

EXPLORING COMMON CHARACTERISTICS AMONG COMMUNITY COLLEGE
STUDENTS:
COMPARING ONLINE AND TRADITIONAL STUDENT SUCCESS

A Dissertation
by
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Submitted to the Graduate School
Appalachian State University
In partial fulfillment of the requirements for the degree of
DOCTOR OF EDUCATION

May 2010
Doctoral Program in Educational Leadership

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ABSTRACT

EXPLORING COMMON CHARACTERISTICS AMONG COMMUNITY COLLEGE STUDENTS: COMPARING ONLINE AND TRADITIONAL STUDENT SUCCESS (May 2010)

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The internet has had a major impact on education, increasing online education opportunities, particularly for community college students who would not typically have access to higher education. Community college students, who are often nontraditional students, enroll in online courses due to their flexibility and convenience. Previous studies report mixed results regarding the performance of community college students in the online environment as compared to their performance in the traditional seated environment. This study examines course entry characteristics of students in both the regular and online sections of an introductory computer class in a North Carolina community college. These characteristics are compared to student performance on a standardized final assessment, focusing on demographics, technology self-efficacy, and motivation.

The research design used in this study utilized correlation analysis and stepwise multiple regression to determine if the independent variables of demographics, technology self-efficacy, and motivation might predict the dependent variable, student performance on a

standardized final exam. A 3-part survey was administered to students enrolled in CIS 110 – Introduction to Computers, during the fall semester of 2009 at Gaston College in Dallas, North Carolina. This survey was developed from a combination of two previously documented instruments as well as a section to collect demographic data. The 28-question Online Technologies Self-Efficacy Survey (OTSES) instrument validated in 2000 by Miltiadou and Yu was used to determine the students’ past experience with technology. The first portion of the Motivated Strategies for Learning Questionnaire developed by Pintrich, Smith, Garcia, and McKeachie (1991) was used to gather information about the students’ self-motivation. The third section consisted of a 9-question section used to gather the demographic information including gender, age, marital status, family obligations, and course enrollment status.

Results of correlational and stepwise multiple regression analyses of the survey data were compared to the final assessment scores of the students who participated in the survey. This analysis revealed that neither demographics, technology, nor motivation could be used as predictors in the seated courses. Demographics could not be used as predictors in the online courses. Eleven technology and nine motivation factors were found to be significant in the online environment. The significant technology indicators can be grouped into three areas: 1) interaction with web sites; 2) using e-mail; and 3) using the course delivery system. Significant motivation factors focus on the students’ confidence and belief in their own abilities to do well.

The results of this study support the premise that technology self-efficacy and motivation play a role in a student’s ability to be successful in the online environment. As the use of the internet to deliver course material increases and the community college

student continues to demand the flexibility and convenience of this mode of delivery, administrators and faculty in the community college environment must understand the factors that contribute to online student success. Implications for practice and policy, and recommendations for further research are presented.

ACKNOWLEDGMENTS

I would like to thank my chair, Dr. Les Bolt, for his assistance and support during the dissertation process. The members of my committee, Dr. Jim Killacky and Dr. John Tashner also provided valuable insight and assistance in making this study possible. Additionally, my advisor, Dr. Vachel Miller provided me with the foundation necessary to develop my research and writing. My sincere thanks to each of you for everything you have done. The faculty and staff of Appalachian State University are outstanding in their approach to higher education and helping people achieve their dreams.

My family has been incredibly supportive and has given me the opportunity to aggressively write and study in order to achieve my life-long goal. Thanks to my husband, Mark, and my children, Charlie and Michelle, who have sacrificed in order for me to complete this process.

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CHAPTER 1: INTRODUCTION

The recent expansion in technology, particularly the internet, has had a major impact on society. Education is no exception. A 2008 report from the Sloan Consortium (Allen & Seaman) states a 12.9% growth rate in online enrollment in postsecondary colleges and universities during fall semester 2007 as compared to a 1.2% growth rate in student population overall. Parsad and Lewis (2008) report that 97% of community colleges in the United States offer courses in an online format. Online courses in higher education, defined as having 80% or more of the content delivered using asynchronous internet technologies (Allen & Seaman, 2008), have virtually eliminated other methods of distance course delivery including correspondence courses and video broadcasts. Online or web-based courses have fast become the distance delivery method of choice for postsecondary educational institutions (Meyer, 2002) with 70.7% of postsecondary educators seeing online education as critical to their long-term strategy (Allen & Seaman).

The increase in online education has provided opportunities for students who would not typically have access to higher education. Community college students, who are most frequently nontraditional adult students, are particularly drawn to online courses due to their flexibility and convenience (Allen & Seaman, 2008). Family and work obligations make attending traditional classes difficult for these particular students (Lim, 2001).

Unfortunately, existing research does not provide a definitive understanding of the relationship between the unique characteristics of community college students and their ability to succeed in the online course environment (Muse, 2003).

Online learning should provide the same level of educational effectiveness as traditional classroom learning (Rovai & Baker, 2005). During the late 1990's, Russell (2001) chronicled over 350 studies that claimed there was "no significant difference" in the two distinct methods of course delivery. However, there are concerns about whether the same level of learning occurs in online courses as compared to the same courses offered face-to-face (Noble, 2002). In 1999, the Institute for Higher Education Policy was commissioned by the American Federation of Teachers and the National Education Association to analyze the research that had been previously conducted comparing the two methods, and in the report entitled, "What's the Difference," found the results to be nonconclusive, citing design flaws in popular research methods (Phipps & Merisotis, 1999). The U.S. Department of Education's recent meta-analysis found that, "Learning outcomes for students who engaged in online learning exceeded those of students receiving face-to-face instruction, with an average effect size of +.24 favoring online conditions" (Means, Toyama, Murphy, Bakie, & Jones, 2009, p. xiv). Within the 51 study effects, the average student in online courses scored .24 standard deviations above the average student in the seated courses.

This study examines course entry characteristics of community college students in both the regular and online sections of an introductory computer class and how they relate to performance on a standardized final assessment. The relationships between the entry characteristics and the final exam scores in the online course sections are compared to the same relationships in course sections taught in the face-to-face format. The results of this study provide insight into the demographic, technological, and motivational indicators that may exist, assisting community college administrators, faculty, and students in determining

readiness for online course enrollment and factors that may contribute to the rate of success, thereby affecting a student's chances for a successful outcome in an online course. For the purpose of this study, courses taught in both the online and traditional format are delivered within the traditional 16-week semester period. The online class is completely web-based without face-to-face meetings, and the traditional class is primarily taught in a face-to-face lecture format.

