concerns about fraud and abuse within the for-profit sector and the correspondence school industry. Nevertheless, they are barriers to students pursuing education in a distance format.

The federal prohibition on providing incentive compensation in college admissions is a less straightforward example of policy restriction on distance education. This policy was enacted in the 1992 congress “to protect students against abusive recruiting tactics” (p. 94). The

restriction is interpreted to apply to student enrollment via web portals. This restriction bars Title IV higher education institutions from using third-party web portals. Institutions may use its own website to provide the same service.

State government has two roles in providing quality distance education, according to Meyers (2002). First, they oversee distance education programs offered within a state. Secondly, they protect citizens from fraudulent educational providers. Economic reasons for embracing and researching distance education are important. Nevertheless, providing access to all citizens and narrowing disparities among different segments of the population within states are equally important, according to the National Governors Association (2001). For both reasons, high-quality training and education are seen as “a method to boost income growth at all levels” (p. 4).

Accrediting Agencies Policy Issues

Distance education has forced accrediting agencies to reexamine long held definitions of quality higher education. Meyers suggested that former definitions of quality relied on procedures and not on what a student has actually learned (Meyers, 2002). Research is the key to establishing quality standards that include new measures to determine academic program quality, taking into account the new delivery method and its unique characteristics.

A report from the Council on Higher Education Accreditation (Eaton, 2001) stated, “distance learning creates pressure to reposition accreditation as a source of information about quality” (p. 12). In this report, Eaton suggested that the delicate balance of federal funds, academic institutions, and accreditation agencies are being altered by distance education because the work of the academy is being altered. Eaton recommends that techniques to measure the

effectiveness of distance education be updated to demonstrate reliable and valid performance measurements.

A review of the policies of several major accreditation associations and professional groups by American Association for Higher Education Teaching Learning Technology developed the *Best Practices and Accreditation Issues in Distance Education* (Chiti and Karlen, 2001). The report suggested that a primary concern for evaluative bodies is that the distance education initiative is consistent with the mission and purposes of the institution with evaluative mechanisms in place to assure that programs and courses offered electronically have the same requirements and meet the same outcomes as traditionally offered courses.

According to Chiti and Karlen (2001) accrediting agencies are also concerned with faculty training for distance education, learning resources, student services, and physical and financial resources. The commitment to distance learning goes beyond the effort to provide quality courses in a new environment to a demonstrated commitment to continuous improvement.

In an effort toward improvement of these policy barriers with regard to e-learning, the United States Secretary of Education announced the fifteen institutions, systems, and consortia that have been selected to participate in the Distance Education Demonstration Program in ("Distance learning in higher education," 2001). The program was created to examine the quality and viability of expanded distance education programs that currently are prohibited from receiving Title IV student aid. The participation agreements between the USDE and the demonstration program projects identify the specific elements of current law and regulation that USDE has agreed to waive to test the consequences on Title IV student aid programs.

Concerns about current assessment approaches are increasing as online learning environments become more prevalent in higher education. The methods and models necessary for e-learning will need to be reinvented just as the method of communication has been reinvented. The positive aspect with regard to progress in e-learning assessment is that a vast amount of research is clear on how to improve student learning generally speaking and the field of assessment has a wealth of research to apply to this new medium. The key to success in assessment will be to update our methods to include e-learning and to specifically address the differences that are presented using this technology. This research has begun. The challenge is to test and standardize these guidelines into meaningful models that can be implemented.

Instructional Design

Instructional design methodologies helped to shape this study and particularly the learning-centered and student-centered approaches to teaching and learning. These approaches have been used in the literature as fundamental philosophies underpinning effective online learning.

Learning Centered Student Centered Instructional Design

One of the pivotal researchers in the area of student-centered learning is Caffarella (1993). Caffarella suggested that when working with adults, the learning must focus on the individual. In this case the learner is expected to assume most of the responsibility for the learning and the instructor is seen as a facilitator or guide to learning.

Rogers (1983) suggested that student-centered learning is concerned with significant learning that leads to personal growth and development. Rogers suggested that such learning has five characteristics. First, the learner should be personally involved in the learning event. Second, the learning should be self-initiated and a sense of discovery must come from within.

Rogers states that thirdly, the learning makes a difference in the behavior, attitudes, or personality of the learner. The fourth characteristic is that the learner can best determine whether the learning experience is meeting the need. Last, when experiential learning takes place the essence is the meaning of the learning experience.

Cross (1981) suggested that for learning to flourish the environment must be nourishing and encouraging. Caffarella (1996) agrees with this notion and suggested that learning is best when the facilitator fosters a climate for learning. Caffarella recognizes that feelings are a critical part of fostering relationships in learning experiences.

One foundational work framing this study is the work by O'Banion (1997) which suggested that a transformation took place in the 1990s. He advocates a shift in focus to the learning process and the development of the learning college. O'Banion named this revolution the "Learning College" and developed six guiding principles (p. 5). He used different kinds of assessments to provide evidence of progress toward the mission and goals of an institution. O'Banion outlines a variety of assessment opportunities that are attached to each of the six guiding principles of the Learning College. Principle six in O'Banion's work is "The Learning College and its learning facilitators succeed only when improved and expanded learning can be documented for learners" (p. 5). This principle documents that learning is improved and expanded and is a reflection of the ever-growing need to demonstrate effectiveness.

Demographic Profile of Student Characteristics

Four demographic profiles are included. First, the online learner demographic student profiles will be described. The second profile is that of Community College students in the United States. The third demographic student profile will be that of Georgia Department of Technical and Adult Education students. A final profile will be included that describes the

demographic characteristics of Northwestern Technical College students. Similarities and differences in these demographic student profiles will be examined.

Online Learner Student Profile

Online learning technology is touted as an apparatus that will improve access to every sector of education. But controversy still exists over whether this technology improves access or creates barriers. Studies indicate (Armstrong, 2000; Attewell, 2001; DiMaggio et al, 2001) that web-based instruction creates new barriers for disadvantaged students, which translates into exclusion for non-traditional students.

A review of the research revealed (Attewell, 2001; Bimber 2000; Katz et al, 2001; Selwyn & Gorard 1999; Spender, 1997) that demographic factors, such as age, gender and ethnicity, play a significant role in the usage gap in technology. This gap in usage has been termed the “digital divide.” What implications does digital divide research create for online education?

An opposing view concerning the digital divide has recently surfaced that suggests the implications of the digital divide are not as significant as previous research suggested (Soker, 2005; Stanley, 2003; Tu & McIsaac, 2002; Williams et al, 2000). According to Soker (2005), research has incorrectly focused on the ownership of technology as opposed to access to technology. Soker suggested that access and the ability to use the technology is key, due to nationwide improvement in public access to technology, and suggests that ownership is not a valid measure of access. Many educational institutions, public libraries, and community recourses provide public access to technology and the Internet.

According to the National Telecommunications and Information Administration (NTIA), (2000) Internet use is growing in all segments of society. While disadvantaged students use the

technology and the Internet less, according to van Dijk and Hacker (2003), differences in access to technology according to age, gender and ethnicity are gradually disappearing. Recent research suggested that access and ownership are not as important as the student's inclination or ability to use the technology (Stanley, 2003; Tu & McIsaac, 2002; Williams et al, 2000).

Spender (1997) suggested that online technology may help certain students overcome traditional classroom difficulties, such as extreme shyness and stereotyping based on visual clues. Sullivan (2002) speculated that online education might be a more equalizing educational environment due to the fact that decisions are not made based on clothing style or skin color. Instead, judgments are based on written communications.

The digital divide with respect to gender has been given considerable attention in the literature. For example, recent studies (Selwyn & Gorard, 1999) found that gender is becoming less critical to access in technology use. Ory, Bullock, and Burnaska (1997) compared attitudes toward online learning and found no significant difference based on gender. Rovai and Jordan (2004) confirmed those findings in their study comparing online and traditional learning environments and found no significant difference in gender, age or ethnicity among students.

Age is still a factor in Internet use according to NTIA (2000). Trends found that all age categories experienced a significant increase in Internet and e-mail use, and this gap is expected to continue to diminish. Soker (2005) suggested that the rate of Internet use in 2002 for the population 19 or less was 79.5% while for the more mature population, over 30, the Internet usage was 63.5%.

United States Community College Demographic Student Profile

The American Association of Community Colleges (AACC), defined today's community colleges (2004), with the following quotation from the AACC website:

Community colleges are centers of educational opportunity. They are an American invention that put publicly funded higher education at close-to-home facilities, beginning nearly 100 years ago with Joliet Junior College. Since then, they have been inclusive institutions that welcome all who desire to learn, regardless of wealth, heritage, or previous academic experience.

According to Cohen and Brawer (1996), constituents of the community college sector of education bring a unique set of characteristics to post secondary education. These characteristics include older age, financial need, and ethnic diversity. Many technical college students work part-time or full-time and a large number of these students have family and economic responsibilities that constrain their time and travel. Childcare issues are barriers for many technical college students.

Enrollment is exploding in community colleges (Evelyn, 2004) and the business community is beginning to understand that community colleges are necessary to produce the work force needed. One of the problems associated with the increasing enrollment is the large population of academically unprepared students. Community colleges have an open enrollment policy, which leads to a less academically prepared student body. It also leads to students who are unprepared to navigate the higher education system and its associated bureaucracy. According to Kahn (2004), community colleges can boast of small class size and they can be proud that they provide education for the masses. Community colleges for the most part serve local communities.

According to the U.S. Department of Education, National Center for Educational Statistics (2004), undergraduate enrollment will continue to increase over the next ten years. Currently the U.S. has over 1,170 community colleges with approximately 84 % of those

institutions public institutions. Enrollment in community colleges is said to number over 10.4 million students. Female students make up 58 % of community college students while male students make up 42 %. The report also predicts an increase in the number of part-time students. Sixty-three percent of students attend part-time, while 37 % are full-time students. The average age for community college students is 29. Students of age 24 and above represent 43 % of all undergraduates in 1999-2000. Eighty-two percent of those students worked while attending school.

The American Council on Education states (Eckel, 2004) that even with the increasing price of attending college, the student population is growing more diverse. Diversity exists in age, race/ethnicity, gender, socioeconomic status, and academic interests. As stated previously, the majority of community college students are female. More than 40 % are age 25 years or older. About twenty % come from families at or below the federal poverty level. Minority students favor community colleges and make up 30 % of community college enrollment. Over 42 % of students in public two-year institutions enroll in one or more remedial education classes. One third of community college students receive at least one form of financial aid.

Georgia Department of Technical and Adult Education Demographic Student Profile

The technical college system in the state of Georgia is not a community college system in the strictest sense. However, technical colleges make up a subset of the community colleges in the nation (AACC, 2004). According to the GDTAE (2005) website, “the Georgia Department of Technical and Adult Education oversees the state's system of technical colleges, the adult literacy program, and a host of economic and workforce development programs” (GDTAE, 2005). Consequently, the technical college demographic student profile in Georgia closely resembles the community college sector detailed previously.

According to the GDTAE (2005) website, there are 34 technical colleges, 31 branch campuses, as well as technical programs at four university system institutions that make up GDTAE. GDTAE institutions offer a variety of associate degree and diploma programs, continuing education programs, and economic development programs. According to the GDTAE, End of Year Report GDTAE (2004), approximately 160,000 students were enrolled in credit programs FY 2004. Approximately 50 % of those students were full-time students and an equal percentage was part-time students. Female students make up 61 % of students while 39 % of students were male. Race and ethnic diversity enrollments were as follows: American Indian, .3 %; Asian, 1.6 %; African American, 41.1 %; Hispanic, 2 %; white, 53.1 percent; and multi-racial students make up 1.7 % of the population. Students 25 years of age and under make up 50.2 % of students and a little less than half of students were over 25. Over 28 % of students need one or more developmental studies courses.

GDTAE's disadvantaged population makes up 48.1 % of the total enrollment according to the End of Year Report for GDTAE (2004). Disadvantaged is defined as the unduplicated count of students who have at least one of the following characteristics: physically or mentally disabled, displaced homemaker, single parent, limited English, academically disadvantaged, or economically disadvantaged.

While the statistics vary between GDTAE and community colleges in general, the population served by both is increasingly diverse. This population faces challenges witnessed in every part of higher education, but challenges exist largely in the two-year post-secondary environment. These students are characterized by older age, greater financial need, and increased ethnic diversity.

Northwestern Technical College Student Demographic Profile

Northwestern Technical College's student profile varies from both the GDTAE student profile and the student profile of community college students, but all share important characteristics. According to the Technical College System End of Year Report GDTAE (2004), the enrollment at Northwestern Technical College for fiscal year 2004 was 3,902. Part-time enrollment made up 48 % of the total enrollment. Full-time student enrollment was 52 % of the total enrollment. The male population at Northwestern makes up 33.5 % of the total enrollment and the female population is 66.5 %. This is a higher percentage of females than in the national and state student profile. The disadvantaged population is 48.5 % of the student body which is very similar to the state percentage of disadvantaged students. Disadvantaged population of students is defined as it was for GDTAE as unduplicated count of students who have at least one of the following characteristics: physically or mentally disabled, displaced homemaker, single parent, limited English, academically disadvantaged, or economically disadvantaged. The racial ethnic profile of Northwestern students is as follows: American Indian, .5%; Asian, .6%; African American, 4.5 %; Hispanic, .8 %; white, 92.9 %; and multi-racial students make up .7 % of the population. The ethnic population is the only considerably different student characteristic from the GDTAE population and the population at the national level because students at Northwestern are much less ethnically diverse. The age of students is similar to both state and national profiles. The population 25 years of age or younger is 47.9 %. The population older than 25 is 52.2 %. This translates into over half of the population of Northwestern being older than the traditional college student. This is higher than the percentage of both the national and state student profiles. At 38 %, the population at Northwestern taking at least one developmental class is higher than the state level.

Northwestern Technical College students face similar challenges as those cited in the state and national student profiles. Northwestern students are characterized by older age, greater financial need, and less academic preparedness. However, unlike the GDATE and national community college student profile, Northwestern students are much less ethnically diverse than the national and state profiles.

CHAPTER 3

METHODOLOGY

This chapter describes the methodology used in this study to determine if significant differences exist in learning and satisfaction levels between online distance education students and those in traditionally delivered courses. The research subjects are Northwestern Technical College (NTC) students who took Computer Information Systems (CIS) courses online or in regular classrooms. The chapter includes information on the study site, participants, instruments, and process and timetable for data collection. In addition, the chapter describes the data analysis.

Research Questions

This section lists the questions at the foundation of this study. A brief discussion of the methodology used to investigate each question follows.

Research question 1.

Based on industry standard assessments, what are the differences in learning outcomes between students who took CIS courses in an online distance education format and students who took CIS courses in a face-to-face format?

Question 1 is asked to determine if the two educational environments, online and traditional courses, produce significantly different learning outcomes. Astin's Conceptual Model for Assessment, described in chapter two, is the framework for analysis of the two environments. First, an industry-standard certification test measures student knowledge before the course. The test represents the input variable in Astin's model. The same testing instrument, representing the output variable, measures post-course student knowledge.

The difference between the two scores is the measure of learning that took place during the course. Based on the Astin model, the differences between the environments can be

assessed by analyzing the input and the output. Therefore, the pre and post-test scores were recorded for statistical analysis.

Research question 2.

What are the differences in student satisfaction between students who enrolled in online CIS courses and students who took CIS courses in a face-to-face format?