Definition of the Problem

The mission of the community college system is to serve all segments of society through a flexible and open admissions policy (Vaughn, 1999). The mission of the North Carolina Community College System (NCCCS) is to open the door to high-quality, accessible educational opportunities that minimize barriers to post-secondary education, maximize student success, develop a globally and multi-culturally competent workforce, and improve the lives and well-being of individuals (NCCCS, 2010). Because the typical community college student is often older with work and family responsibilities, online courses are very popular (Muse 2003; Summers, 2003). Community college students come from a variety of backgrounds and have personal issues that can interfere with their ability to obtain a traditional college education. The structure of the online environment provides nontraditional students with an opportunity to access higher education through a more flexible format that can be accessed anytime and anyplace (George Mason University, 2001), giving them more time to focus on issues such as career and family. The popularity of online education among these students has created a rapidly changing market for community colleges. During the 2000-2001 academic year, the National Center for Education Statistics reported that 90% of community colleges offered online courses with

1,472,000 students enrolled (Waits & Lewis, 2003). This number increased to 97% in 2007 (Parsad & Lewis, 2008). During the fall semester 2007, over one-half of all online students were enrolled in two-year, associate degree-granting institutions (Allen & Seaman, 2008).

Community college students, who are often adult, nontraditional students, are more at risk of dropping out or failing a class than students at traditional 4-year colleges and universities (Wirt et. al, 2002). The 2008 Distance Education Survey conducted at 139 community colleges by the American Association of Community College's Instructional Technology Council found the dropout rate of community college students in online courses to be 35% as compared to 28% in the face-to-face environment (Lokken, 2009). These statistics suggest that online community college students may be more at risk of unsuccessful course completion than their counterparts in the traditional educational setting. During 2008-09, the difference in the drop rate at the community college used in the study was not significant, with 88% retention in online classes as compared to 89% retention in classes delivered in the traditional face-to-face format (Gaston College, 2009).

Need for the Study

Of students enrolled in all postsecondary educational institutions, 53% are 24 years of age or older (Provasnik & Planty, 2008). During the academic year 2006-07, over 51% of the students in the North Carolina Community College System (NCCCS) were over the age of 24. From 1999 through 2007, NCCCS saw an increase in the number of degree-seeking students enrolled in online classes ranging from 25.45% to 51.31% (NCCCS, 2008). Prince and Jenkins (2005) report that 60% of older first-time community college students do not complete a degree or a certificate, compared with 40% of their younger counterparts. These data present a concern about the potential success of nontraditional students as compared to

the traditional college age student between the ages of 18 and 21. Muse (2003) and Summers (2003) report that research with a specific focus on students in online classes does not take into account the unique characteristics of community college students. This study addresses that gap.

Other demographics may also contribute to successful online course completion, including work and family (Prince & Jenkins, 2005). Outside responsibilities often hinder enrollment in traditional on-campus courses, so many adults choose the flexibility of the online environment. Waits and Lewis (2003) report that nearly two-thirds of community college students attend college part time, 50% work full time, and many have the responsibility of caring for dependents. Over one-half are the first in their family to attend college. These life and time barriers can impact a community college student's ability to complete course requirements.

Because community college students come from a variety of educational backgrounds, they possess a wide range of skill levels (Allen & Seaman, 2005). Lack of experience with technology can have an impact on their success in the online environment (Phillippe & Valiga, 2000). Although the amount of high speed internet availability has increased in North Carolina, the state still ranks in the lower 50% in the United States in household penetration (Baller & Lide, 2008). Phillippe and Valiga (2000) found community college students often lack the resources to acquire the appropriate technology to be successful including computers and access to the internet, and that 11% of community college students have no experience with the internet at all. Lack of access and experience can prevent them from being successful in the online environment (Levy, 2003; Muse 2003).

Phipps and Merisotis conducted a research synthesis in 1999, finding that motivation was more important than access to or experience with technology to community college student success in online courses. Online students must be more self-motivated, disciplined, and independent learners than their face-to-face counterparts. They must possess a different learning mindset (Pillay, Irving, & McCrindle, 2006) and must be able to work with a limited amount of peer and teacher interaction (Diaz & Cartnal, 1999).

Studies of online education have been conducted to individually tie the factors of student demographics, technology, and motivation to student success; however, many of them focus on only a few variables and do not include a theoretical or conceptual framework (Liu, 2007). Muse (2003) and Summers (2003) contend that few studies focus specifically on community college students and their unique characteristics. Clearly, there is a need for research that will lead to an understanding of this combination of characteristics and how they predict success for community college students. Institutions can use the results to determine if changes are necessary to online course delivery or in faculty and student preparation for this growing form of instruction.

Purpose of the Study

The purpose of this study is to examine how entry characteristics of demographics and background (including age, gender, marital status, employment status, number of children, and student status), technology self-efficacy, and motivation relate to a student's performance in an online community college class. The following four research questions guide the study:

1. To what extent do demographic and educational characteristics of age, gender, marital status, employment status, number of children, and student status predict

student performance on a standardized final assessment in an entry level technology course?

2. To what extent do technology skills predict student performance on a standardized final assessment in an entry level technology course?
3. To what extent does level of self motivation predict student performance on a standardized final assessment in an entry level technology course?
4. Do predictors for online class success differ from those for success in traditional seated classes?

Significance of the Study

The North Carolina Community College System reports a 32% increase in online course enrollments in 2005-06 and a 25% increase in 2006-07 (NCCCS, 2008). As indicated by these statistics, increasing numbers of North Carolina community college students are enrolling in online courses. Colleges are responding to this demand by offering more courses for which all of the instruction is delivered via the internet. As previously noted, some research suggests that there is no significant difference in the success of students in online classes as opposed to those in seated classes (Russell, 2001). Means, Toyama, Murphy, Bakie, and Jones (2009) found that online students perform better, while other studies indicate that this is not the case, particularly when comparing the community college students to the typical 4-year college student (Noble, 2002; Phipps & Merisotis, 1999). This study addresses the existing gap in current research by specifically targeting the community college student who tends to be nontraditional. Course completion data based on student outcomes were collected and analyzed, controlling for students who failed to successfully complete the course.

This study provides valuable information to community college faculty as they teach and advise students. Faculty can use the results of this study to identify online students who may be at risk for dropping out or unsuccessful course completion. Interventions may be appropriate for the students who need additional technology or academic resources.

Community college administrators may benefit from this study. Financial losses from dropouts and consequences from student failure both have a negative impact on an institution's reputation. Accreditation can be placed in jeopardy when retention and success rates are low. Negative publicity from student failure can have an impact on the institution's ability to adequately serve its target population. Institutional leaders may use this information to assist them in establishing criteria for student entry into online courses or to modify course delivery and content to enhance the online course experience.