Research question two is designed to measure differences in student satisfaction levels. Again, Astin's model is used. A student expectation survey is administered at the beginning of the course to assess the level of a student's pre-course satisfaction. A student satisfaction survey is administered at the end of the course. The data from the two surveys is used to determine if significant differences exist between students in online courses and students who were enrolled in traditional courses.

Research question 3.

What are the differences in student characteristics between students who enrolled in online CIS courses and students who enrolled in CIS courses in a traditional face-to-face format?

Research question three was used to determine if any student characteristics point to a correlation with student learning or student satisfaction. Data were collected on age, gender, ethnicity, college entrance scores and college grade point average. Appropriate statistical methods were used to analyze the demographics.

Study Population

The study subjects consisted of all student enrolled at Northwestern Technical College (NTC) who were enrolled in two Computer Information Systems (CIS) courses CIS 2228 and CIS 2229 in the spring, summer and fall quarters of 2004. Both of these courses are delivered in an online format and a traditional format. The subjects were chosen from courses with the two

different delivery methods for the purpose of identifying characteristics that may cause significant differences in learning outcomes and student satisfaction. Online courses in this study did not have a face-to-face component. The traditional courses delivered all content through lecture, demonstration, lab assignments, and handouts. This study did not examine blended/hybrid-type course delivery or web-facilitated course delivery.

Institutional Context

This study was conducted at NTC, a two-year technical college in Rock Spring, Georgia. NTC is under the governance of the Georgia Department of Technical and Adult Education (GDTAE).

Courses

The courses that were a part of this study were CIS 2228 – Advanced Spreadsheet Techniques and CIS 2229 – Advanced Database Techniques. These two courses are offered in every technical college in the state of Georgia that has a Computer Information Systems – Microcomputer Specialists program and are also a part of a number of certificate programs throughout the state. Many colleges in the GDTAE system offer these courses in both online and traditional formats. For that reason the results of this research are relevant to technical colleges throughout the state.

Sample Size

The study population included students enrolled in every section of CIS 2228 – Advanced Spreadsheet Techniques and CIS 2229 – Advanced Database Techniques offered in spring, summer, and fall quarters of 2004 at Northwestern Technical College. Of the 102 students asked to participate, a total of 67 students agreed to be subjects of the study. Of the 67

participants, 40% were online students and 60% took their courses on campus. The table below describes the course sections and the number of participating students in each course section.

Table 3.1

Student Participation Breakdown

Quarter	Courses	Face to Face Course Enrollment	Face to Face Research Population	Face to Face % Participating	Internet Course Enrollment	Internet Research Population	Internet % Participating
Spring 2004	CIS 2228	15	14	93%			
	CIS 2229				23	15	65%
Summer 2004	CIS 2228	13	12	92%			
	CIS 2228				17	1	6%
Fall 2004	CIS 2228	16	14	88%			
	CIS 2229				18	11	61%
Total		44	40	91%	58	27	46.5%

Participants in the study made up 66% of the total course enrollments in all course sections. Only 46.5% of the online students participated in the study. The on-campus research had a higher participation rate of 91%.

Of the 67 students who participated in the study not all students completed every data collection instrument. For this reason some of the findings will be based on a number other than 67 due to the responses on that particular data item. A number of students did not respond to all survey questions. Two students were in the course during the pretest but not during the post-test phase. These students completed the expectation survey and the first Certiport exam but did not complete the course, therefore the satisfaction data and the second Certiport exam grade was not collected.

Selection Criteria for Faculty Members

Three faculty members agreed to participate in this study. Each has experience in both traditional classroom settings and online settings. Two of the instructors are adjunct faculty members, and one instructor is a full-time faculty member. Each of the instructors has received favorable reviews and comments from students who were taught online and students who attended classes on campus. The three instructors have taught both of the courses in this study in both formats. In accordance with NTC policy, these instructors participated in a Blackboard training session before teaching online classes. The Blackboard training is intended to help instructors become comfortable with the online learning environment.

Definitions of Terms

Due to the rapidly changing nature of technology coupled with the historical evolution of distance education, the phrase “distance learning” has come to encompass a variety of learning activities and delivery modes. Originally, distance learning simply referred to correspondence courses. It evolved to include many modes of delivery. Due to its strong association with technological innovations, distance learning currently refers to a technology-related delivery.

It is generally agreed that distance learning is defined as learning that occurs when the student and instructor are separated by time and space (Allen & Seaman, 2003; Meyers, 2002; Twiggs, 2001; U. S. Department of Education, 2003). The term distance education is defined in much the same way as distance learning except perhaps it defines a more formal education process as opposed to simple learning. To further complicate the issue, the terms distance learning, distance education, electronically-mediated education, e-learning, distributed learning, web based learning, and online learning are interchangeable to a great extent. In an effort to clarify terms used in this study, a discussion will identify distinctions in the definitions pertaining to distance learning terms used in the literature and clarify how the related terms are used.

Delivery Modes of Distance Learning

Distance learning exists in various forms including correspondence study, interactive videoconferencing, telecourses, asynchronous online instruction, and synchronous online instruction (U.S. Department of Education, 2003). Modes of distance education for purposes of this study are defined.

Asynchronous online instruction

Students use the Internet in asynchronous online instruction to access electronic classrooms that contain instructional content, links to other online material and numerous communication and assessment components according to the U.S. Department of Education (2003). The asynchronous component means that students do not have to be online at a particular time, but typically, have deadlines at which time they must have assignments submitted. Students can be located anywhere in the world as long as they have access to the

Internet. They can also work on the course at their convenience. Students typically develop a sense of community via chat rooms, discussion groups, group projects and email.

Delivery methods of online instruction defined

Research in online learning has developed standard definitions for the breakdown of learning modes. This breakdown has created four categories of learning modes (Allen & Seaman, 2003). Allen and Seaman's definitions are used in this research to describe specifically the amount of online content delivery within the course. Allen and Seaman have defined delivery methods as traditional, web facilitated, blended/hybrid, and online.

Traditional course delivery

Traditional course delivery is defined as a "course with no online technology used - content is delivered in writing or orally" (p. 6).

Web-facilitated delivery

Web facilitated delivery is defined as a "course which uses Web-based technology to facilitate what is essentially a face-to-face course" (p. 6). Web facilitated courses may use Blackboard or WebCT to post the syllabus and assignments but the lion's share of the content is delivered in a traditional method. Web-facilitated instruction is specifically defined as having less than 30 percent of the course content delivered online.

Blended/hybrid courses

Blended/hybrid courses are defined by Allen and Seaman as a "course that is a blend of the online and face-to-face course" (p. 6). Between 30 to 79% of the content is delivered online and typically uses online discussion. Blended courses also have a substantial face-to-face component.

Online delivery

Online delivery is defined by Allen and Seaman as “a course where the vast bulk of the content is delivered online” (p. 6). This course typically does not have face-to-face meetings.

In this research, the courses studied are delivered through either traditional or online delivery methods. The online courses in this study do not have a face-to-face component. The traditional courses have all content delivered orally or in writing. This study does not examine blended/hybrid type course delivery or Web-facilitated course delivery.

The terminology used in this study consists of the terms online learning, e-learning, and web-based learning. These terms are used interchangeably and focus on distance learning that occurs in an asynchronous online format. Online delivery and traditional delivery are the only two methods of delivery used in this study.

Instrumentation

Four survey instruments were used in this study to collect student satisfaction and student expectation data; Online Student Expectation Survey (Appendix A), On Campus Student Expectation Survey (Appendix B), Online Student Satisfaction Survey (Appendix C), and On Campus Student Satisfaction Survey (Appendix D). Student skill and knowledge levels were assessed using the Microsoft Office User Specialist certification exam preparation assessment (Certiport, 2005). This industry standard assessment was used to determine student knowledge before and after a course. Data also was gathered from the NTC Banner Student Information System. Each data collection instrument will be described in more detail.

Microsoft Office User Specialists Exams

The Microsoft Office User Specialist certification exam preparation assessment as an industry recognized assessment must meet high demands of rigor in the test development,

validation and analysis process. This process is rigorous for performance based industry assessments and includes the gathering of empirical, theoretical, statistical, and conceptual evidences. According to Certiport, Inc. the MOUS exams adhere to the testing industries highest set of guidelines of acceptable professional test development and meet or surpass those guidelines (2005). Approvals have been granted by The Standards for Educational and Psychological Testing, the Uniform Guidelines on Employee Selection Procedures, and the exams meet the approval of the Buros Institute for Assessment Consultation and Outreach.

Online Student Expectation Survey

Online student expectations prior to taking the course were gathered using the Online Student Expectation Survey (Appendix A). The survey contained a total of 30 questions. The survey contained questions to determine student name, student SSN, course name, course number, instructor's name, and student demographic questions. The demographics included student age, gender, and ethnicity. Along with the demographic questions the survey consisted of 21 additional questions designed to determine student's expectation levels prior to taking the course. Of the 21 questions, 15 questions were Likert type questions, 2 yes/no questions, 2 fill in the blank questions, and 2 open ended questions.

In the Online Student Expectation Survey, seventeen of the 21 questions resembled a Likert type response scale for most questions, but the number of responses to each question ranged from 4 to 6 choices and were single response survey questions. This is different from the norm of 5 responses in the typical 5-point Likert scale. The Cronbach's alpha (1951) score was calculated for all four survey instrument. One problem that surfaced in this calculation was that students skipped some questions which created missing data for some items in each survey. Cronbach's alpha did not calculate if data items were missing. One of the popular approaches

for dealing with missing data in surveys is the mean replacement method developed by Afifi and Elashoff (1966), in which means are used to replace missing data. The Online Student Expectation Survey produced a Cronbach's alpha score of .6159 after the mean replacement method was utilized to transform missing survey data items.

On Campus Student Expectation Survey

On campus student expectations prior to taking the course were gathered using the On Campus Student Expectation Survey (Appendix B). The survey also contained questions to determine student name, course name, course number, instructor's name, and student demographic questions. The demographic questions included student age, gender, and ethnicity. In addition to the demographic questions, the survey consisted of fourteen other questions designed to determine student's expectation levels prior to taking the course. Of the 14 questions in the survey, 10 included Likert type questions, 2 yes/no questions, and 2 fill in the blank questions. The On Campus Student Expectation Survey produced a Cronbach's alpha score of .5917 after the mean replacement method was utilized to transform missing survey data items.

Online Student Satisfaction Survey

Online student satisfaction levels after taking the courses were gathered using the Online Student Satisfaction Survey (Appendix C). This survey contained questions to determine student name, course name, course number, and the instructor's name. The survey contained 36 student satisfaction questions along with an additional area for other student comments. Of the 36 survey questions, 26 questions were Likert type questions, 2 fill in the blank questions, 5 yes/no questions, and 3 open ended questions. The Online Student Satisfaction Survey produced a Cronbach's alpha score of .6381 after the mean replacement method was utilized to transform missing survey data items.

On Campus Student Satisfaction Survey

On campus student satisfaction levels after taking the courses were gathered using the On Campus Student Satisfaction Survey (Appendix D). This survey contained questions to determine student name, course name, course number, instructor's name. The survey contained 28 student satisfaction questions along with an additional area for other student comments. Of the 28 survey questions, 21 questions were Likert type questions, 2 fill in the blank questions, 2 yes/no questions, and 3 open ended questions. The Online Student Satisfaction Survey produced a Cronbach's alpha score of .5419 after the mean replacement method was utilized to transform missing survey data items.

Survey Instrument Development Process

The four survey instruments used to collect student expectation data, student satisfaction data, and student demographic data were developed based on a survey instrument that has been used at NTC for over four years, the Online Course Evaluation Survey (Appendix E). The Online Course Evaluation Survey was designed by the Northwestern Technical College Online Review Board and was placed in service during the spring quarter of 2000. The instrument evolved over the years through administrator, instructor, and student feedback on the survey instrument. The Northwestern Technical College Online Review Board is charged with assessment of online course offerings at NTC. This survey instrument eventually became a model for the development of the statewide online course review instrument now used by the Georgia Virtual Technical College.

NTC's Online Course Evaluation Survey was designed to assess many elements of online courses using one instrument. First, the survey was designed to get feedback on student satisfaction with online courses. Second, this instrument was designed to assist in evaluating

faculty members who taught online courses. The instrument also is used to obtain students' opinions of the course management software, student services offered to off-campus students, and the technology support students receive when taking online courses. The Online Course Evaluation Survey is available to all students who take online courses via the Blackboard course management system at NTC. Students are not required to respond to the survey.

As mentioned earlier, the four survey instruments used in this study were based on the Online Course Evaluation Survey developed at NTC; however, some modifications were made to the original instrument to fit the survey audience and delivery methods used in this study. Many of the questions are identical to ones in the original NTC survey instrument. In addition, a group of demographic questions on the student expectation survey asked for name, age, gender, and ethnicity data. The original surveys were altered to create a survey instrument that gathered student expectation data as opposed to student satisfaction data. For this reason many questions simply changed tense from "how was your experience..." to "how do you expect your experience to be..." to create the student expectation survey questions.

Additional changes were made to create a version of the survey instrument that could be used in on-campus courses. As was stated earlier, the survey was designed for online courses and many of the questions did not apply to on-campus courses. The on campus versions of the survey instruments were shorter for this reason. An example of the process used to alter the original questions in the Online Course Evaluation Survey is described below.

One of the original survey questions asked, "How quickly did you receive assistance with technical support problems?" The responses were: (a) within a week, (b) within 3 days, (c) within 8 hours, (d) immediately (Appendix F). For the student expectation survey, the question was edited to read, "How quickly do you expect to receive assistance with technical support

problems?” (Appendix A) and the student was given the same response options as above. When designing the on-campus version of the survey, this question was omitted from the survey altogether because it was not applicable to a traditionally delivered course.

Student Knowledge

Student skill and knowledge levels were measured using an industry accepted test designed to help students prepare for the Microsoft Office User Specialist certification exam (Certiport, 2005). The certification preparation test is designed to test a user's knowledge of the Office XP product. This test is a production oriented test which simulates the Office XP environment. Students who take the test are required to perform a number of tasks in Office XP. To collect both pretest/input and post-test/output scores in both educational environments the Certiport, Inc. (Certiport, 2005) preparation exam for the Microsoft Office User Specialist certification exam was administered. The exam produces scores that range from 0 to 100.

Certiport Inc., the exclusive administrator of the Microsoft Office Specialist program worldwide, is the leading provider of global, performance-based certification programs and services (Certiport, 2004). Certiport is responsible for the development, marketing, and administration of certification tests for the Microsoft Office suite.

Banner Student Information System

The last method used to collect data for this study was to use the NTC Banner Student Information System. The students' grade point averages at the time of enrollment in the courses and entrance scores were gathered from the NTC Banner Student Information System. The ASSET[®] test is the entrance exam NTC uses for student placement. The ASSET[®] assessment system is a testing and advising program for placing students into postsecondary institutions. The test is developed by ACT, Inc. (ACT, 2005). The researcher made a request to the NTC

Information Technology department for the grade point averages and student ASSET[®] scores for all students enrolled in the courses that were part of this study. Those reports were created and delivered to the researcher.

Approvals

This study was approved by the Institutional Review Board through the Human Subjects Office at the University of Georgia: Project Number H2004-10660-0.

Student Consent and Institution Review Board Approval

All research subjects agreeing to participate in the study had to give their consent in order to participate in the research. An on campus student first had the study explained by the researcher and was then asked to sign a consent form (Appendix F) if they agreed to participate in the study on the first day of class. Online students read an email that described the study and were asked to agree to participate using the online version of the consent form (Appendix G) that was located within the online course by clicking the “Agree” button on the form and then clicking the submit button on the form. In order for the online student to participate in the study, the consent form had to be processed before the end of the first week of the quarter.

Data Collection and Analysis Procedures

All students in the two classes were asked to participate, but the procedures were different for the two course delivery formats. Each student was asked to give consent to participation in the study. Students were told that participation was voluntary and would have no impact on their grades.

Process for on campus students

Students on campus began the process on the first day that the class met in the quarter. The researcher visited the classroom, explained the research, and asked students to participate. The students were told that student participation was voluntary. After this introduction and explanation, the researcher left the room and students were asked to fill out a consent form. For students who agreed to participate in the study, the next step was to complete the expectation survey. Students then were asked to take the Certiport exam on the computers in the classroom. Student results were collected by the course instructor and delivered in person to the researcher.

Data collection for output results followed procedures similar to those used for collecting input data. On the last day of the quarter, student participants were asked to fill out the student satisfaction survey and were also asked to take the Certiport assessment. Those results were delivered to the researcher by the course instructor.

Process for online students

Students were asked to participate by receiving an email from the researcher. The email outlined the process and explained what was expected of participants. It was explained in this letter that student participation was voluntary. The students also received an announcement in their online course that reminded them of the opportunity to participate in the study.

The online students were asked to agree to participation by using an electronically delivered consent form. A student agreed or disagreed by clicking a button on the consent webpage. The second step was for the students to respond to an electronically delivered student expectation survey. The students' responses were recorded using the Blackboard system and were printed by the instructor for recording in the SPSS statistical software version 10.0. The expectation survey and the consent form were completed in the first week of the quarter.

Student data concerning knowledge level prior to and after the course was more difficult to gather for online students. Students could choose to take the Certiport test at the NTC testing center on campus, or the Certiport testing software could be mailed to the student. The student then installed the software, completed the assessment, and either mailed, faxed, or hand delivered the results to the researcher. The entire data collection process was completed within the first week of the quarter.

The data collection procedure at the completion of the course was similar to that for input data. For the student satisfaction survey, the students responded electronically within their Blackboard web course. The results were printed and delivered to the researcher by the course instructor. The students also took the Certiport exam again at the end of the course and those results were delivered to the researcher by mail or fax, or delivered in person. Again, they had the choice of taking the assessment on campus at the NTC testing center or at their home computer.

Data was more difficult to collect from students taking the courses online because of difficulties involved in taking the Certiport exam. The student had to agree to participate electronically. Taking the Certiport exam required a special trip to campus or installation of exam software on the student's home computer. Results of the exams taken on the home computer also had to be delivered and all steps had to take place within the first week of the quarter.

An unexpected challenge in data collection occurred during this study due to a software upgrade that took place on the Georgia Virtual Technical Institute Blackboard server. GVTC upgraded from version 5.0 of Blackboard to version 6.0. The unexpected consequences of this upgrade were that the survey data was reported in a different format after the upgrade. In version

5.0 of Blackboard all survey item data was reported with the corresponding student identification information. No summary data was given and the raw results were keyed. After the upgrade to version 6.0 only summary data was reported for survey instruments in an effort to protect student anonymity.

Consequently, when data was keyed into SPSS after the upgrade the total number of responses to each survey item was known but the student who had given the response was unknown. Early in the study the data was keyed with the raw responses in from the Blackboard reports to SPSS. After the conversion the data was keyed to the correct course and section of that course but it could not be connected to a particular student. For this reason the data could not be analyzed or compared over time from the beginning of the quarter to the end of the quarter. In other words, student expectation data could not be linked to student satisfaction data; therefore, longitudinal data could not be assessed. .

Data has been analyzed using SPSS statistical software version 10.0 to determine if a significant difference exists between the two environments (online and face-to-face). The difference between pretest scores and post-test scores for each student was calculated and independent samples t tests was used to determine if a statistically significant difference existed between the two groups of students. Frequency data for ethnicity, gender and age were calculated. The mean and standard deviation for each group, online and face-to-face, were determined. A simple independent sample t test analysis of student satisfaction between online students and face-to-face students was performed.

The original Online Course Evaluation Survey was designed to capture a variety of information and was not limited to student satisfaction data. For this reason a composite score was not calculated for each of the four modified survey instruments used in this study to measure

student satisfaction. The questions pertaining specifically to student satisfaction were analyzed in this study. In addition, all questions where significant differences were found were evaluated to determine if additional information could be gleaned from the study results.

Data were handled using different procedures depending on the type of data. Data retrieved from the NTC Banner system was entered into SPSS from the Banner reports and keyed by the researcher. Data from the four survey instruments was keyed from printouts that were produced in Blackboard, the online course management system which is used at NTC. As stated before, due to the Blackboard upgrade accomplished during this study, the version 5.0 data was keyed with the raw responses in from the Blackboard reports to SPSS. After the conversion, the version 6.0 data was keyed to the correct course and section of that course but it could not be connected to a particular student. Consequently, student expectation data could not be linked to student satisfaction data and this limited the longitudinal data available for analysis.

Student certification test scores were keyed from individual printouts. Each student submitted the printed results of the certification from both the pretest and the post-test. The data was then checked for accuracy by the researcher. Finally, data was analyzed using SPSS statistical software version 10.0.

Chapter Summary

In this chapter the methodology used in this study has been defined. Each of the three research questions was examined. The study population, courses, and institutional context were described. The sample of students who participated in this study was explained and a description of the instruments used to collect data for this study was given. The data collection procedure was described along with a description of the data analysis methods used.

CHAPTER 4

FINDINGS

The fourth chapter of this study will detail the research findings. It is divided into three sections. The demographic breakdown of the study participants will be described as the first component of the chapter. Second, the results of each data collection instrument will be presented. The third section of the study will examine each of the three research questions and describe the findings relevant to each question.

Demographic Data

Data collected in this study was statistically analyzed and consisted of three demographic data characteristics: gender, age, and ethnicity. The data was analyzed using SPSS version 10.0. The demographic data was gathered for all 67 study participants. The findings for each of these demographic characteristics will be described. The demographic characteristic will be presented in the order gender, age, and finally ethnicity.

The first characteristic to be detailed is gender. In this study 17 participants were male (25.4%) and 50 participants (74.6%) were female. The percentage of males in this study (25.4%) is less than the percentage of males (33.5%) enrolled at Northwestern Technical College. In the online classes 29.6% of students were male and 70.3% were female. In face-to-face classes 22.5% of students were male and 77.5% were female. In this study the online classes had a slightly higher percentage of male participants at almost one third, 29.6% while the face-to-face male participation rate was slightly lower at 22.5%. The results from the survey concerning gender are detailed in the table following.

Table 4.1

Study Participants Gender Profile

Demographics	<i>Face-to-Face</i>		<i>Online</i>		<i>Total</i>	
Gender						
Male	9	13.4%	8	11.9%	17	25.4%
Female	31	46.3%	19	28.4%	50	74.6%
Total	40	60.0%	27	40.0%	67	100.0%

The findings pertaining to age for the study participants is interesting. The average age of study participants was 35.7. The youngest study participant was 18 and the oldest study participant was 78. An interesting finding concerning age in this study was that this population was older than expected and older than all profiles highlighted in this study at the college, state and national levels. In this study the percentage of students age 25 or younger was 28.4% which is much lower than the overall NTC population of 47.9% who are age 25 or younger, or the GDTAE state percentage of 50.2%. The average age of community college students in the United States is 29, which is substantially lower than the average age in this study of 35.7.

The ages of study participants were grouped into six categories which are detailed in the following table. The first age category is students 16-19 which included three participants and made up 4.5 % of the study participants. The second age category of students was those 20-25 which included 16 participants at 23.9%. The third age category was those students 26-30 which included 12 participants at 17.9% of the study population. The fourth age category was those students 31-37 which included 8 participants at 11.9% of study participants. The fifth age category of student were those students 38-45 which included 13 study participants and made up 19.4% of the study population. The sixth age category 46-60 included 11 participants at 16.4%. The last age category of students was those students over 60 which included 4 participants at

5.9% of study participants. Note the high number of students that were 60 and over and note that the oldest student was 78.

Table 4.2

Study Participants Age Profile

Demographics	<i>Face-to-Face</i>		<i>Online</i>		<i>Total</i>	
Age						
16-19	3	4.5%	0	0%	3	4.5%
20-25	6	9.0%	10	14.9%	16	23.9%
26-30	6	9.0%	6	9.0%	12	17.9%
31-37	6	9.0%	2	3.0%	8	11.9%
38-45	7	10.4%	6	9.0%	13	19.4%
46-60	9	13.4%	2	3.0%	11	16.4%
Over 60	3	4.5%	1	1.5%	4	5.9%
Total	40	60.0%	27	40.0%	67	100.0%

These results prompted further analysis of the data with regard to age. Statistical analysis revealed that the average age of students taking classes online in this study was 32.2 and the average age for students taking face-to-face classes was 38.1. An independent sample t tests was performed to determine if age was significantly different with respect to course type. The t test revealed a marginal significance of $p = .06$ if equal variances are not assumed. A scatter plot of the data revealed that one of the participants with age 78 was an outlier with respect to age. After removing that observation from the data another t tests was performed and no significant difference was found with respect to age based on course type $p = .37$.

The last demographic finding to be detailed is the data concerning ethnicity. The ethnic makeup of the study participants was American Indian - 1.5%, Asian - 3.0%, Black or African American – 14.9%, White – 79.1%, other - 1.5%.

The findings indicate that the diversity of the student population in this study is more diverse than that of the profiled NTC population which is 92.9% white. Nevertheless, this study indicated a substantially less diverse population than that of either the typical GDТАЕ student population or community college student population in the United States whose white populations is typically less than 50%.

Table 4.3

Study Participants Ethnicity Profile

Demographics	Face-to-Face		Online		Total	
Ethnicity						
America Indian	0	0.0%	1	1.5%	1	1.5%
Asian	1	1.5%	1	1.5%	2	3.0%
Africa American	8	11.9%	2	3.0%	10	14.9%
White	31	46.3%	22	32.8%	53	79.1%
Other	0	0.0%	1	1.5%	1	1.5%
Total	40	60.0%	27	40.0%	67	100.0%

Data Collection Instrument Results

Four survey instruments were used to collect student expectation data and student satisfaction data: Online Student Expectation Survey (Appendix A), On Campus Student Expectation Survey (Appendix B), Online Student Satisfaction Survey (Appendix C), On Campus Student Satisfaction Survey (Appendix D).

In addition to the survey instruments, student learning outcomes were measured by administering an exam developed by Certiport, Incorporated (Certiport, 2005). The Microsoft Office User Specialists Certification Preparation exam by Certiport, Inc. is an industry accepted exam that assists students who plan to take the Microsoft Office User Specialists exam by

simulating the certification exam and therefore preparing students to sit for the certification test. The Certiport exam was administered twice to each student during the study. Students first took the exam during the first few days of the course and this score was used as a pretest score in the study. Students then took the exam at the end of the course and the results of this administration of the exam were used as post-test scores in this study. Both the pretest results and the post-test results will be analyzed and descriptive statistics will be revealed.

In all four survey instruments there was attrition between pretest and post-test for online and on campus students. Of the 27 students participating in online courses, 9 students attempted the satisfaction survey. Satisfaction data was more difficult to gather simply because it required continued interest in the study over a 10 week period. The table below shows the number of respondents for each survey. The results of each item in the four surveys may be viewed in Appendices H, I, J, and K.

Table 4.4
Student Participation in Surveys

Survey Instrument	Number of Students Participating
Online Student Expectation Survey	27
On Campus Student Expectation Survey	39
Online Student Satisfaction Survey	9
On Campus Student Satisfaction Survey	12

Certiport Microsoft Office User Specialist Certification Preparation Exam Results

The findings for the Certiport Microsoft Office User Specialist, (MOUS) Certification Preparation Exam will be described first by detailing the overall results. After the overall results, the results will be dissected by course type (face-to-face and online). The overall results are presented in table 4.5. The face-to-face and online results are presented in table 4.6

Overall MOUS Results

Of the 67 students who participated in this study, 66 study participants took the MOUS Preparation exam (Certiport, 2005) as a pretest in this study. The same exam was administered again as a post-test and 65 study participants took part in the second testing. During the pretest phase the mean score on the exam was 53.5 for all students participating. The minimum score on the pretest was 6 and the maximum score was 91 with a standard deviation of 20.8. During the post-test phase the mean score on the exam was 80.9 with a standard deviation of 15.6. The minimum score on the post-test exam was 48 and the maximum score was 98.

During the statistical analysis phase of this study a data variable was created referred to as difference, which represented the difference between the pretest score and the post-test score. The mean difference between pretest and post-test scores for all participants was 26.9 with a standard deviation of 10.9. The minimum difference was 3 and the maximum difference was 53.

Table 4.5

Overall MOUS Results

Data Fields	N	Mean	Std. Deviation	Std. Error Mean	Min. Score	Max. Score
MOUS Pretest Score	66	53.5	20.8	4.2	6	91
MOUS Post-test Score	65	80.9	15.6	3.0	48	98
Difference in Scores	65	26.9	10.9	2.3	3	53

Face-to-face MOUS Results

Exam results were separated to analyze only the on campus study participants. The minimum Certiport Microsoft Office User Specialist Certification Preparation Exam (Certiport, 2005) pretest score for on campus students was six and the maximum pretest scored was 86. The mean pretest score for study participants who took the class on campus was 51.6 with a standard deviation of 20.3. Descriptive statistics for the post-test administration of the Certiport exam involving on campus students resulted in a mean post-test score of 79.8 and a standard deviation of 15.5. A minimum post-test score of 48 and a maximum post-test score of 98 was calculated.

The difference between pretest score and post-test score on the MOUS Certification Preparation Exam was calculated for on campus students. The mean difference between scores for on campus students was 27.3 with a minimum of 6 and a maximum difference of 86 and the standard deviation was 10.2.

Online MOUS Results

Descriptive statistical analysis was also completed for students who participated in the online course. Online study participants scored an average mean pretest score of 56.2 with a

standard deviation of 21.7. The minimum MOUS Certification Preparation Exam pretest score was 23 and the maximum pretest score was 91. Online study participants scored on the post-test exam a mean of 82.3 with a standard deviation of 15.6. The post-test minimum score for online study participants was 51 and the maximum was 98.

The difference between pretest score and post-test score was calculated for online students as well. The mean difference between scores for online students was 26.2 with a standard deviation of 12.0, a minimum difference in pretest and post-test scores of 3 and a maximum difference of 53.

In the table below the group statistics for the pretest scores, the post-test scores, and the differences between the two scores are detailed and separated by course type.

Table 4.6
Certification Exam Group Statistics

Data Fields	Online				Face-to-Face			
	N	Mean	Std. Deviation	Std. Error Mean	N	Mean	Std. Deviation	Std. Error Mean
MOUS Pretest Score	27	56.2	21.7	4.2	39	51.6	20.3	3.2
MOUS Post-test Score	27	82.3	15.6	3.0	38	79.8	15.5	2.5
Difference in Scores	27	26.2	12.0	2.3	38	27.3	10.2	1.7

Statistical analysis of the test result data was accomplished using SPSS version 10.0. The test performed was independent sample t tests. The results are listed in the table following.