Students may benefit from this study by identifying characteristics that may be important to their success in the online environment. If students are more aware of the traits they possess and the risks involved in enrolling in online classes, they can be aware of the challenges they may face. They could seek services that would improve their chances for success.

There are many factors that influence student persistence and success. The online environment presents additional challenges to the typical community college student, yet the convenience and flexibility of online delivery are very appealing. It is imperative that community colleges make every effort to assist students in attaining academic success including tools to help them deal with the challenges.

Research Methodology

This study employs a quantitative research design to test the research questions. The study examines the relationship between student characteristics and the performance on a standardized final exam in sections of a community college course taught online as compared to the same data derived from the face-to-face sections of the same course. The variables are measured by data gleaned from a college survey compiled from questions developed to obtain demographic information, the Online Technologies Self-Efficacy Survey instrument (Miltiadou & Yu, 2000) and the Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia, & McKeachie, 1991). The unique blend of these instruments provides data on a combination of the characteristics of demographics, technology self-efficacy, and motivation. The characteristics were analyzed to determine how well they predict success for community college students.

The research design utilizes a correlation analysis and stepwise multiple regression, which allows the researcher to learn more about the relationships between several independent variables and a dependent variable (Fraenkel & Wallen, 1990). Demographics, technology self-efficacy, and motivation are the independent variables in this study, while student performance on the standardized final exam is the dependent variable.

Participants of the study were students enrolled in CIS 110, Introduction to Computers, during the fall semester of 2009 at Gaston College in Dallas, North Carolina. The survey was deployed to students via the internet as soon as enrollment was verified for the term. Faculty and student participation was voluntary. Upon course completion, student retention data were obtained from the Office of Student Records and assessment data were obtained from the Business and Information Technology Division.

Definition of Terms

Many of the terms used in this study will be common to community college and distance education settings; however, several terms are defined here to add clarity to the study.

Asynchronous: Student and teacher do not have person-to-person direct interaction at the same time or place (Phipps & Merisotis, 1999).

Demographics: For the purpose of this study, demographics are defined as age, gender, marital status, employment status, number of children, and student enrollment status.

Distance/online education or distance/online learning: The separation of teacher and learning with the majority of the instructional process using educational media to unite teacher and learner and deliver course content (Clark & Verduin, 1989). An online course has at least 80% of the content delivered via the Internet, generally without face-to-face meetings (Allen & Seaman, 2005). For the purpose of this study, online instruction is delivered via the Blackboard learning management system and student/instructor interaction is limited to the discussion board and e-mail.

Educational outcomes: The educational result of a student attending a course. Outcomes are determined by the learning objectives for the course and measured by a standardized final exam developed within the department. All questions on the exam were created to tie directly to the expected outcomes.

First-generation college student: A student whose mother and/or father did not earn a postsecondary degree or certificate.

Full-time student: A student who is enrolled in 12 or more semester hours during a 16-week term.

Nontraditional student: A student age 25 or older who has at least one nontraditional characteristic including delayed enrollment in postsecondary education, part-time attendance for some part of the year, full-time employment while enrolled, being financially independent, having dependents other than a spouse, single parent, or having no high school diploma or equivalent (Wirt et. al, 2002).

Online course: A course that has at least 80% of the content delivered via the Internet, generally without face-to-face meetings (Allen & Seaman, 2005). For the purpose of this study, an online course is delivered via the Blackboard learning management system and uses no other delivery system. Students generally work in isolation except for online discussion board activity and e-mail interaction with the instructor.

Part-time student: A student who does not attend school on a full-time basis, usually enrolled in fewer than 12 semester hours in a 16-week term.

Persistence: Continuous enrollment in a course throughout the semester.

Technology self-efficacy: A student's belief in his or her own ability to use computers and learn new computer skills (Lim, 2001).

Traditional course: A course that meets in a classroom on scheduled days and times. The format of the course is primarily lecture.

Withdrawal: A student leaving a course during a term by completing a withdrawal form and ceasing to attend class.

Organization of this Paper

This chapter introduced the issues relating to online community college student success and the need for additional and more comprehensive studies relating to the unique characteristics of the community college student. As the use of the internet to deliver courses

increases and the community college student demands the flexibility and convenience of this mode of delivery, administrators and faculty in the community college environment must have information to do what they can to help students be successful. Students should be aware of the characteristics necessary to be successful in online learning.

Chapter 2 examines the literature about the past and current models of student success factors relating to online learning at all levels of higher education, with a focus on community colleges. The literature relating to the independent variables in this study: demographics, technology, and motivation, is examined and reviewed. Chapter 3 provides an explanation of the methodology used in this study. Chapter 4 reports the findings of the data analysis including descriptive statistics, and Chapter 5 includes a summary of the findings, conclusions, and recommendations for future research.

CHAPTER 2: REVIEW OF THE LITERATURE

This chapter provides an overview of existing models examining factors that affect student success in online learning. This study is guided by the increasing popularity of online courses in the community college setting and the fact that most research relating to course outcomes focuses on the traditional college student. The unique characteristics of the typical community college student, including demographics, technological, and motivational indicators will be examined to determine the relationship of each when compared to student performance in both the online and face-to-face environment.

Community colleges are open-door institutions whose mission is to serve all segments of the population (Vaughn, 1999). The students who attend community college come from a variety of educational backgrounds and represent a multitude of ages, ethnic, and cultural heritages (Allen & Seaman, 2005). Many are first-generation college students or are from low socioeconomic backgrounds (Horn & Nevill, 2006), have life and time conflicts, and often have jobs and other responsibilities (Liu, Gomez, Khan, & Yen, 2007). The open-door, open admissions policy of the community college provides individuals who would not otherwise have access to higher education, an opportunity to attend college.

The diversity and life challenges of community college students have made the flexibility of online courses very popular (Muse, 2003; Summers, 2003). An online course is defined as having at least 80% of the content delivered via the Internet, generally without face-to-face meetings (Allen & Seaman, 2005). As early as 1996, Keegan recognized that

typical online instruction delivered by community colleges results in a fundamental separation of teacher from learner. Clark and Verduin (1989) define online learning as:

- The separation of teacher and learner during at least a majority of the instructional process;
- The use of educational media to unite teacher and learning and carry course content;
- The provision of two-way communication between teacher, tutor, or education agency and learner (p. 25).

Online learners make up nearly 22% of the students in higher education (Allen & Seaman, 2008). The National Center for Education Statistics (NCES) reports that during the academic year 2000-2001, community colleges had the largest percentage of online enrollment of any other higher education institution with 1,472,000 out of 3,077,000 students (48%), choosing to take courses within the online environment (Wirt, Choy, Rooney, Provasnik, Sen, & Tobin, 2004). During fall 2007, the reported percentage was 51% (Allen & Seaman, 2008). During 2007, 97% of all community colleges offered online courses (Parsad & Lewis, 2008).