Table 4.7

Independent Samples Test Results for Test Scores

	t-test Equality Means	for of	
	t	df	p
Certification Data			
Pretest Score	0.9	64	0.4
Post-test Score	0.6	63	0.6
Difference in Scores	-0.4	63	0.7

Note that no significant differences were found between the course taught online and the courses taught in a face-to-face format in regard to MOUS test scores.

Findings

In the next section of this study each of the three research questions will be listed followed by a statement of the findings related to each of the three research questions.

Research Question 1

Based on industry standard assessments, what are the differences in learning outcomes between students who took CIS courses in an online distance education format and students who took CIS courses in a face-to-face format?

In this study no significant differences were found in learning outcomes between students who took CIS courses in an online format and students who took CIS courses in a traditional face-to-face format. The statistical analysis was accomplished by calculating the difference between pretest and post-test scores for each student. Those differences were analyzed for

online versus on campus students using an independent sample two tailed t test which is designed to test for significant differences in means scores.

The group statistical analysis of this data (Appendix L) indicates that the 27 online student had a mean score difference of 26.2, and the 38 on campus students had a mean score difference of 27.3 and the means did not differ significantly at the $p < .05$ level (note: $p = .67$) (Appendix M).

Research Question 2

What are the differences in student satisfaction between students who enrolled in online CIS courses and students who took CIS courses in a face-to-face format?

The statistical analysis for this question involved first determining which survey questions pertained to student satisfaction. The following survey question was selected as most relevant to indicating student satisfaction. The question was included in both the online and on campus student satisfaction survey. The question was “How satisfied were you with the educational experience (what you learned) in this course?”(Appendix C, Appendix D).

To establish whether the survey question results differed significantly a t test statistic was computed for this question. The results of this test (Appendix M) indicated that overall student satisfaction did differ significantly at the $p < .05$ level for students depending on the type of course into which a student was enrolled with (note: $p=.03$) and ($t=2.3,df=19$). The group statistics indicated (Appendix L) that overall the on campus students were more satisfied with the courses in this study. The results collected for this survey question are listed in Table 4.5. It is important to note that in both surveys the vast majority of students are either satisfied or very satisfied. It is also important to note the low number of responses in both the online and on campus surveys.

Table 4.8
Student's Overall Satisfaction Level

How satisfied were you with the educational experience (what you learned) in this online learning course?						
	Very satisfied	Satisfied	Somewhat satisfied	Not satisfied	Unanswered	Number of Students Responding
Online	52.4%	42.9%	4.8%	0.0%	0.0%	9
	Very satisfied	Satisfied	Somewhat satisfied	Not satisfied	Unanswered	Number of Students Responding
On Campus	66.7%	33.3%	0.0%	0.0%	0.0%	12

To further analyze the results of the student satisfaction survey data, all questions that were found to show significant differences based on course format were examined. Those questions are listed in the table below.

Table 4.9
Satisfaction Data Demonstrating Significant Differences

Question	t	df	p
Why did you enroll in this course?	*3.1	19	0.01
Instructor encouraged interactivity among students in discussions and/or activities.	*2.6	19	0.02
How useful to learning the material in this course were the lectures by your instructor?	*2.5	19	0.02
How satisfied were you with the educational experience (what you learned) in this online learning course?	*2.3	19	0.03
How frequently did you communicate with your instructor	*-4.3	19	0.00
* $p < .05$			

In addition to the satisfaction question discussed previously, four survey questions pointed to a significant difference based on course format. The t test analysis of these questions indicated that significant differences exist based on course format. Each of these questions will be listed below with the corresponding significance found during this analysis and any other relevant statistical findings for each question.

The first question to demonstrate a significant difference, $p=.01$, with regard to the course format was the survey question, “Why did you enroll in this course?” (Appendix C, D). A majority of the students, 65%, who enrolled in the online course, selected the response “Convenience due to work/family/school”. While a majority of on campus students, 85%, responded, “To satisfy degree/certification requirement” (Appendix C, D).

The second question to demonstrate a significant difference, $p=.02$, with the course format selected was the survey question, “Instructor encouraged interactivity among students in discussions and/or activities.” (Appendix C, D). Online students appear to be more satisfied based on the results of this survey. A majority of the students, 61.9%, who enrolled in the online course format, selected the response “strongly agree”. While a majority of on campus students, 66.7%, responded, “Agree” (Appendix C, D). In both surveys all students either agreed or strongly agreed and therefore the differences are minimal.

The next question to demonstrate a significant difference, $p = .02$, with the course format selected was the survey question, “How useful to learning the material in this course were the lectures by your instructor? (Appendix D) and stated slightly differently in the online course survey “How useful to learning the material in this course were the online lecture notes and the PowerPoint lectures in your course?” (Appendix C). The response for this question indicates that on campus students found lectures more useful than did the online students. Note that the

lectures are delivered in different formats due to the difference in the course delivery method. The on campus lectures were in person lectures while the online lectures took the form of PowerPoint's and lecture notes.

The fourth and final question to demonstrate a significant difference, $p=.00$, with the course format selected was the survey question, "How frequently did you communicate with your instructor" (Appendix C, D). The differences in these responses are extreme as demonstrated in the following table.

Table 4.10
Communication Frequency Results

How frequently did you communicate with your instructor?							
	Never	Once a week	Once every 3 days	Once every day	Many times a day	Unanswered	Number of Students Responding
On Campus	0.0%	8.3%	41.7%	41.7%	8.3%	0.0%	12
Online	19.0%	76.2%	0.0%	4.8%	0.0%	0.0%	9

It seems important to note that on campus student attended classes either two times a week or 5 days a week depending on if the class was an evening class or a day class. It may be difficult to determine how students interpreted this question. If attending a lecture is communicating with the instructor, then the day classes certainly had a greater opportunity to communicate with their instructor. Online students indicated that they communicated with their instructor less frequently.

In all of the four questions discussed above it is important to note that the topic of the question do lend themselves to different responses based on the course format due to how the

course is conducted. It does not seem apparent that these questions are directly related to satisfaction in the course. It also is important to note that in the primary question concerning student satisfaction, the majority of student appeared to be satisfied with their course, nevertheless, it has been determined that significant differences existed in student satisfaction.

Research Question 3

What are the differences in student characteristics between students who enrolled in online CIS courses and students who enrolled in CIS courses in a traditional face-to-face format?

An independent sample t tests analysis of student demographic data was performed to determine if a relationship existed between the type of course into which a student was enrolled and the demographic characteristics of the participating students. The t tests analysis did not demonstrate significant difference between the types of courses the students took, online and on campus. The demographic data collected for this study which included gender, age and ethnicity. This demonstrates that the type of course format into which a student enrolled was not significantly different for any student demographic characteristic. One marginally significant difference was found with regard to age but further statistical analysis determined that those results were misleading due to one student's age of 78 which was determined to be an outlier.

CHAPTER 5

RESULTS AND CONCLUSIONS

The last chapter consists of a summary and conclusions for this study. The chapter will begin with a brief review of the study. Next, the conclusions that were made based on the findings in this study are presented. A discussion is offered which is developed from the integration of the conclusions made in this study together with the theory that is foundational to the study. The last section of this chapter includes implication for future research.

Summary

This study seeks to determine if there are significant differences in learning and satisfaction for students who enrolled in computer courses delivered in traditional format or online distance education format at a technical college in Georgia. The study first addresses student learning for those enrolled in CIS courses online and those who enrolled in the courses in a traditional face-to-face format. The study then examines differences in student satisfaction between the two groups. Finally, the research attempts to uncover differences in student characteristics for the two groups of students to determine if any relationship exists between these student characteristic and the educational delivery format selected. Student characteristics considered include student demographic data, student admission data, student expectation data, student satisfaction data, and student learning data collected in this study.

This study was conducted at Northwestern Technical College, NTC, a two-year technical college in Rock Spring, Georgia. NTC is under the governance of the Georgia Department of Technical and Adult Education (GDТАЕ). The courses that were a part of this study were CIS 2228 – Advanced Spreadsheet Techniques and CIS 2229 – Advanced Database Techniques. These two courses are offered in every technical college in the state of Georgia that has a

Computer Information Systems – Microcomputer Specialists program and are also a part of a number of certificate programs throughout the state.

In this study 102 students were enrolled in these courses and were asked to participate. A total of 67 students agreed to be subjects of the study. Participants in the study made up 66% of the total course enrollments. Only 46.5% of the online students participated in the study. The on-campus research had a higher participation rate of 93%. Seventeen participants were male, which translates into 25.4% of the study population. The 50 female students made up 74.6% of the population. The ethnic makeup of the study population included: American Indian - 1.5%, Asian - 3.0%, Black or African American - 13.4%, White - 80.6%, other - 1.5%. The average age was 35.7, with ages ranging from 18 to 78 years.

Four survey instruments were used to collect student expectation data and student satisfaction data. The four instruments were Online Student Expectation Survey (Appendix A), On Campus Student Expectation Survey (Appendix B), Online Student Satisfaction Survey (Appendix C), and On Campus Student Satisfaction Survey (Appendix D). In addition to the survey instruments, student learning outcomes were measured by administering an exam developed by Certiport, Incorporated. The Microsoft Office User Specialists Certification Preparation exam (Certiport, 2005) is an industry-accepted exam that simulates the Microsoft Office User Specialists exam and prepares students to sit for the actual Microsoft exam. The Certiport exam was administered twice during the study. Students took the exam during the first few days of the course and the scores were used as pretest scores. Students then took the exam at the end of the course, and the results were used as post-test scores.

The findings in this study indicated that there was no significant difference in student learning between the two learning environments, online and traditional on campus courses. The

study does indicate significant difference in student satisfaction level although the findings suggest that the majority of students in both course formats were satisfied with their course. Study findings also indicate that course format, online and on campus, was not significantly different for any student demographic characteristic. The research questions and results will be described below including conclusions drawn from this study.

Conclusions

The results of this study are consistent with similar studies pertaining to distance education. Each research question in this study is listed in the table below followed by the findings pertaining to the question.

Table 5.1
Research Questions and Findings

Research Question 1	Based on industry standard assessments, what are the differences in learning outcomes between students who took CIS courses in an online distance education format and students who took CIS courses in a face-to-face format?
Findings	No significant differences were found in learning outcomes between students who took CIS courses in an online format and students who took CIS courses in a traditional face-to-face format.
Research Question 2	What are the differences in student satisfaction between students who enrolled in online CIS courses and students who took CIS courses in a face-to-face format?
Findings	This study indicates that the two groups of students did differ significantly in overall level of student satisfaction, although the findings suggest that the majority of students in both course formats were satisfied with their course.
Research Question 3	What are the differences in student characteristics between students who enrolled in online CIS courses and students who enrolled in CIS courses in a traditional face-to-face format?
Findings	Data indicates that course format, online and on campus, was not significantly different for any student demographic characteristic. Three demographic data characteristics; gender, age, and ethnicity, pointed to no significant difference based on course format.

Discussion

The results of this study support current research in the area of effectiveness and distance education. Research indicates that the instructional format has little effect on student achievement as long as the delivery technology is appropriate. Russell's (1999) work described as "The No Significant Difference Phenomenon" shows no significant difference in student learning or student satisfaction for students using face-to-face instruction or distance instruction. Studies conducted after Russell's compilation support his findings (Dominguez & Ridley, 1999; Gagne, 2001; Miller, 2000; Ryan, 2000; Johnson, 2002; Jeffries, 2001). Comparing online and traditional deliveries, the studies found no significant differences in student achievement.

All research data were analyzed to determine if significant differences existed based on course format for any of the data collected in this study. A t tests analysis of student demographic data was performed to determine if a significant difference existed between course format and student demographic characteristics, including gender, age and ethnicity. The analysis did not demonstrate a significant difference between course formats, online or on campus, and demographic data collected for this study. This indicates that course format was not significantly different for any student demographic group.

Demographic data analysis demonstrated that a significant difference did not exist with regard to gender, age, and ethnicity. This supports the works by Sullivan (2002) and Ory, Bullock, and Burnaska(1997) which demonstrated that gender does not seem to be a factor in college-level online learning. The results are also supported by the works of Brown (1997) and Healy (1999) that suggest that generational differences seems to be less important to success in online learning than a student experience level and motivation level. The lack of ethnic diversity

in this study is not consistent with the typical highly diverse technical college population, however, the study population is more diverse than the typical ethnic make up of NTC's student population.

According to the National Telecommunications and Information Administration (NTIA) (2000), Internet use is growing in all segments of society. While disadvantaged students use the technology and the Internet less, according to van Dijk and Hacker (2003), differences in access to technology according to age, gender and ethnicity are gradually disappearing. Recent research suggested that access and ownership are not as important as the student's inclination or ability to use the technology (Williams et al., 2000; Stanley, 2003; Tu & McIsaac, 2002).

Five satisfaction survey questions pointed to a significant difference based on course format. A t test analysis of these questions indicated that a significant difference was found based on course format. One question to demonstrate a significant relationship, $p = .01$, with the course format selected was the survey question, "Why did you enroll in this course?" (Appendix A, Appendix B). A majority of the students, 65%, who enrolled in the online course format, selected the response "Convenience due to work/family/school". A majority of on-campus students, 85%, responded "To satisfy degree/certification requirement" (Appendix A, Appendix B).

These findings support the findings of Bentley (1998) and Gell and Cochrane (1996). Their research found that online delivery of courses offers flexibility of schedules and better suits students who must fit their studies into other responsibilities. Those responsibilities include work as well as child care and parent care responsibilities.

Students' level of satisfaction was found to be significantly different in this study for student in online courses versus on campus courses while the large majority of students were

either satisfied or very satisfied in both course formats. The results are not clear with regard to student satisfaction in this study.

The findings in this study are not surprising because in a number of the later studies differences were found in student satisfaction levels according to (Gagne, 2001; Johnson, 2002; Jeffries, 2001; Meyer, 2002; Ryan, 2000). These studies suggest that while learning outcomes were often the same, differences were found in some studies in completions and student satisfaction.

One result that emerged from this study was the discovery that the survey instruments use in this study should be refined. This study determined that the Cronbach's (1951) alpha score which was calculated for all four survey instruments was lower than anticipated. Those scores ranged from .5419 to .6381 with the instruments used for online students scoring slightly higher than the on campus versions of the surveys. A Cronbach's alpha score of 0.7 or above is generally considered acceptable and all four scores were below this threshold. Based on this information, it is recommended that the model survey, the Online Course Evaluation Survey (Appendix E), designed by the Northwestern Technical College Online Review Board be refined and that a factor analysis be completed in an effort toward improvement of this instrument.

Implication for Future Research

The study of student learning, particularly assessing student learning and student satisfaction is a complicated task in all learning environments. Many entities work together including the nature of education, the learning environments, teachers, administrations, political ramifications, policy issues, and funding issues, together with the simple fact that the students are complex human beings; to convince this researcher that any such attempt is a daunting task, nevertheless, one completely worth pursuing.

For Technical College Student

The value of this research is a relevant concern for today's global societies and the economic growth of Georgia. It is important to the development of this state that educators ensure increased access to higher education, and discover ways to include non-traditional students, such as women, ethnic minorities, those who live in distant rural or disadvantaged areas, and those who must combine their studies, family responsibilities, and full or part-time employment.

The population in this study is characterized as non-traditional students in a technical college setting. The lack of research designed to discover more about the technical college student is startling in contrast to the wealth of research in K-12 and university settings. This is true in the state of Georgia and throughout the nation. While research is not typically at the heart of the mission of technical colleges, it is imperative that the nation's technical colleges increase research pertaining to this population served, the non-traditional student, and allocate the resources to facilitate this research.

For Online Delivery

This research supports the claim that online delivery is an effective delivery mechanism for student learning. The study supports the case that online delivery of education can play a central role in the goal of developing an educated society and competent workforce in Georgia. In this study, the delivery method did not significantly alter learning outcomes in these two CIS courses. A number of related issues surfaced that were not addressed by this study. All indications suggested that online delivery is here to stay. It is an effective mechanism of delivery for various types of educational content to certain populations of students. It is not

destined to replace all other forms of educational delivery. It seems important to discover what types of content and which students this delivery method best suits.

It would be of interest to investigate if all technical college students in all majors would have similar outcomes. This study is the only study examining student learning and student satisfaction in the online environment for Georgia's technical colleges. Similar studies should be pursued that look at other groups of students in the technical college population. Research could some day determine that certain majors or areas of study are more effective in online learning environments than other areas of study. A few studies have suggested this, but it will never be confirmed or denied without further research. Due to the technical college student population differences, similar studies should be duplicated in the technical college setting in other program areas and in non program specific studies.

Studies that examine entire programs of study would be valuable for a number of reasons. Similar studies would include the general education core which is excluded from this study. A program level study would also examine learning over time. For accountability reasons and in an effort to improve programs, the topics of retention, program satisfaction, and program effectiveness should be studied for entire certificate, diploma, and degree programs.

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APPENDIX A

**Northwestern Technical College
Online Student Expectation Survey**

Directions: Please complete this online student expectation survey. Your responses are important to us and will be automatically sent when you click the submit button. Thank you for helping us improve our online courses at Northwestern.

Student Name: _____ **Student SSN:** _____

Course Number: _____ **Course Name:** _____

Instructor's name: _____

Gender:

Male _____

Female _____

This is my _____ online course.

1st _____

2nd _____

3rd _____

4th+ _____

Age: _____

Ethnic Group:

(Mixed racial heritage should be indicated by checking more than one category)

____ American Indian or Alaska Native

____ Asian

____ Black or African American

____ Hispanic or Latino

____ Native Hawaiian or Other Pacific Islander

____ White

1. Why did you enroll in this distance learning course? (Select one.)
 - A. Convenience due to work/family/school _____
 - B. Interest in subject matter or instructor _____
 - C. To satisfy degree/certification requirement _____
 - D. Course recommended by others _____
 - E. Other (Please specify.) _____

2. What is your knowledge of this topic before this course? (Select one.)
 - A. No knowledge at all _____
 - B. Basic knowledge _____
 - C. Beyond basic knowledge _____
 - D. Advanced knowledge _____

Enter an appropriate number in the blank provided, for the next 2 questions.

3. How many hours do you expect to devote to this class each week counting both online course time and hours spent studying for the course? _____

4. About how many times do you expect to contact the instructor for assistance per week during the course? _____

5. Do you feel that you have received adequate information about this online course, its procedures, and how to successfully navigate the course?

Yes _____ No _____

If not, what additional information did you need? Please explain.

For the questions below, please select one answer only.

6. How helpful do you expect the online resource materials will be in this class?
 - A. Highly Useful _____
 - B. Useful _____
 - C. Somewhat Useful _____
 - D. Not Useful _____

7. How skilled do you expect the instructor to be in his/her distance learning instruction?
 - A. Superior _____
 - B. Good _____
 - C. Average _____
 - D. Fair _____

8. As compared to a face to face course, do you think that the amount of work assigned during this class will be:

- A. Overwhelming (much more than other courses) _____
- B. Demanding (somewhat more than other courses) _____
- C. Manageable (about the same as other courses) _____
- D. Insufficient (much less than other courses) _____

9. Do you think that your educational experience (what you learn) in this online course will be:

- A. much more than other courses _____
- B. somewhat more than other courses _____
- C. about the same as other courses _____
- D. much less than other courses _____

10. How proficient are you expected to be with the technologies that are required for this course?

- A. Very proficient _____
- B. Proficient _____
- C. Somewhat Proficient _____
- D. Not Proficient _____

11. To what extent do you think that you may experience technical problems in this course?

- A. Many technical problems expected _____
- B. Some technical problems expected _____
- C. Very few technical problems expected _____
- D. No technical problems expected _____

12. How quickly do you expect to receive assistance with technical support problems?

- A. Within a week _____
- B. Within 3 days _____
- C. Within 8 hours _____
- D. Immediately _____

13. Who do you expect to turn to for assistance with technical support problems? select one?

- A. GVTC Blackboard technical support staff
- B. Northwestern's distance education office
- C. Instructor
- D. Other Student
- E. Friend of family member

14. How frequently do you expect to communicate (e.g. send and receive email) with your instructor?

- A. Never _____
- B. Once a week _____
- C. Once every 3 days _____
- D. Once every day _____
- E. Many times a day _____

15. How frequently do you expect to engage with other students in discussions and/or activities?
- A. Never _____
 - B. Once a week _____
 - C. Once every 3 days _____
 - D. Once every day _____
 - E. Many times a day _____
16. How quickly do you expect the instructor to provide feedback on assignments, activities, and tests?
- A. Within 2 weeks
 - B. Within a week
 - C. Within 3 days
 - D. Next day
 - E. Many times a day
17. How easy to follow do you expect instructions for the course lessons, projects, and assignments to be?
- A. Very Clear _____
 - B. Clear _____
 - C. Somewhat Confusing _____
 - D. Very Confusing _____
18. Do you expect the purpose and objectives of the course to be clear?
- A. Very Clear _____
 - B. Clear _____
 - C. Somewhat Confusing _____
 - D. Very Confusing _____
19. Do you expect examinations and graded assignments or graded activities to be consistent with face to face courses?
- A. Overwhelming (much more than other courses) _____
 - B. Demanding (somewhat more than other courses) _____
 - C. Manageable (about the same as other courses) _____
 - D. Insufficient (much less than other courses) _____
20. What do you expect to like best about the course?
21. What do you expect to like least about this online course?

APPENDIX B

Northwestern Technical College On Campus Student Expectation Survey

Directions: Please complete this student expectation survey. Your responses are important to us and will be automatically sent to the office of Academic Affairs when you click the submit button.

Thank you for helping us improve our courses at Northwestern.

Student Name: _____ **Student SSN:** _____

Course Number: _____ **Course Name:** _____

Instructor's name: _____

Gender: _____ **Age:** _____

Male _____

Female _____

Ethnic Group:

(Mixed racial heritage should be indicated by checking more than one category)

____ American Indian or Alaska Native

____ Asian

____ Black or African American

____ Hispanic or Latino

____ Native Hawaiian or Other Pacific Islander

____ White

1. Why did you enroll in this course?

A. Convenience due to work/family/school _____

B. Interest in subject matter or instructor _____

C. To satisfy degree/certification requirement _____

D. Course recommended by others _____

E. Other (Please specify.) _____

2. What is your knowledge of this topic before this course?

A. No knowledge at all _____

B. Basic knowledge _____

C. Beyond basic knowledge _____

D. Advanced knowledge _____

Enter an appropriate number in the blank provided, for the next 2 questions.

3. How many hours do you expect to devote to this class each week counting both in class time and hours spent studying for the course? _____

4. About how many times do you expect to contact the instructor outside of class time for assistance per week during the course? _____

5. How helpful do you expect the textbook and other learning materials to be in this class?

- A. Highly Useful _____
- B. Useful _____
- C. Somewhat Useful _____
- D. Not Useful _____

6. How effective do you expect the instructor to be in his/her instruction?

- A. Highly Effective _____
- B. Effective _____
- C. Somewhat effective _____
- D. Not effective _____

7. I expect that the amount of work assigned during this class will be:

- A. Overwhelming (much more than other courses) _____
- B. Demanding (somewhat more than other courses) _____
- C. Manageable (about the same as other courses) _____
- D. Insufficient (much less than other courses) _____

8. Do you think that your educational experience (what you learned) in this course will be:

- A. much more than other courses _____
- B. somewhat more than other courses _____
- C. about the same as other courses _____
- D. much less than other courses _____

9. How frequently do you expect to communicate with your instructor?

- A. Never
- B. Once a week
- C. Once every 3 days
- D. Once every day
- E. Many times a day

10. How frequently do you expect the instructor to encouraged interactivity among students in discussions and/or activities?

- A. Never
- B. Once a week
- C. Once every 3 days
- D. Once every day

E. Many times a day

11. How frequently do you expect the instructor to provide feedback on assignments, activities, and tests?

- A. Never
- B. Once a week
- C. Once every 3 days
- D. Once every day
- E. Many times a day

12. How easy to follow do you expect instructions for the course lessons, projects, and assignments to be?

- A. Very Clear _____
- B. Clear _____
- C. Somewhat Confusing _____
- D. Very Confusing _____

13. Do you expect the purpose, objectives, and grading procedures for the course to be clear?

- A. Very Clear _____
- B. Clear _____
- C. Somewhat Confusing _____
- D. Very Confusing _____

14. Do you expect examinations and graded assignments or graded activities to be consistent with other courses?

- A. Overwhelming (much more than other courses) _____
- B. Demanding (somewhat more than other courses) _____
- C. Manageable (about the same as other courses) _____
- D. Insufficient (much less than other courses) _____

15. Do you expect to enroll in any online courses given the opportunity while attending Northwestern?

Y____ N____

APPENDIX C

Northwestern Technical College Online Course Satisfaction Survey

Directions: Please complete this online student expectation survey. Your responses are important to us and will be recorded when you click the submit button. Thank you for helping us improve our online courses at Northwestern.

Student Name: _____ **Student SSN:** _____

Course Number: _____ **Course Name:** _____

Instructor's name: _____

1. Why did you enroll in this distance learning course? (Select most important reason.)

- A. Convenience due to work/family/school _____
- B. Interest in subject matter or instructor _____
- C. To satisfy degree/certification requirement _____
- D. Course recommended by others _____
- E. Other (Please specify.) _____

2. What was your knowledge of this topic before this course? (Select one.)

- A. No knowledge at all _____
- B. Basic knowledge _____
- C. Beyond basic knowledge _____
- D. Advanced knowledge _____

3. What is your knowledge of this topic now? (Select one.)

- A. No knowledge at all _____
- B. Basic knowledge _____
- C. Beyond basic knowledge _____
- D. Advanced knowledge _____

Enter an appropriate number in the blank provided, for the next 2 questions.

4. How many hours did you devote to this class each week? _____

5. About how many times did you contact the instructor for assistance during the course? _____

6. Was adequate information provided to you prior to taking the course?

Yes _____ No _____

If not, what additional information did you need? Please explain.

7. Were you able to access class materials easily?

Yes _____ No _____

8. How useful were the online learning materials? (Select one.)

- A. Highly Useful _____
 B. Useful _____
 C. Somewhat Useful _____
 D. Not Useful _____

9. How effective was the instructor in his/her distance learning instruction?

- A. Highly Effective _____
 B. Effective _____
 C. Somewhat effective _____
 D. Not effective _____

10. How could the instructor be more effective in his or her distance learning instruction? Please explain.

11. The amount of work assigned during class time was: (Select one.)

- A. Overwhelming _____
 B. Demanding _____
 C. Manageable _____
 D. Insufficient _____

12. Your educational experience (what you learned) in this online course as compared to other classes was:

- A. much more than other courses _____
 B. somewhat more than other courses _____
 C. about the same as other courses _____
 D. much less than other courses _____

13. How satisfied were you with the educational experience (what you learned) in this online learning course?

- A. Very Satisfied _____
 B. Satisfied _____
 C. Somewhat Satisfied _____
 D. Not Satisfied _____

14. How satisfied were you with the technical support received during this course?

- A. Very Satisfied _____
 B. Satisfied _____
 C. Somewhat Satisfied _____
 D. Not Satisfied _____

15. How satisfied were you with the technologies that were required for this course?
- A. Very Satisfied _____
 - B. Satisfied _____
 - C. Somewhat Satisfied _____
 - D. Not Satisfied _____
16. How many technical problems did you experience in this course?
- A. Great many technical problems _____
 - B. Some technical problems _____
 - C. Very few technical problems _____
 - D. No technical problems _____
17. How quickly did you receive assistance with technical support problems?
- A. Within a week _____
 - B. Within 3 days _____
 - C. Within 8 hours _____
 - D. Immediately _____
18. Who did you turn to for assistance with technical support problems?
- A. GVTC Blackboard technical support staff _____
 - B. Northwestern's distance education office _____
 - C. Instructor _____
 - D. Other Student _____
 - E. Friend of family member _____
19. How frequently did you communicate with your instructor?
- A. Never _____
 - B. Once a week _____
 - C. Once every 3 days _____
 - D. Once every day _____
 - E. Many times a day _____
20. Instructor encouraged interactivity among students in discussions and/or activities.
- A. Strongly Agree _____
 - B. Agree _____
 - C. Disagree _____
 - D. Strongly Disagree _____
21. Instructor provided feedback on assignments and projects in a timely manner.
- A. Strongly Agree _____
 - B. Agree _____
 - C. Disagree _____
 - D. Strongly Disagree _____
22. Instructions for the course lessons, projects, and assignments were easy to follow.
- A. Strongly Agree _____
 - B. Agree _____
 - C. Disagree _____
 - D. Strongly Disagree _____
23. The purpose, objectives and grading procedures for the course were clear.
- A. Strongly Agree _____
 - B. Agree _____
 - C. Disagree _____
 - D. Strongly Disagree _____
- _____

24. Examinations and graded assignments or graded activities were consistent with face to face courses.
A. Strongly Agree ____ B. Agree ____ C. Disagree ____ D. Strongly Disagree ____

25. Would you recommend this course to others? Yes ____ No ____

26. Would you enroll in another Computer Information Systems online course? Yes ____ No ____
If no, Please explain.

27. Would you enroll in other online courses (of any type) given the opportunity?
Yes ____ No ____

If no, please explain.

28. What did you like best about the course?

29. What did you like least about this online course?

Other comments or suggestions:

APPENDIX D

**Northwestern Technical College
On Campus Course Satisfaction Survey**

Directions: Please complete this online student expectation survey. Your responses are important to us and will be recorded when you click the submit button. Thank you for helping us improve our online courses at Northwestern.

Student Name: _____ **Student SSN:** _____

Course Number: _____ **Course Name:** _____

Instructor's name: _____

1. Why did you enroll in this course? (Select the most important reason.)

- A. Convenience due to work/family/school _____
- B. Interest in subject matter or instructor _____
- C. To satisfy degree/certification requirement _____
- D. Course recommended by others _____
- E. Other (Please specify.) _____

2. What was your knowledge of this topic before this course? (Select one.)

- A. No knowledge at all _____
- B. Basic knowledge _____
- C. Beyond basic knowledge _____
- D. Advanced knowledge _____

3. What is your knowledge of this topic now? (Select one.)

- A. No knowledge at all _____
- B. Basic knowledge _____
- C. Beyond basic knowledge _____
- D. Advanced knowledge _____

Enter an appropriate number in the blank provided, for the next 2 questions.