Muse (2003) and Summers (2003) contend that existing research does not provide a true understanding of the relationship between the unique characteristics of community college students and their abilities to succeed in the online education environment. It has been reported that withdrawal rates in online community college classes are sometimes as high as 50-80% (Lynch, 2003). Muse and Summers challenge that there is not enough available research data to explain these statistics. In a bibliography of 355 reports and studies compiled from 1928 through 1999, Russell (2001) suggests that there is no

significant difference in the achievement of student outcomes in traditional classes versus their distance education and online counterparts. A meta-analysis of recent online learning studies conducted by the Department of Education (Means, Toyama, Murphy, Bakie, & Jones, 2009) found that learning outcomes for students who took all or part of their class online were higher than those taking the same course in the traditional face-to-face format, with an average effect size of +.24. Within the 51 study effects, the average student in online courses scored .24 standard deviations above the average student in the seated courses. Cohen (1992) suggests that in meta-analyses, effect sizes of .20 are “small,” sizes of .50 “medium,” and sizes of .80 or greater “large.” Although the study reports a “small” effect size using this definition, Means, Toyama, Murphy, Bakie, and Jones (2009) contend that learning is significantly higher in the online environment at $p < .001$. The analysis included studies involving both K-12, undergraduate, and graduate students, but does not provide data that focus specifically on the community college student.

A review of the current literature provides some insight into specific past and future models that relate to college student success in the online environment. The areas of demographics, technology, and motivation, particularly among community college students are the focus.

Characteristics of Community College Students

Demographics

There are many varied and conflicting studies related to community college students and the ability to use demographics as a predictor in online course success. Age, gender, outside responsibilities such as marital status, employment status, and number of children, along with student status seem to be the most often used predictors with varying results.

Nationally, community colleges serve students that are older, working adults. Sixty percent are first-generation college students. Seven percent are single parents, 51% of whom report an annual income of below \$20,000 (Phillipe & Valiga, 2000). The NCES reports that during the 2003-04 academic year, 40% of the nation's community college students were under 24 years of age, 18% were 25 – 29 years of age, and 35% were age 30 or older. Two-thirds of community college students attend part time, and more than 80% work either full or part time. Thirteen percent come from homes where English is not the primary language, and more than half of community college students come from homes where neither of their parents attended college. Fifty-nine percent are women. Fifteen percent are Black and 14% are Hispanic (Horn & Nevill, 2006).

Statewide during 2006-07, over 51% of degree-seeking students in the North Carolina Community College system were 25 years of age or older. Sixty-eight percent were employed either full or part time, and 63% were male. Sixty-two percent were white. Only 20% were enrolled in school full time, taking 12 credit hours or more (NCCCS, 2008). At Gaston College, 52% of the students attending fall semester 2009 were 25 years of age or older, 62% were female, and 75% were white. Due to the state of the economy and recent layoffs in the area, 56% of students were attending school full-time and were currently unemployed or underemployed. The average age of degree-seeking students was 32 years (Gaston College, 2009).

Online courses provide opportunities for community colleges to respond to the diverse needs of their target population and to provide the flexibility of anytime/anywhere learning that fits within their students' lifestyle (Liu, 2007). Many colleges have taken advantage of this opportunity and have increased their online offerings (Allen & Seaman,

2005). NCES reports that 69% of American community colleges are using online education to increase student access through convenience, 60% are using it to grow their student enrollment, and 65% are using distance learning to make courses available to students outside their traditional service area (Wirt et al., 2004). In a survey conducted by the Instructional Technology Council (ITC), of 154 community college members of the American Association of Community Colleges (Lokken & Womer, 2007), responding institutions reported a 15% increase in online enrollment from 2004 to 2005 and an 18% increase from 2005 to 2006 compared to only a 2% increase in enrollment overall. The latest data from the North Carolina Community College System report an increase of 32% in online curriculum course registrations in 2005-06 and an increase of over 25% in 2006-07 (NCCCS, 2008). The local community college used in this study reports an increase of 31% in online enrollment in both 2008 and 2009 (Gaston College, 2009). The diversity and life challenges of community college students make the flexibility of online courses very appealing (Muse, 2003; Summers, 2003). Online learners comprise nearly 22% of students enrolled in higher education and for the past six years, associate degree institutions have had the largest percentage of online enrollment, reporting 51% during fall semester 2007 as compared to a 1.6% growth increase overall (Allen & Seaman, 2008).

In a study to determine why students choose the online learning environment, Hannay and Newvine (2006) found that out of 217 adult students in university criminal justice courses, 88% chose distance learning because of the convenience and flexibility to manage their additional personal commitments. Studies by Halsne and Gatta (2002), Ross and Powell (1990), and Rovai and Baker (2005) found that postsecondary online education students were more likely to be older and female with work and family responsibilities. In a

study of 47 students in an undergraduate business communications class, Tucker (2000) noted an average age of 23 years in the courses taught in the traditional environment and an average age of 38 years in the online courses. While she found there to be no significant difference in the final grade averages of the online learners as compared to traditional students, Tucker did note that students in the online classes scored an average of 85.92 on the final exam as opposed to a face-to-face average of 78.26. This finding led her to posit that the older student prefers the online environment and performs better on some learning indicators.

Ross and Powell (1990) conducted one of the first studies to focus specifically on the relationship between distance education success and gender. The study found that online learners were predominantly female and that women scored up to 20 percentage points over men in areas of applied studies, humanities, sciences, and social sciences. A more recent study by Halsne and Gatta (2002) compared a number of demographic characteristics of 1642 community college students in both online and seated courses to determine learner characteristic differences. They found that women with dependent children were more likely to take online courses and were between 26 and 55 years of age with full time jobs. Rovai and Baker (2005) contend that distance education has been historically marketed to older women due to communication differences in gender that make online learning more appealing to females. While reporting that the convenience of online courses appeals to busy females, they also indicate that women use virtual messaging systems more often than men and thrive in the asynchronous environment. This finding is consistent with research that suggests that female students are more likely to participate in online discussions (Arbauch, 2000; Herring, 2000). Coleman-Ferrell (2001) surveyed 100 students enrolled in internet-

based courses at a community college in Florida, concluding that the older students made a higher letter grade in online classes. In a similar vein, Wojciechowski and Bierlein-Palmer (2005) conducted a study of 179 students in an online business class at a community college in Michigan, finding a significant correlation of .36 between older students and the final grade.