4. How many hours did you devote to this class each week? _____

5. About how many times did you contact the instructor for assistance during the course? _____

6. How useful were the textbook and other learning materials? (Select one.)

- A. Highly Useful _____
- B. Useful _____
- C. Somewhat Useful _____
- D. Not Useful _____

7. How effective was the instructor in his/her instruction? (Select one.)

- A. Highly Effective _____
- B. B. Effective _____
- C. Somewhat effective _____
- D. D. Not effective _____

8. How could the instructor be more effective in his or her instruction? Please explain.

9. The amount of work assigned during class time was:

- A. Overwhelming _____
- B. Demanding _____
- C. Manageable _____
- D. Insufficient _____

10. Your educational experience (what you learned) in this course as compared to other classes was:

- A. much more than other courses _____
- B. somewhat more than other courses _____
- C. about the same as other courses _____
- D. much less than other courses _____

11. How satisfied were you with the educational experience (what you learned) in this course?

- A. Very Satisfied _____
- B. B. Satisfied _____
- C. Somewhat Satisfied _____
- D. Not Satisfied _____

12. How frequently did you communicate with your instructor?

- A. Never
- B. Once a week
- C. Once every 3 days
- D. Once every day
- E. Many times a day

13. Instructor encouraged interactivity among students in discussions and/or activities.

- A. Strongly Agree _____
- B. Agree _____
- C. Disagree _____
- D. Strongly Disagree _____

14. Instructor provided feedback on assignments and projects in a timely manner.
A. Strongly Agree ____ B. Agree ____ C. Disagree ____ D. Strongly Disagree ____
15. Instructions for the course lessons, projects, and assignments were easy to follow.
A. Strongly Agree ____ B. Agree ____ C. Disagree ____ D. Strongly Disagree ____
16. The purpose, objectives and grading procedures for the course were clear.
A. Strongly Agree ____ B. Agree ____ C. Disagree ____ D. Strongly Disagree ____
17. Examinations and graded assignments or graded activities were consistent with other
A. Strongly Agree ____ B. Agree ____ C. Disagree ____ D. Strongly Disagree ____
18. Would you recommend this course to others? Yes ____ No ____
19. Would you enroll in another Computer Information Systems course? Yes ____ No ____
If no, Please explain.
20. Would you enroll in an online course (of any type) given the opportunity?
Yes ____ No ____
If no, please explain.
21. What did you like best about the course?
22. What did you like least about this online course?

Other comments or suggestions:

APPENDIX E

**Northwestern Technical College
Office of Academic Affairs**

Online Course Evaluation

Directions: Please complete this online course evaluation and email it to the Office of Academic Affairs as an attached document. Thank you.

Course Name: _____

Course Number: _____ Term: _____ Year: _____

Instructor's name: _____

Place an X in the appropriate space.

1. This is my: 1st. _____, 2nd. _____, 3rd. _____, 4th.+ _____ online course.

Place an X by the best response of A, B, C, D, (or E) for the next 3 questions.

2. Why did you enroll in this distance learning course?

- B. Convenience due to work/family/school _____
- B. Interest in subject matter or instructor _____
- F. To satisfy degree/certification requirement _____
- G. Course recommended by others _____
- H. Other (Please specify.) _____

3. What was your knowledge of this topic before this course?

- B. No knowledge at all _____
- B. Basic knowledge _____
- C. Beyond basic knowledge _____
- D. Advanced knowledge _____

4. What is your knowledge of this topic now?

- A. No knowledge at all _____
- B. Basic knowledge _____
- C. Beyond basic knowledge _____
- D. Advanced knowledge _____

Enter an appropriate number in the blank provided, for the next 2 questions.

5. How many hours did you devote to this class each week? _____

6. About how many times did you contact the instructor for assistance during the course? _____

7. Was adequate information provided to you prior to taking the course?

(Place an X by your choice) Yes _____ No _____

If not, what additional information did you need? Please explain.

8. Were you able to access class materials easily?

(Place an X by your choice) Yes _____ No _____

Place an X by the best response of A, B, C, or D for the next 2 questions.

9. How effective were the online learning materials?

E. Highly Effective _____

F. Effective _____

G. Somewhat effective _____

H. Not effective _____

10. How effective was the instructor in his/her distance learning instruction?

E. Highly Effective _____

F. B. Effective _____

G. Somewhat effective _____

H. D. Not effective _____

11. How could the instructor be more effective in his or her distance learning instruction? Please explain.

Place an X by your choice the best response of A, B, C, or D for the next 4 questions.

12. The amount of work assigned during class time was:

A. Overwhelming _____

B. Demanding _____

C. Manageable _____

D. Insufficient _____

13. How satisfied were you with the educational experience gained in this online learning (course)?

E. Very Satisfied _____

F. B. Satisfied _____

G. Somewhat Satisfied _____

H. Not Satisfied _____

14. How satisfied were you with the technical support received during this course?

E. Very Satisfied _____

F. Satisfied _____

G. Somewhat Satisfied _____

H. Not Satisfied _____

15. How satisfied were you with the technologies that were required for successful completion of this course?

E. Very Satisfied _____

F. Satisfied _____

G. Somewhat Satisfied _____

H. Not Satisfied _____

16. Did technical problems interfere with your learning the content?

(Place an X by your choice) Y ____ N ____

If yes, Please, explain.

17. Did the technology used in the course aid in the understanding of the content?

(Place an X by your choice) Y ____ N ____

If no please, explain.

Place an X by your choice the best response of A, B, C, or D, for each question, for questions 19- 26.

18. Effective use of communication was used throughout the course.

A. Strongly Agree ____ B. Agree ____ D. Disagree ____ E. Strongly Disagree ____

19. Instructor encouraged interactivity among students in discussions and/or activities.

A. Strongly Agree ____ B. Agree ____ D. Disagree ____ E. Strongly Disagree ____

20. Instructor provided feedback on assignments and projects in a timely manner.

A. Strongly Agree ____ B. Agree ____ D. Disagree ____ E. Strongly Disagree ____

21. Instructions for the course lessons, projects, and assignments were easy to follow.

A. Strongly Agree ____ B. Agree ____ D. Disagree ____ E. Strongly Disagree ____

22. The purpose, objectives and grading procedures for the course were clear.

A. Strongly Agree ____ B. Agree ____ D. Disagree ____ E. Strongly Disagree ____

23. Examinations and graded assignments or graded activities were consistent with course objectives.

A. Strongly Agree ____ B. Agree ____ D. Disagree ____ E. Strongly Disagree ____

24. Would you recommend this course to others? (Circle one.) Y ____ N ____

25. Would you enroll in another online course of this type? (Circle one.) Y ____ N ____

If no, Please explain.

26. Would you enroll in other online courses (of any type) given the opportunity?

(Place an X by your choice) Y ____ N ____ If no, please explain.

27. What did you like best about the course?

28. What did you like least about this online course?.

Other comments or suggestions:

Thank you for completing this online course survey.
Mail to: lpettigr@nwtcollege.org

APPENDIX F

Research Consent Agreement

I agree to take part in a research study titled “A Comparison of Student Learning and Student Satisfaction in an Online Distance Education Format and a Traditional Format in a Technical College in Georgia”, which is being conducted by Ginger Sabine, Institute of Higher Education, Department of Higher Education at the University of Georgia, 706.764.3713, under the direction of Dr. Libby V. Morris, Department of Higher Education, University of Georgia, 706.542.7588. I do not have to take part in this study; I can stop taking part at any time without giving any reason, and without penalty. I can ask to have information related to me returned to me, removed from the research records, or destroyed.

The purpose of this study is to determine if there are significant differences in student learning and student satisfaction with two Computer Information Systems courses delivered in a traditional format and an online distance education format. I could benefit from the information gained in the research because it will assist my institution, Northwestern Technical College, in gaining information about course effectiveness and student satisfaction in both the face-to-face and online course offerings. Students could benefit from the experience of taking the Certiport practice exam for the Microsoft Office User Specialists exam.

This study seeks to determine if there are significant differences in student learning and student satisfaction with two Computer Information Systems courses delivered in a traditional format and an online distance education format at a technical college in Georgia. The attributes that deter and promote effectiveness will be studied. Student attributes that lead to specific learning outcomes will be studied as well as student attributes that lead to specific student satisfaction levels. This study will help determine how to make online courses offered at Georgia’s technical college more effective by building on existing distance education theory and creating research specific to the technical college setting.

If I volunteer to take part in this study, I will be asked to do the following things:

- I will first have the study explained by the researcher and will be asked to sign a release form if I agree to participate in the study. (20 minutes)
- I will be administered a student expectation survey at the end of the first day of the course in the traditional course and given the link to the survey on the first login to the course offered online (15 minutes).
- I will be asked in a face-to-face on campus course to go to the testing center and to have the Certiport exam administered anytime during the first four days of the quarter. I will be asked if in an online course to go to a link to the Certiport exam in my web course and will be asked to take the exam during the first week of the course. Time required to take the Certiport exam will be approximately (1 hour).
- Upon the completion of the course I will be administered a student satisfaction survey (15 minutes).
- I will have student GPA and ASSET entrance scores collected from the Northwestern Technical College Banner system. When signing this document I am agreeing to allow this data to be used in the study.
- Finally, I will be asked to take the Certiport exam again in the same manner defined previously to determine the learning outcomes for the course (1 hour).

No discomforts or stresses are expected if I participate in this study. No risks are expected. All information concerning me will be kept confidential. If information about me is published, it will be written in a way that I cannot be recognized. However, research records may be obtained by court order. The researcher will answer any further questions about the research, now or during the course of the project, and can be reached by telephone at: 706.764.3713

My signature below indicates that the researchers have answered all of my questions to my satisfaction and that I consent to volunteer for this study. I have been given a copy of this form.

Signature of Researcher. Date

Signature of Participant Date

For questions or problems about your rights please call or write: Chris A. Joseph, Ph.D., Human Subjects Office, University of Georgia, 606A Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

APPENDIX G

Online Consent Document

Dear Student,

As a student enrolled in this course you will be asked to take part in a research study titled “A Comparison of Student Learning and Student Satisfaction in an Online Distance Education Format and a Traditional Format in a Technical College in Georgia”, which is being conducted by Ginger Sabine, Institute of Higher Education, Department of Higher Education at the University of Georgia, 706.764.3713, under the direction of Dr. Libby V. Morris, Department of Higher Education, University of Georgia, 706.542.7588. You do not have to take part in this study; you may stop taking part at any time without giving any reason, and without penalty. You can ask to have information related to you returned to you, removed from the research records, or destroyed. The results of this study may be published.

The purpose of this study is to determine if there are significant differences in student learning and student satisfaction with two Computer Information Systems courses delivered in a traditional format and an online distance education format at a technical college in Georgia. The attributes that deter and promote effectiveness will be studied. Student attributes that lead to specific learning outcomes will be studied as well as student attributes that lead to specific student satisfaction levels. This study will help determine how to make online courses offered at Georgia’s technical college more effective by building on existing distance education theory and creating research specific to the technical college setting.

You are being asked to participate in this research project as a current member of either CIS 2228 or CIS 2229. You may withdraw from this research at any time and you may omit any question that you do not feel comfortable answering. If you volunteer to take part in this study you will be asked to do the following things:

- I will have the study explained in email form and will submit this consent letter upon login to the course if I agree to participate in the study.
- I will be administered a student expectation survey on the first login to the course (15 minutes).
- I will be asked to go to the Northwestern Technical College testing center to have the Certiport exam administered anytime during the first four days of the quarter. I will be asked if in an online course to go to a link to the Certiport exam in my web course and will be asked to take the exam during the first week of the course. Time required to take the Certiport exam will be approximately (1 hour).
- Upon the completion of the course I will be administered a student satisfaction survey (15 minutes).
- I will have student GPA and ASSET entrance scores collected from the Northwestern Technical College Banner system. When signing this document I am agreeing to allow this data to be used in the study.
- Finally, I will be asked to take the Certiport exam again in the same manner defined previously to determine the learning outcomes for the course (1 hour).

No discomforts or stresses are expected if I participate in this study. No risks are expected. All information concerning me will be kept confidential. If information about me is published, it will be written in a way that I cannot be recognized. However, research records may be obtained by court order. The researcher will answer any further questions about the research, now or during the course of the project, and can be reached by telephone at: 706.764.3713

My signature below indicates that the researchers have answered all of my questions to my satisfaction and that I consent to volunteer for this study. I have been given a copy of this form.

Signature of Researcher. Date

Signature of Participant Date

For questions or problems about your rights please call or write: Chris A. Joseph, Ph.D., Human Subjects Office, University of Georgia, 606A Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

APPENDIX H

Online Student Expectation Survey Results**1. Why did you enroll in this online course?**

Convenience due to work/family/school	Interest in subject matter or instructor	To satisfy degree/certificate requirements	Course recommended by others	Unanswered
66.7%	11.1%	22.2%	0.0%	0.0%

2. What is your knowledge of this topic before this course?

No knowledge at all	Basic knowledge	Advanced knowledge	Beyond basic knowledge	Unanswered
33.3%	66.7%	0.0%	0.0%	0.0%

3. How many hours do you expect to devote to this class each week counting both online course time and hours spent studying for the course?

2-4 hours	5-8 hours	9-16 hours	More than 20	Unanswered
0.0%	33.3%	56%	10.7%	0.0%

4. About how many times do you expect to contact the instructor for assistance during the course?

Will not contact	1 time	2-3 times	4-5 times	Unanswered
0.0%	62.5%	12.5%	25%	0.0%

5. Do you feel that you have received adequate information about this online course, its procedures, and how to successfully navigate the course?

Yes	No	Unanswered
88.9%	11.1%	0.0%

6. How skilled do you expect the instructor to be in his/her distance learning instruction?

Superior	Good	Average	Fair	Unanswered
55.6%	44.4%	0.0%	0.0%	0.0%

7. As compared to other courses in my program of study, I expect that the amount of work assigned during this class will be:

Overwhelming	Demanding	Manageable	Insufficient	Unanswered
0.0%	33.3%	66.7%	0.0%	0.0%

8. Do you think that your educational experience (what you learned) in this online course will be:

much more than other courses	somewhat more than other courses	about the same as other courses	much more than other courses	less than other courses	Unanswered
0.0%	55.6%	44.4%	0.0%	0.0%	

9. How skilled are you with the technologies (computer, software, Internet, etc) that will be used in this course.

Very Proficient	Proficient	Somewhat Proficient	Not Proficient	Unanswered
22.2%	33.3%	44.4%	0.0%	0.0%

10. To what extent do you think that you may experience technical problems in this course?

Great technical problems	many technical problems	Some technical problems	Very few technical problems	No technical problems	Unanswered
0.0%	33.3%	44.4%	22.2%	0.0%	

11. How quickly do you expect to receive assistance with technical support problems?

within a week	within 3 days	within 8 hours	immediately	Unanswered
22.2%	44.4%	33.3%	0.0%	0.0%

12. Who do you expect to turn to for assistance with technical support problems?

GVTC/Blackboard technical support staff	Northwestern's distance education office	Instructor	Other students	Friend or family member	Unanswered
55.6%	0.0%	44.4%	0.0%	0.0%	0.0%

13. How frequently do you expect to communicate with your instructor?

Never	Once a week	Once every 3 days	Once every 3 days	Once every day	Many times a day	Unanswered
0.0%	55.6%	44.4%	0.0%	0.0%	0.0%	0.0%

14. How frequently do you expect the instructor to encourage interactivity among students in discussion and/or activities?

Never	Once a week	Once every 3 days	Once every 3 days	Once every day	Many times a day	Unanswered
0.0%	66.7%	33.3%	0.0%	0.0%	0.0%	0.0%

15. How frequently do you expect your instructor to provided feedback on assignments, activities, and tests?

Same day	Next day	Within 3 days	Within a week	Within 2 weeks	Unanswered
22.2%	22.2%	55.6%	0.0%	0.0%	0.0%

16. How easy to follow do you expect instructions for the course lessons, projects, and assignments to be considering the online format?

Very Easy to Follow	Easy to Follow	Somewhat Difficult to Follow	Very Difficult to Follow	Unanswered
0.0%	88.9%	11.1%	0.0%	0.0%

17. Do you understand the purpose, objectives and grading procedures for the course?

Yes, entirely	Somewhat	Somewhat confusing	Not at all	Unanswered
77.8%	22.2%	0.0%	0.0%	0.0%

18. Do you expect examinations and graded assignments or graded activities to be consistent with face-to-face courses?

Very Similar	Similar	Different	Very Different	Unanswered
22.2%	55.6%	22.2%	0.0%	0.0%

19. What do you expect to like best about the course?

interaction with students
time management
learn new things
washing clothes while I attend class
interaction with students
time management
study at my own schedule
learning new software
knowledge about Access
the hands on do it yourself
learn Excel
learn software
working in my pajamas
the convenience
less gas to buy
learn new things
learning new software
Unanswered 37%

20. What do you expect to like least about this online course?

reading assignments
possible confusion in assignment requirements
instructor contact
impersonal
reading assignments
technical difficulties
nothing
not enough instruction
Unanswered 70.3%

APPENDIX I

Online Student Satisfaction Survey

1. Why did you enroll in this online course?

Convenience due to work/ family/school	Interest in subject matter or instructor	To satisfy degree/certificate requirements	Course recommended by others	Unanswered
52.4%	4.8%	42.9%	0.0%	0.0%

2. What is your knowledge of this topic before this course?

No knowledge at all	Basic knowledge	Advanced knowledge	Beyond basic knowledge	Unanswered
14.3%	61.9%	23.8%	0.0%	0.0%

3. What is your knowledge of this topic now?

No knowledge at all	Basic knowledge	Advanced knowledge	Beyond basic knowledge	Unanswered
0.0%	4.8%	71.4%	23.8%	23.8%

4. How many hours did you devote to this class each week?

2-4 hours	5-8 hours	9-16 hours	More than 20	Unanswered
42.9%	38.1%	9.5%	4.8%	4.8%

5. About how many times did you contact the instructor for assistance during the course?

Did not contact	1 time	2-3 times	4-5 times	Unanswered
14.3%	4.8%	33.3%	19.0%	76.2%

6. Was adequate information provided to you prior to taking the course?

Yes	No	Unanswered
95.2%	4.8%	0.0%

7. Were you able to access class materials easily?

Yes	No	Unanswered
95.2%	4.8%	0.0%

8. How useful to learning the material in this course were the discussion board postings?

Highly useful	Useful	Somewhat useful	Not useful	Did not join	Unanswered
23.8%	23.8%	47.6%	23.8%	4.8%	0.0%

9. How useful to learning the material in this course were the online lecture notes and the PowerPoint lectures in your course?

Highly useful	Useful	Somewhat useful	Not useful	Did not join	Unanswered
28.6%	57.1%	14.3%	0.0%	4.8%	0.0%

10. How useful to learning the material in this course were the lab exercises that you worked through within the projects as you read the textbook?

Highly useful	Useful	Somewhat useful	Not useful	Did not attempt those labs	Unanswered
76.2%	23.8%	0.0%	0.0%	0.0%	0.0%

11. How useful to learning the material in this course were the "In the Lab" exercises that you worked through at the end of each project in your textbook?

Highly useful	Useful	Somewhat useful	Not useful	Did not join	Unanswered
47.6%	42.9%	9.5%	0.0%	0.0%	0.0%

12. How useful to learning the material in this course were the Graded Lab Assignments that you worked through and turned in for each project?

Highly useful	Useful	Somewhat useful	Not useful	Unanswered
57.1%	33.3%	23.8%	0.0%	0.0%

13. How useful to learning the material in this course were the ungraded online resources such as practice quizzes and games that you worked through within the textbook website?

Highly useful	Useful	Somewhat useful	Not useful	Did not attempt	Unanswered
19.0%	33.3%	23.8%	0.0%	23.8%	0.0%

14. How useful to learning the material in this course were the graded quizzes that were required in this course?

Highly useful	Useful	Somewhat useful	Not useful	Unanswered
47.6%	42.9%	9.5%	0.0%	0.0%

15. How useful to learning the material in this course were the major online exams that were required in this course?

Highly useful	Useful	Somewhat useful	Not useful	Unanswered
42.9%	38.2%	19.0%	0.0%	0.0%

16. How effective was the instructor in his/her distance learning instruction?

Highly effective	Effective	Somewhat effective	Not effective	Unanswered
71.4%	28.6%	0.0%	0.0%	0.0%

17. How could the instructor be more effective in his or her distance learning instruction? Please explain.

turn around time on homework maybe

when you ask a ? need to give a answer the ?

the instructor was wonderful. i do not see that any change should be made.

this was my first on-line course & i think my instructor has been great. clear expectations were given in the syllabus, the assignments allowed students to be creative, and assignments were graded very timely.

i honestly can't think of anything to change

my instructor was always a great help.

i felt she did a great job

more detailed instructions for assignments

My teacher is great!

it would be hard to improve her way of instructions.

don't know how she could be more effective. good communication, helpful with problem when they arose quickly, and made you think also.

just keep doing what you are doing now.

no opinion

she is a very good instructor

i believe the instructor was very effective and i do not see any improvement needed.

more examples

a better explanation of graded work. explain how to correct my mistakes

more detailed instructions for the online graded labs

Unanswered

9.5%

18. The amount of work assigned during this course was:

Overwhelming	Demanding	Manageable	Insufficient	Unanswered
0.0%	28.6%	71.4%	0.0%	0.0%

19. Your educational experience (what you learned) in this online course as compared to other classes in your major was:

much more than other courses	somewhat more than courses	about the same as other courses	much less than courses	Unanswered
4.8%	14.3%	81.0%	0.0%	0.0%

20. How satisfied were you with the educational experience (what you learned) in this online learning course?

Very satisfied	Satisfied	Somewhat satisfied	Not satisfied	Unanswered
52.4%	42.9%	4.8%	0.0%	0.0%

21. How satisfied were you with the technical support received during this course?

Very satisfied	Satisfied	Somewhat satisfied	Not satisfied	Unanswered
52.4%	42.9%	4.8%	0.0%	0.0%

22. How satisfied were you with the technologies that were required for this course?

Very satisfied	Satisfied	Somewhat satisfied	Not satisfied	Unanswered
28.6%	66.7%	4.8%	0.0%	0.0%

23. How many technical problems did you experience in this course?

Great technical problems	Some technical problems	Very few technical problems	No technical problems	Unanswered
9.5%	14.3%	23.8%	52.4%	0.0%

24. How quickly did you receive assistance with technical support problems?

within a week	within 3 days	within 8 hours	immediately	Unanswered
14.3%	9.5%	0.0%	61.9%	14.3%

25. Who did you turn to for assistance with technical support problems?

GVTC/Blackboard technical support staff	Northwestern's distance education office	Instructor	Other students	Friend or family member	Unanswered
9.5%	0.0%	33.3%	19.0%	23.8%	14.3%

26. How frequently did you communicate with your instructor?

Never	Once a week	Once every 3 days	Once every day	Many times a day	Unanswered
19.0%	76.2%	0.0%	4.8%	0.0%	0.0%

27. Instructor encouraged interactivity among students in discussion and/or activities.

Strongly Agree	Agree	Disagree	Strongly disagree	Unanswered
61.9%	38.1%	0.0%	0.0%	0.0%

28. Instructor provided feedback on assignments and projects in a timely manner.

Strongly agree	Agree	Disagree	Strongly disagree	Unanswered
42.9%	57.1%	0.0%	0.0%	0.0%

29. Instructions for the course lessons, projects, and assignments were easy to follow.

Strongly agree	Agree	Disagree	Strongly disagree	Unanswered
33.3%	52.4%	9.5%	0.0%	4.8%

30. The purpose, objectives and grading procedures for the course were clear.

Strongly agree	Agree	Disagree	Strongly disagree	Unanswered
52.4%	47.6%	0.0%	0.0%	0.0%

31. Examinations and graded assignments or graded activities were consistent with face-to-face courses.

Strongly agree	Agree	Disagree	Strongly disagree	Unanswered
23.8%	76.2%	0.0%	0.0%	0.0%

32. Would you recommend this course to others?

Yes	No	Unanswered
100.0%	0.0%	0.0%

33. Would you enroll in another Computer Information Systems online course?

Yes	No
100.0%	0.0%

34. Would you enroll in other online courses (of any type) given the opportunity?

Yes	No
100.0%	0.0%

35. What did you like best about the course?

work on projects anytime
 convenience & ability to work on my time schedule
 you can work on projects whenever you need to.
 how easy it was to fit into my schedule.
 what i am learning is very useful in my job. learning all the different advantages to excel program-there is so much you can do-i am still learning from my book-this will be 1 book i will not turn back in.
 updating my knowledge of excel and understanding the formulas better.
 i was able to work on my own time
 being able to take the class at home
 everything
 i liked the convenience.
 it was on-line
 i learned
 convenience of working at own pace.
 convenient
 the convience of being able to spend the time working rather than traveling to the school. since it is at least 45 minutes
 convenience
 on line schedule
 the multiple times you could take the quizzes.
 learning all the different advantages to excel program-there is so much you can do-i am still learning from my book-this will be 1 book i will not turn back in.
 Unanswered 4.8%

36. What did you like least about this online course?

i really don't have anything
 assignment instructions a little vague
 little personal contact

it was hard

reading

the hours i have to work it gives me more flexible time on the computer-now if i can just get dsl in my area & all the viruses off my computer i will be in good shape.

microsoft office 2003

just computer issues nothing to do with course itself

nothing.

i enjoyed all of the course

having to check in once a week on the discussion board, i wasn't use to doing that and missed a few times.

not enough instruction with graded labs

Other comments or suggestions:

i enjoyed the class and found it to be extremely useful in my job.

enjoyed the class

great teacher/course! i would recommend!

great class and instructor

i liked the fact that she let us work ahead. had the quizzes there so when i finished the chapter and was fresh in my mind i could take the quiz before i went further.

i have enjoyed this class-in my work we are now using excel & this has helped me greatly.

i really did enjoy the course

very satisfied overall

i have heard many other students complain about on-line classes, especially in regards to other instructors. i do not have any experiences with the other instructors, but i have enjoyed my instructors structure and i am thankful for that, as i have enjoyed the class and i am not walking away from a "nightmare." thanks so much.

instructor is a great !

for me, the whole point of taking an oline class is to be able to take the class without going to the campus on certain days at certain times. there were assignments that required certain features unique to excel 2003. according to the discussion board i apparently was not the only one who had windows xp or another version of excel. i don't normally justify purchashing new software versions for a few features i may seldom use. my schedule doesn't allow time to go to the lab on campus to complete an assignment.

would like to see the entire cis degree on line like other colleges.

had to buy my textbooks online b/c they were sold out at the school (so i didnt have them for a few days).

APPENDIX J

On Campus Expectation Survey Results**1. Why did you enroll in this course?**

Convenience due to work/family/school	Interest in subject matter or instructor	To satisfy degree/certificate or requirements	Course recommended by others	Unanswered
12.5%	0.0%	82.5%	5.0%	0.0%

2. What is your knowledge of this topic before this course?

No knowledge at all	Basic knowledge	Advanced knowledge	Beyond basic knowledge	Unanswered
5.0%	92.5%	0.0%	2.5%	0.0%

3. How many hours do you expect to devote to this class each week counting both class hours and hours spent studying for the course?

2-4 hours	5-8 hours	9-16 hours	More than 20	Unanswered
7.9%	44.8%	47.4%	0.0%	5.0%

4. About how many times do you expect to contact the instructor for assistance per week during the course?

0	1 time	2-3 times	4-5 times	Unanswered
38.2%	47.1%	14.7%	0.0%	10.0%

5. How skilled do you expect the instructor to be in his/her instruction in this course?

Superior	Good	Average	Fair	Unanswered
62.5%	37.5%	0.0%	0.0%	0.0%

6. As compared to other courses in my program of study, I expect that the amount of work assigned during this class will be:

Overwhelming	Demanding	Manageable	Insufficient	Unanswered
0.0%	15.4%	84.6%	0.0%	0.0%

7. Do you think that your educational experience (what you learned) in this course will be:

much more than other courses	somewhat more than other courses	about the same as other courses	much less than other courses	Unanswered
9.1%	22.7%	68.2%	0.0%	0.0%

8. How frequently do you expect to communicate with your instructor?

Never	Once a week	Once every 3 days	Once every day	Many times a day	Unanswered
0.0%	21.6%	45.6%	21.6%	10.8%	0.0%

9. How frequently do you expect to engage with other students in discussion and/or activities.

Never	Once a week	Once every 3 days	Once every day	Many times a day	Unanswered
2.7%	35.1%	10.8%	35.1%	16.2%	0.0%

10. How frequently do you expect your instructor to provided feedback on assignments, activities, and

tests?						
Same day	Next day	Within 3 days	Within a week	Within 2 weeks	Unanswered	
21.1%	15.8%	39.5%	13.2%	10.5%	0.0%	

11. How easy to follow do you expect instructions for the course lessons, projects, and assignments to be?

Very Easy to Follow	Easy to Follow	Somewhat Difficult to Follow	Very Difficult to Follow	Unanswered
55%	42.5%	2.5%	0.0%	0.0%

12. Do you understand the purpose, objectives and grading procedures for the course?

Yes, entirely	Somewhat	Somewhat confusing	Not at all	Unanswered
65.0%	35.0%	0.0%	0.0%	0.0%

13. Do you expect examinations and graded assignments or graded activities to be consistent with other courses in my major?

Very Similar	Similar	Different	Very Different	Unanswered
35.0%	60.0%	5.0%	0.0%	0.0%

14. Do you expect to enroll in any online courses given the opportunity while attending Northwestern?

Yes	No	Unanswered
57.5%	42.5%	0.0%

APPENDIX K

On Campus Student Satisfaction Survey

1. Why did you enroll in this course?

Convenience due to family/school	Interest in subject matter or instructor	To satisfy degree/certificate requirements	Course recommended by others	Unanswered
8.3%	8.3%	83.3%	0.0%	0.0%

2. What was your knowledge of this topic before this course?

No knowledge at all	Basic knowledge	Advanced knowledge	Beyond basic knowledge	Unanswered
25.0%	75.0%	0.0%	0.0%	0.0%

3. What is your knowledge of this topic now?

No knowledge at all	Basic knowledge	Advanced knowledge	Beyond basic knowledge	Unanswered
0.0%	16.7%	8.3%	75.0%	0.0%

4. How many hours did you devote to this class each week?

2-4 hours	5-8 hours	9-16 hours	More than 20	Unanswered
8.3%	41.7%	50.0%	0.0%	0.0%

5. About how many times did you contact the instructor for assistance during the course?

Did not contact	1 time	2-3 times	4-5 times	More than 5
16%	8.3%	25.0%	16.7%	33.3%

6. How useful to learning the material in this course were the class discussions?

Highly useful	Useful	Somewhat useful	Not useful	Unanswered
33.3%	66.7%	0.0%	0.0%	0.0%

7. How useful to learning the material in this course were the lectures by your instructor?

Highly useful	Useful	Somewhat useful	Not useful	Unanswered
58.3%	41.7%	0.0%	0.0%	0.0%

8. How useful to learning the material in this course were the lab exercises that you worked through within the projects as you read the textbook?