Muse (2003) conducted a study at a community college in Maryland, testing 276 students enrolled in online courses during the fall semester of 2002. The average age of respondents was 30, with a range of 16 to 72 years. The results indicated that older students are more likely to successfully complete an online course. He concluded that their background and life experience prepared them for an online course and they maintained a 3.4 grade point average as opposed to their younger, more inexperienced counterparts who maintained a grade point average of 2.75. The study focused on factors that lead to the success and risk of community college students in online classes. According to Muse, it is important to identify the type of student that would thrive in the online environment and he reported 3 areas of concern: 1) a lack of current information about why students succeed or fail in community college online courses; 2) a lack of preassessment measures in place to help these students determine if Web-based learning is suitable for them, and; 3) the need for institutions to reduce the attrition rate to deal with the financial repercussions of having large numbers of noncompleters.

Menager-Beeley (2001) surveyed 59 students in two online classes in a California community college, finding that the majority of students were not taking their first online class, were primarily female, and held a high interest in the course content. She found that older students in the range of 28-50 years of age are more likely to drop an online class,

presuming that work and family responsibilities contributed to them having less consumable time.

A study of 269 online and 116 traditional university students conducted by Urtel (2008) found that older students do not automatically outperform younger students in the online environment. The average age of students in the distance education class was 27 years and the average age of students in the traditional class was 24 years. While both groups achieved the same level of academic success, the female students in the traditional class significantly outperformed females in the online class. Male students fared as well in both environments.

In a three-year study of 179 online undergraduates in business classes, Wojciechowski and Bierlein-Palmer (2005) compared student characteristics such as gender, age, placement test scores, grade point average (GPA), and previous academic experience with student success in online courses. The student's GPA was found to have the highest relationship to the final grade, while participation in an optional orientation was the second highest. Among other significant factors were previous course withdrawals, reading placement test scores, and success in previous online courses. The average age of the students in the study was 25, which suggests that distance education is popular with younger students; however, this study found that older students typically make higher grades in online courses, finding a .36 correlation. This study also supports the notion that female students are more attracted to the online environment. Almost 70% of the students in the study were female; however, no significant relationship was found between gender and final grade.

Technology

As computers and internet technology have become more popular and accessible in the United States, usage has increased. The U.S. Census Bureau (2007) reported 61.8% of American households owned a computer and 54.7% of households had internet access during 2003. In 2007, the number of American households with access to the internet increased to 61.7%. During the Bureau's 2007 survey, respondents were not asked about computer ownership. In March 2009, 63% of American households were using high-speed internet connections, up from 55% in March 2008 while dial-up connections were down from 10% to 7%. The growth in broadband connectivity is attributed to an increase in access of older adults and low income Americans (Website Optimization, LLC, 2009).

Although North Carolina counties served by the community college used in this study has high speed internet availability in the range of 70% - 89% (N.C. Rural Internet Access Authority, 2009), North Carolina still ranks from 26th to 28th in the nation in household penetration (Baller & Lide, 2008). Phillippe and Valiga (2000) report that overall 11% of community college students taking credit courses have never used the internet. Of community college students between the ages of 40 – 59, 20% have no internet experience at all. Since the internet has only been widely used to deliver education for about two decades, many older students who are attending or returning to college after many years may not have a level of familiarity with the online environment. This can stand in the way of their success (Levy, 2003).

A level of confidence with technology is one of the primary factors affecting student achievement in an online class. Students must have access to technology and the ability to use the hardware and software required to meet online course learning objectives (Miltiadou

& Yu, 2000). According to NCES, online courses use many different technologies in their delivery (Waits & Lewis, 2003). Online students must have access to these technologies and must be able to adapt to the ever-changing technology environment in order to meet their academic goals. Students should have a level of comfort with technology tools – experience in solving simple problems, checking e-mail, and performing basic tasks at the very least (Schrum, 2002).

In a study of 57 competences among graduate students in the central United States, the two most important competencies for online course success were “basic technology” and “technology access knowledge” (Egan & Akdere, 2004). Community college students do not have the educational experience that graduate students have. Many of them are attending college for the first time in many years; therefore, their lack of experience with technology may have even more of an impact on their educational success (Phillippe & Valiga, 2000). Additionally, Phillippe and Valiga report that the cost of purchasing a computer is one of the top five barriers students perceive to college success. Twenty percent of the students they surveyed had actually learned to use a computer while attending a community college. In a study of 235 adult learners at five institutions during two semesters, Lim (2001) found lack of knowledge of technology directly related to online student success, particularly for adult learners who can experience anxiety regarding the use of computers. A student’s perception of their own technology self-efficacy – the belief in their own ability to use computers and learn new computer skills – can affect their experience in the online environment. In a review of literature, Levy (2003) cited student technology training and support as one of six factors to consider before offering a course online.

Several studies have been conducted that compare technology self-efficacy to success in the online environment. The Online Technologies Self-Efficacy Scale (OTSES) (Miltiadou & Yu, 2000) that will be used in this study has been tested extensively with mixed results. Miltiadou and Yu used the OTSES to research outcomes in distance education classes during the spring semester of 2000. Three hundred and thirty students participated in the study. A strong relationship was reported between technology self-efficacy and the final course grade. Wang and Newlin (2002) also reported a strong relationship between the OTSES and distance learning course outcomes. During 2003, Corbeil found a significant relationship between the OTSES and self-directed learning readiness, internal locus of control, and student success. DeTure (2004) utilized the OTSES to measure the learning outcomes of 73 online students in six courses. She reported a weak relationship between the OTSES and academic performance.

Other studies have been conducted that attempt to predict student performance in the online environment using technology self-efficacy. In a three-year study of 179 business students conducted at a small community college in the Midwest, Wojciechowski and Bierlein-Palmer (2005) found a .438 significance between the number of prior online courses taken and a student's success in present and subsequent online courses, attributing that finding to increased independence and time management skills. Menager-Beeley (2001) conducted a similar study of 59 students in two online classes at a community college and found that the previous online course completions and prior course grades earned were not significant predictors of a student's success. Hiltz and Shea (2006) found that prior online course experience and consistent access to computers and the internet are two of the most important factors that influence student success in the online environment.

Technology continues to be integrated into higher education. Although high-speed access is becoming more readily available, many community college students may not have the financial resources to acquire the appropriate computer and internet technology necessary for the online course environment (Phillippe & Valiga, 2000). Students' lack of technology access and skills may prevent them from successful completion of an online course (Muse, 2003). College officials must ask themselves if students have the necessary skills to use the technology that online classes require, and if the college is providing the necessary access and support (Phipps & Merisotis, 1999). Community college student technology competence cannot be assumed (Pillay, Irving, & McCrindle, 2006).

Motivation

Eighty percent of the community college respondents to the Allen and Seaman (2005) survey agree with the statement, "Students need more discipline to succeed in an online course than in a face-to-face course" (p. 15). Students are sometimes under the misconception that online classes are easier and take less time than traditional lecture-based courses (Thomas, 2007). In his report of a survey conducted by e-Learners.com, Thomas notes that students believe that an online course requires them to stay motivated and work independently. In their three-year study in a university science course, Yazon, Mayer-Smith, and Redfield (2002) asked over 500 students their opinion of the web-based learning environment and 85% agreed that online learning requires a more interactive approach to learning in sharp contrast to face-to-face courses.

A student's motivation can be described as intrinsic or extrinsic. Intrinsic motivation represents the desire to learn for learning's sake, while the student who is extrinsically motivated is typically influenced by external factors such as the possibility of a promotion or

higher pay (Kember, 1995). In the National Education Association's 1999 report reviewing current research on distance education, Phipps and Merisotis (1999) conclude that student motivation is more important to online success than a familiarity with technology. Because online students are separated from the source of instruction, their success can depend on their ability to take responsibility for learning (Allen & Seaman, 2005).

Online learning requires a different mindset so students must be self-regulated and independent (Pillay, Irving, & McCrindle, 2006), have a conscious intent to learn, and the ability to develop a goal and carry it through to completion (Milligan & Buckenmeyer, 2008). They must be able to determine their own objectives and evaluation measures (DeTure, 2004). Students who do not have a level of motivation and self-discipline will be at a disadvantage, particularly in the online classroom (Pillay, Irving, & McCrindle, 2006). The distance learning environment appeals to students who are motivated since they are more apt to work well in isolation and do not require intense interaction with peers or teachers (Diaz & Cartnal, 1999). Recent research findings are mixed regarding the relationship between motivation and online course performance.

To determine which of six learning styles affected success in online courses, a study of 108 community college health education students was conducted in California by Diaz & Cartnal (1999). They found online students to be intrinsically motivated and independent learners. Pillay, Irving, and McCrindle (2006) studied 330 education students at an Australian university, finding student engagement in online learning to be related to student preferences and attitudes when accompanied by a high degree of self-confidence. Menager-Beeley (2001) also found a positive correlation between 59 online community college students in California who successfully completed a class and their motivational values. Liu

(2007) surveyed 108 community college students in web-based courses during fall 2006, finding that successful online students accept the responsibility for their own learning.

On the other hand, a study of 94 graduate students in an online MBA program in Texas revealed a significant, but small relationship between motivation and performance (Wang & Newlin, 2002). DeTure (2004) conducted a study of 73 students at an American southeastern community college in fall 2002. The results showed that independent learners were not any more likely to achieve success in the online course environment than in the traditional face-to-face format. In his study of 1028 web-based community college students in Maryland, Muse (2003) found that although motivation was not statistically significant in predicting successful online course completion, he recommends that additional research be conducted in this area.

Study results do agree that colleges must be willing to modify course content and online instruction methodology to meet individual learning styles of students (Diaz & Cartnal, 1999). In addition, administrators should take appropriate steps to increase the likelihood of online course success by providing students with the proper preparation or guiding course placement (Pillay, Irving, & McCrindle, 2006).

Implications for this Study

Muse (2003) and Summers (2003) suggest that there needs to be more and better research to determine the characteristics necessary for a student to succeed in the online course environment at the community college level. Many studies of online education focus on only a few variables and do not include a theoretical or conceptual framework (Liu, 2007). While there have been studies conducted that suggest that online retention and success could be related to access to technology (Wirt et al., 2004) and technical skills

(Corbeil, 2003; Miltiadou, 2000; Muse, 2003) or self motivation (Allen & Seaman, 2005), there have been few formal studies to combine factors that affect the performance of students in online courses.

There is conflicting research to validate a perception that more students enrolled in online courses tend to withdraw from the course during the semester or make a failing grade than their counterparts in traditional seated courses. Given the popularity of online courses, community colleges must respond to these findings. Through existing global research and a study of local phenomenon, community college administrators can determine factors that result in online student success and identify those that lead students to be unsuccessful in online courses so they can attempt to provide strategies for improving student achievement in an every-growing distance learning environment.

Conceptual Framework

Research studies that have examined community college students in online classes report mixed results when pinpointing student characteristics that contribute to persistence and success (Mathes, 2003). This study utilizes a unique combination of variables including demographic and background characteristics, prior experience with technology, and level of motivation, as they relate to student outcomes in the online course environment at the community college level. Each variable is examined and analyzed and compared to student outcomes in an online course as well as the seated course counterpart.

A student's demographic and background characteristics play an important part in the desire to succeed in an online course. A number of demographic variables including age, gender, ethnicity, enrollment status, number of children, and number of hours worked per week have been found to have an impact on success (Diaz & Cartnal, 1999; Mathes, 2003;

Menager-Beeley, 2001; Moore, 2002; Rovai, 2003). This study includes nine questions to determine the participating students' demographic characteristics.

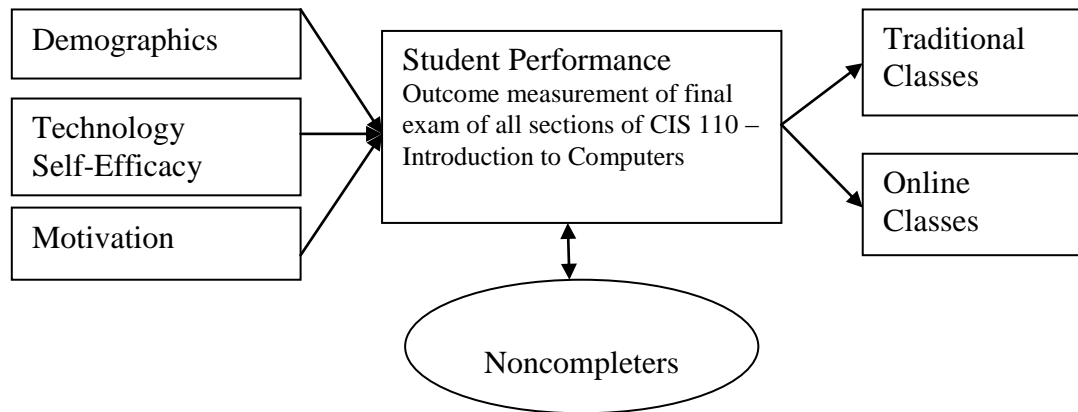
Familiarity with technology has a significant impact on a student's ability to persist and succeed in an online course (Moore, 2002). By their very nature, online courses require a basic knowledge of computer technology and access to the internet. The less familiar students are with technology, the more likely they will experience negative issues in the online course environment. The present study uses the Online Technologies Self-Efficacy Survey (OTSES) instrument validated in 2000 by Miltiadou and Yu to determine the past experience with computers and technology that students need to be successful in the online course environment.