Highly useful	Useful	Somewhat useful	Not useful	Did not attempt those labs	Unanswered
83.3%	8.3%	8.3%	0.0%	0.0%	0.0%

9. How useful to learning the material in this course were the "In the Lab" exercises that you worked through at the end of each project in your textbook?

Highly useful	Useful	Somewhat useful	Not useful	Did not join	Unanswered
66.7%	25.0%	8.3%	0.0%	0.0%	0.0%

10. How useful to learning the material in this course were the Graded Lab Assignments that you worked through and turned in for each project?

Highly useful	Useful	Somewhat useful	Not useful	Unanswered
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58.3% 33.3% 8.0% 0.0% 0.0%

11. How useful to learning the material in this course were the ungraded online resources such as practice quizzes and games that you worked through within the textbook website?

Highly useful	Useful	Somewhat useful	Not useful	Did not attempt	Unanswered
33.3%	50.0%	16.7%	0.0%	0.0%	0.0%

12. How useful to learning the material in this course were the graded quizzes that were required in this course?

Highly useful	Useful	Somewhat useful	Not useful	Unanswered
33.3%	58.3%	8.3%	0.0%	0.0%

13. How useful to learning the material in this course were the major written exams that were required in this course?

Highly useful	Useful	Somewhat useful	Not useful	Unanswered
25.0%	50.0%	25.0%	0.0%	0.0%

14. How effective was the instructor in his/her instruction?

Highly effective	Effective	Somewhat effective	Not effective	Unanswered
83.3%	16.7%	0.0%	0.0%	0.0%

15. How could the instructor be more effective in his or her instruction? Please explain.

she did a great job

Instructor very knowledgeable

nothing

great job

Instructor was great

did a great job

nothing

Unanswered

76.6%

16. The amount of work assigned during this course was:

Overwhelming	Demanding	Manageable	Insufficient	Unanswered
0.0%	16.7%	83.3%	0.0%	0.0%

17. Your educational experience (what you learned) in this course as compared to other classes in your major was:

much more than other courses	somewhat more than other courses	about the same as other courses	much less than other courses	Unanswered
8.3%	41.7%	50.0%	0.0%	0.0%

18. How satisfied were you with the educational experience (what you learned) in this course?

Very satisfied	Satisfied	Somewhat satisfied	Not satisfied	Unanswered
66.7%	33.3%	0.0%	0.0%	0.0%

19. How frequently did you communicate with your instructor?

Never	Once a week	Once every 3 days	Once every day	Many times a day	Unanswered
0.0%	8.3%	41.7%	41.7%	8.3%	0.0%

20. Instructor encouraged interactivity among students in discussion and/or activities.

Strongly Agree	Agree	Disagree	Strongly	Unanswered
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33.3%	66.7%	0.0%	disagree	0.0%	0.0%
-------	-------	------	-----------------	------	------

21. Instructor provided feedback on assignments and projects in a timely manner.

Strongly agree	Agree	Disagree	Strongly disagree	Unanswered
66.7%	33.3%	0.0%	0.0%	0.0%

22. Instructions for the course lessons, projects, and assignments were easy to follow.

Strongly agree	Agree	Disagree	Strongly disagree	Unanswered
41.7%	58.3%	0.0%	0.0%	0.0%

23. The purpose, objectives and grading procedures for the course were clear.

Strongly agree	Agree	Disagree	Strongly disagree	Unanswered
58.3%	41.7%	0.0%	0.0%	0.0%

24. Examinations and graded assignments or graded activities were consistent with other courses in my major.

Strongly agree	Agree	Disagree	Strongly disagree	Unanswered
41.7%	58.3%	0.0%	0.0%	0.0%

25. Would you recommend this course to others?

Yes	No	Unanswered
100.0%	0.0%	0.0%

26. Would you enroll in other courses (of any type) given the opportunity?

Yes	No
66.7%	33.3%

27. What did you like best about the course?

learning how to set up a database	
timing	
student interaction and instructor he	
limited pressure from time constraint	
working ahead and convenience	
learning how powerful Excel is	
Using Excel	
learning about Excel	
everything	
Unanswered	60.0%

28. What did you like least about this course?

the queries and forms were hard	
the work	
assignments were vague and difficult	
nothing	
it was good	
nothing	
Unanswered	80.0%

Other comments or suggestions:

We need to recycle the wasted paper
I am using Access readily and I really enjoyed class

I enjoyed this class, everyone is involved
overall great
better wording on assignment/ more precise

APPENDIX L

Group Statistics						
	Date Field	Course Type	N	Mean	Std. Deviation	Std. Error Mean
Banner Data						
	ASSET Score Math	Online	17	37.4	3.2	0.8
		Face-to-Face	31	38.0	6.6	1.2
	ASSET Score Reading	Online	20	40.5	6.0	1.4
		Face-to-Face	32	42.6	6.5	1.2
	ASSET Writing	Online	17	42.5	5.5	1.3
		Face-to-Face	31	42.0	5.8	1.0
	GPA	Online	27	3.4	0.6	0.1
		Face-to-Face	39	3.5	0.5	813.0
	Date Field	Course Type	N	Mean	Std. Deviation	Std. Error Mean
Certification Exam Results						
	MOUS Pretest Score	Online	27	56.2	21.7	4.2
		Face-to-Face	39	51.6	20.3	3.2
	MOUS Post-test Score	Online	27	82.3	15.6	3.0
		Face-to-Face	38	79.8	15.5	2.5
	Difference in Scores	Online	27	26.2	12.0	2.3
		Face-to-Face	38	27.3	10.2	1.7
	Date Field	Course Type	N	Mean	Std. Deviation	Std. Error Mean
Expectation Data						
	AGE	Online	27	32.3	10.9	2.1
		Face-to-Face	39	38.0	14.5	2.3
	GENDER	Online	27	1.7	0.5	896.0
		Face-to-Face	39	1.8	0.4	683.0
	NOCLASS	Online	9	2.8	1.2	0.4
		Face-to-Face	0(a)	.	.	.
	ENTHIC	Online	27	5.5	1.4	0.3
		Face-to-Face	39	5.4	1.3	0.2
	WHYENROL	Online	26	1.6	0.9	0.2
		Face-to-Face	39	2.9	0.8	0.1
	KNOWLED	Online	26	1.7	0.5	951.0
		Face-to-Face	39	2.0	0.3	448.0
	HOURSEXP	Online	26	10.5	4.4	0.9

	Face-to-Face	37	8.8	3.2	0.5
INSTCONT	Online	22	2.3	1.8	0.4
	Face-to-Face	33	0.8	0.8	0.1
ORIENTA	Online	26	1.1	0.3	639.0
	Face-to-Face	1	3.0	.	.
INSTGOOD	Online	26	1.4	0.5	988.0
	Face-to-Face	39	1.4	0.5	789.0
AMTWORK	Online	26	2.7	0.5	951.0
	Face-to-Face	38	2.8	0.4	599.0
EXPEREDU	Online	26	2.4	0.5	973.0
	Face-to-Face	21	2.6	0.7	0.2
TECHSKL	Online	26	2.2	0.8	0.2
	Face-to-Face	1	2.0	.	.
TECPROBL	Online	26	2.9	0.7	0.1
	Face-to-Face	1	1.0	.	.
FEEDBACK	Online	26	2.0	0.8	0.2
	Face-to-Face	0(a)	.	.	.
TECSUPQ	Online	26	1.9	1.0	0.2
	Face-to-Face	0(a)	.	.	.
COMMFREQ	Online	26	2.5	0.5	0.1
	Face-to-Face	36	3.2	0.9	0.2
INTERACT	Online	26	2.3	0.5	923.0
	Face-to-Face	36	3.3	1.2	0.2
FREQFEED	Online	26	2.4	0.9	0.2
	Face-to-Face	37	2.8	1.3	0.2
EASYINST	Online	26	2.2	0.4	722.0
	Face-to-Face	39	1.5	0.8	0.1
PURPOSE	Online	26	1.3	0.5	887.0
	Face-to-Face	39	1.3	0.5	765.0
SIMILAR	Online	26	2.1	0.6	0.1
	Face-to-Face	39	1.7	0.6	911.0
ENROLONL	Online	0(a)	.	.	.
	Face-to-Face	39	1.4	0.5	804.0

	Date Field	Course Type	N	Mean	Std. Deviation	Std. Error Mean
Satisfaction Data						
	WHYENR	Online	9	1.7	1.0	0.3
		Face-to-Face	12	2.8	0.6	0.2
	PRIORKNO	Online	9	1.6	0.5	0.2
		Face-to-Face	12	1.8	0.5	0.1
	KNOWNOW	Online	9	2.6	0.5	0.2
		Face-to-Face	12	2.9	0.5	0.2
	HOURSDEV	Online	9	6.6	5.7	1.9
		Face-to-Face	12	8.3	2.9	0.8
	CONTACNO	Online	9	4.3	4.2	1.4
		Face-to-Face	12	5.4	5.1	1.5
	ADEQINFO	Online	9	1.2	0.4	0.2
		Face-to-Face	0(a)	.	.	.
	ACCESMAT	Online	9	1.0	0.0	0.0
		Face-to-Face	0(a)	.	.	.
	DISCUSSI	Online	9	2.3	0.7	0.2
		Face-to-Face	12	1.7	0.5	0.1
	LECTURE	Online	9	2.1	0.8	0.3
		Face-to-Face	12	1.4	0.5	0.2
	LABEXER	Online	9	1.7	0.7	0.2
		Face-to-Face	12	1.3	0.6	0.2
	INTHELAB	Online	9	1.7	0.7	0.2
		Face-to-Face	12	1.4	0.7	0.2
	GRADELAB	Online	9	2.0	0.7	0.2
		Face-to-Face	12	1.5	0.7	0.2
	ONLINGAM	Online	9	1.8	0.7	0.2
		Face-to-Face	12	1.8	0.7	0.2
	QUIZZES	Online	9	1.8	0.4	0.2
		Face-to-Face	12	1.8	0.6	0.2
	MAJEXAMS	Online	9	2.0	0.7	0.2
		Face-to-Face	12	2.0	0.7	0.2
	INSTREFF	Online	9	1.6	0.5	0.2
		Face-to-Face	12	1.2	0.4	0.1
	AMTOWORK	Online	9	2.8	0.4	0.2
		Face-to-Face	12	2.8	0.4	0.1

	EDEXPRIE	Online	9	2.6	0.5	0.2
		Face-to-Face	12	2.4	0.7	0.2
	SATISFY	Online	9	1.3	1.2	0.4
		Face-to-Face	12	2.2	0.5	0.1
	TECTSAT	Online	9	1.6	0.5	0.2
		Face-to-Face	0(a)	.	.	.
	TECHNOLO	Online	9	1.6	0.7	0.2
		Face-to-Face	0(a)	.	.	.
	NOTEKPRO	Online	9	3.1	1.1	0.4
		Face-to-Face	0(a)	.	.	.
	FEEDQUIK	Online	9	4.0	1.4	0.5
		Face-to-Face	0(a)	.	.	.
	WHOHELP	Online	9	4.0	1.6	0.5
		Face-to-Face	0(a)	.	.	.
	COMMUNNO	Online	9	2.2	0.4	0.2
		Face-to-Face	12	3.5	0.8	0.2
	INTERFRE	Online	9	1.8	0.4	0.2
		Face-to-Face	12	1.7	0.5	0.1
	TIMEFEED	Online	9	1.7	0.5	0.2
		Face-to-Face	12	1.3	0.5	0.1
	INSTEASY	Online	9	1.9	0.6	0.2
		Face-to-Face	12	1.6	0.5	0.2
	PURPOCLR	Online	9	1.7	0.5	0.2
		Face-to-Face	12	1.4	0.5	0.2
	CONSISTE	Online	9	1.9	0.6	0.2
		Face-to-Face	12	1.6	0.5	0.2
	RECOMMEN	Online	9	1.0	.00(b)	0.0
		Face-to-Face	12	1.0	.00(b)	0.0
	ENROLCIS	Online	9	1.0	0.0	0.0
		Face-to-Face	0(a)	.	.	.
	ENROLAGA	Online	9	1.0	0.0	0.0
		Face-to-Face	12	1.3	0.5	0.1
a. t cannot be computed because at least one of the groups is empty						
b. t cannot be computed because the standard deviations of both groups are 0.						

APPENDIX M

Independent Samples Test Results				
	Levene's Test for Equality of Variances	t-test for Equality of Means		Highlighted Values Indicate Significant Difference
	F	t	df	Significants
Banner Data				
ASSETM	9.182	-0.346	46	0.731
ASSETR	0.248	-1.162	50	0.251
ASSETW	0.384	0.255	46	0.800
GPA	1.365	-0.392	64	0.696
	F	t	df	Significants
Certification Data				
ENTSCOR	0.532	0.875	64	0.385
EXTSCOR	0.000	0.619	63	0.538
DIFFER	0.292	-0.419	63	0.677
	F	t	df	Significants
Expectation Data				
AGE	1.858	-1.750	64	0.085
GENDER	1.333	-0.591	64	0.557
ENTHIC	0.077	0.364	64	0.717
WHYENROL	6.175	-6.393	63	0.000
KNOWLED	38.917	-3.376	63	0.001
HOURSEXP	1.771	1.734	61	0.088
INSTCONT	35.926	4.143	53	0.000
ORIENTA	.	-5.676	25	0.000
INSTGOOD	0.335	0.306	63	0.761
AMTWORK	11.420	-1.761	62	0.083
EXPEREDU	1.923	-1.092	45	0.281
TECHSKL	.	0.181	25	0.858
TECPROBL	.	2.476	25	0.020
COMMFREQ	5.014	-3.587	60	0.001
INTERACT	41.993	-3.780	60	0.000
FREQFEED	2.599	-1.450	61	0.152
EASYINST	9.837	3.852	63	0.000
PURPOSE	1.243	-0.541	63	0.590
SIMILAR	0.635	2.562	63	0.013

Satisfaction Data

	F	t	df	Significants
WHYENR	7.131	-3.060	19	0.006
PRIORKNO	2.339	-0.909	19	0.375
KNOWNOW	1.899	-1.575	19	0.132
HOURSDEV	0.296	-0.892	19	0.383
CONTACNO	1.843	-0.520	19	0.609
DISCUSSI	1.888	2.552	19	0.019
LECTURE	0.127	2.457	19	0.024
LABEXER	1.006	1.434	19	0.168
INTHELAB	0.065	0.828	19	0.418
GRADELAB	0.601	1.648	19	0.116
ONLINGAM	0.043	-0.181	19	0.858
QUIZZES	1.345	0.114	19	0.910
MAJEXAMS	0.058	0.000	19	1.000
INSTREFF	5.938	1.949	19	0.066
AMTOWORK	0.369	-0.306	19	0.763
EDEXPRIE	0.909	0.514	19	0.613
SATISFY	1.873	2.330	19	0.031
COMMUNNO	4.690	-4.318	19	0.000
INTERFRE	1.228	0.535	19	0.599
TIMEFEED	0.000	1.525	19	0.144
INSTEASY	0.518	1.254	19	0.225
PURPOCLR	0.559	1.115	19	0.279
CONSISTE	0.518	1.254	19	0.225
ENROLAGA	65.143	-2.018	19	0.058