Motivation is a primary factor in a student's ability to succeed in any college course, but particularly in an online class. The student must accept the responsibility to make decisions about learning and maintain active control in the learning process (Corbeil, 2003). This study uses the Motivated Strategies for Learning Questionnaire developed in 1991 by Pintrich, Smith, Garcia, and McKeachie to determine how motivation level affects success in the online environment.

These instruments were used to obtain information about community college student characteristics in both the online and seated sections of a technology course and the results were compared to how well the same students performed on a standardized final exam at the end of the semester. The college uses the locally-developed standardized final exam as a gauge of student learning outcomes in many courses, including the course used in this study, CIS 110 – Introduction to Computers. The course description and syllabus for this course are included in Appendix A. Data were collected by the Gaston College during fall 2009 as part

of the Quality Enhancement Plan for the upcoming accreditation by the Southern Association of Colleges and Schools (SACS). The researcher was granted permission to use the collected data for the purpose of this study. Figure 1 provides a visual depiction of the conceptual framework.

Figure 1. Conceptual Framework



Past and current studies of factors relating to student success in online learning in higher education, particularly in the community college setting, provide a foundation for this study. The review of the literature identifies a gap between studies relating to online learning and the typical community college student. This study addresses the gap between the unique characteristics of these students and their success in the online class environment. While Chapter 2 provided an overview of the literature relating to the independent variables in this study including demographics, technology, and motivation, Chapter 3 will provide an explanation of the methodology.

CHAPTER 3: METHODOLOGY

The purpose of this study is to examine how entry characteristics of demographics and background (including age, gender, marital status, employment status, number of children, and student status), technology self-efficacy, and motivation predict a student's performance in an entry-level community college class. These predictors are used to identify whether or not differences exist in the characteristics between the seated and online sections of the course.

In the North Carolina Community College System (NCCCS), online enrollments rose 25% in both academic years 2005-06 and 2006-07 (NCCCS, 2008). Community college students are typically non-traditional; that is, they are age 25 or older and have either delayed enrollment in postsecondary education, attend part-time for some part of the year, are employed full-time, are financially independent, have dependents other than a spouse, are a single parent, or have no high school diploma (Wirt et. al, 2002). At the local college, 52% of the students attending fall semester 2009 are 25 years of age or older. Although recent studies have suggested that students in online classes outperform students in the traditional class environment (Means, Toyama, Murphy, Bakie, & Jones, 2009), they do not focus on the often nontraditional community college student. Most research indicates that these students do not perform as well in the online environment as they do in a traditional seated class (Noble, 2002; Phipps & Merisotis, 1999). The absence of attention to community college students is the basis for this study.

A 68-question three-part survey was administered to students in the seated and online sections of a technology course in a community college setting, and that data were compared to the same students' performance on a standardized final exam at the end of the semester. The first portion of the survey instrument addressed the demographics, the second portion addressed technology self-efficacy, and the third portion addressed motivation. Course-level data were used to measure student success since students attend community colleges for a variety of reasons other than just attainment of a degree. Students may enroll in a course to update job skills, for personal enrichment, or to transfer to a four-year college or university (Hagedorn, 2005).

Research Questions

The following four research questions guided the study:

1. To what extent do demographic and educational characteristics of age, gender, marital status, employment status, number of children, and student status predict student performance on a standardized final assessment in an entry level technology course?
2. To what extent do technology skills predict student performance on a standardized final assessment in an entry level technology course?
3. To what extent does level of self motivation predict student performance on a standardized final assessment in an entry level technology course?
4. Do predictors for online class success differ from those for success in traditional seated classes?

Research Design

A quantitative correlational research design was used in this study. According to Fraenkel and Wallen (1990), correlational research design is used to “help explain important human behaviors or to predict likely outcomes” (p. 338). A correlational design does not imply causality, but shows a relationship between the dependent and independent variables used in the study (Hatfield, Faunce, & Soames, 2006). Since several independent variables, including demographics, technology self-efficacy, and self-motivation, were used to attempt to predict one dependent variable; student performance on a standardized final examination, this study employed multiple regression, which is commonly utilized when researchers want to learn more about the relationship between several predictor variables and the criterion or dependent variable.

Two previously developed surveys, with modifications, were combined and used to obtain the independent variable data along with a nine-question section developed locally to determine the participating students’ demographic information including gender, age, marital status, family obligations, and course enrollment status. The Online Technologies Self-Efficacy Survey (OTSES) instrument validated in 2000 by Miltiadou and Yu was used to determine the students’ past experience with technology. This 28-question survey was used in its entirety; however, it was modified to reflect current vocabulary and simplified to clarify the wording. The first portion of the Motivated Strategies for Learning Questionnaire developed by Pintrich, Smith, Garcia, & McKeachie (1991) relates to self-efficacy, intrinsic value, extrinsic value, control of learning beliefs, task value, and test anxiety and includes 31 questions that were used in this study to obtain information relating to factors that determine self motivation.

For the purpose of this study, an online class is defined as a class where all of the instruction takes place using the internet and Blackboard, the learning management system adopted by the local community college. The specific course that was evaluated allows for very little social interaction between student and teacher or student and student, with the exception of text-based discussion boards and e-mail correspondence. The seated section of the same course is primarily conducted in the traditional classroom, with an internet component comprising one-fourth of the course activity, including online tests and various assignments.

The approval of the Vice-President of Academic Affairs was obtained at the community college where the study was conducted. The data were collected during fall 2009 by Gaston College for the Quality Enhancement Plan for the upcoming accreditation by the Southern Association of Colleges and Schools (SACS). The researcher obtained written permission to use the collected data for the purpose of this study. Permission to conduct the study was granted by the Institutional Review Board.

Instrument

The two instruments, including the Online Technologies Self-Efficacy Survey (OTSES), and the Motivated Strategies for Learning Questionnaire (MSLQ), were combined with a 9-question demographic section developed locally for a total of 68 questions. A copy of the survey is included in Appendix B. Written permissions from the authors of the OTSES and the MSLQ are included in Appendix E.

Online Technologies Self-Efficacy Survey

The Online Technologies Self-efficacy Scale (OTSES) was validated in 2000 by Miltiadou and Yu at Arizona State University. Their work was to measure student

confidence with technology used in online courses such as electronic mail and discussion boards, along with other methods of course delivery and student/instructor interaction. These authors contend that technology self-efficacy is important to learning, particularly with online students, because those who do not feel comfortable with technologies tend to spend more time trying to use them and less time working on the actual course content. Self-efficacy is defined as individuals' confidence in their ability to control their thoughts, feelings, and actions to influence an outcome (Bandura, 1986). Miltiadou and Yu contend that while there are various instruments that measure self-efficacy, none exist that specifically target student perceptions of confidence with technology. The researcher's goal was to create such an instrument.

The OTSES consisted of 40 items representing behaviors to represent constructs. After review and feedback from content experts, students, and survey designers, Miltiadou and Yu deleted 10 items. The final instrument contained 30 questions on a 4-point Likert scale of "Very Confident," "Somewhat Confident," "Not Very Confident," to "Not Confident At All." Four subscales were defined including: (a) Internet Competencies, which measured use of an internet browser application; (b) Synchronous Interaction, which measured the use of chat technologies; (c) Asynchronous Interaction I, which measured the use of electronic mail; and (d) Asynchronous Interaction II, which measured the use of a bulletin or discussion board. A pilot test was conducted at a major university.

Miltiadou and Yu's research study included 330 college students at five educational institutions. The construct validity; that is, how valuable the instrument is in practical use, and the internal consistency of the survey were then validated. Two significant changes were made to the instrument as a result. First, a correlational analysis revealed that the 4 subscales

were highly interrelated. Consequently, they were collapsed into a single construct. Second, question 10 was determined to be irrelevant as factor loading was indetermined. For the remaining questions, there was an internal consistency reliability estimate of .95 from the Cronbach's coefficient alpha.

Motivated Strategies for Learning Questionnaire

The Motivated Strategies for Learning Questionnaire (MSLQ) was designed at the National Center for Research to Improve Postsecondary Teaching and Learning (NCRIPAL) and the School of Education at the University of Michigan by a team of researchers led by Pintrich, Smith, Garcia, and McKeachie (1991). In its entirety, the 81-question survey is divided into 15 scales that are designed to assess students' motivation and learning strategies in a college course. The motivation section of the questionnaire consists of 31 items within six scales that assess a student's beliefs about the goals, values, and skills necessary to succeed in a college course. The MSLQ was formally developed beginning in 1986 with the founding of NCRIPAL. It was originally tested in the college setting in three waves, after which the resulting data were analyzed and modifications were made. The final version, published in 1991, was tested in both the university and community college setting within 14 subject domains and 5 disciplines. In the original survey, answers were rated on a 7-point Likert scale from "not at all true of me" to "very true of me." For the purpose of this study, the answers were changed to a 5-point scale to align with other survey questions. Colman, Norris and Preston (1997) contend that a 5-point scale can be legitimately compared to results from a 7-point scale with a linear transformation.

The 31 survey items used to rate student motivation in the MSLQ can be grouped into six scales. See Appendix C for a summary of each of the scales, their components, and

the related question number. The first scale measures intrinsic goal orientation and consists of four questions. Intrinsic goal orientation rates the degree to which a student perceives his or her own reason for participating in a task. Reasons can include challenge, curiosity, or mastery. "Having an intrinsic goal orientation towards an academic task indicates that the student's participation in the task is an end all to itself, rather than participation being a means to an end" (Pintrich, Smith, Garcia, & McKeachie, 1991, p. 9). Four questions are contained in the second scale, which measures extrinsic goal orientation. Extrinsic goal orientation is related to the degree to which the student perceives his or her own reason for participating related to such issues as grades, rewards, performance, and competition. The third scale, task value, contains six questions. Pintrich et al. define task value as a student's evaluation of how interesting, important and useful the task is. A student with a high task value would have a more active approach to learning, and would have a higher perception of the interest, importance, and utility of the course material. The fourth scale, control of learning beliefs, contains four questions. Students with a higher level of belief in their own control of learning would result in a more positive outcome. If a student believes that their efforts in a class will make a difference in the learning process, they will be more likely to put forth the effort that will lead to a more productive learning experience. Eight questions are in the fifth scale, self-efficacy for learning and performance. This scale assesses two aspects of expectancy: expectancy for success and self-efficacy. Expectancy for success refers to task performance confidence and self-efficacy relates to the belief that a student has the skills and ability necessary to master a task. There are five questions in scale six, test anxiety. Text anxiety has two components: a cognitive and an emotional component. The cognitive component relates to the negative thoughts that a student may experience during

the taking of a test, while the emotional component deals with the physiological reactions to anxiety.

The motivational portion of the MSLQ was tested by Pintrich et al. (1991), for factor validity by running a confirmatory analysis. The authors tested the 31 motivation items to see how well they fit into the six latent factors. The goodness of fit indices are noted as “reasonable values” (p. 79), particularly since the survey was tested across a range of course and subject areas. Lambda-Ksi estimates were used to determine covariances between the latent constructs – a value of .8 or higher was noted as well defined. The authors admit that the results could change depending on factors such as course characteristics, teacher demands, and individual student characteristics; however, they claim a sound structure and factor validity for the MSLQ scales. See Appendix D for Lambda-Ksi estimates.

Other External Validity

Fall semester 2009, the term used in this study, was the first semester a survey was administered at the local community college to gather information on the factors that relate to a student’s performance in an online class. Since no reliability data was available, the college reached out to surrounding North Carolina community colleges who offer the same course with the same learning objectives, asking them to review the survey and provide feedback on how well they believe it would predict a student’s performance in an online community college class. One faculty member expressed that her local college is using a similar survey to pretest students for entry into online classes. Another faculty member requested that the survey be given to his students, and an administrator stated that he had concerns in the same three areas of demographics, technology, and motivation regarding the students that are enrolling in online courses at his local college. This feedback provided

reassurance to the researcher that the local areas of concern are also being experienced by other faculty and administrators in community colleges across the state.

Rationale for the Design

Demographics, technology experience, and self motivation are the independent variables in this study. Experience with technology and online education in the community college setting led the researcher to choose these three variables. First, the demographic data were used to test the issue that nontraditional students experience different levels of success in an online course. Because community college students are primarily classified as nontraditional (Wirt et. al, 2002), these data were used to address whether or not the nontraditional student performs as well in the online environment (Noble, 2002; Phipps & Merisotis, 1999). Second, since confidence with technology is a primary factor affecting student achievement in technology and online classes (Osborn, 2001) combined with the fact that 11% of community college students taking credit courses have never used the internet (Phillippe & Valiga, 2000), it may be possible that a lack of experience with technology influences success. Third, it is reported by Allen and Seaman (2005) that 80% of community college administrators agree that students need more discipline to succeed in an online course than in a traditional seated course. Because the student and instructor are separated, the student must bear greater responsibility for learning. After a review of relevant literature, these three variables were chosen due to the lack of research using this particular combination.

The dependent variable in this study is student performance which is being measured by the student's score on a standardized final examination. The standardized assessment is currently used by the college as a culminating measure to determine overall levels of student

success in the course being studied to evaluate the learning objectives for college accrediting agencies. The final exam for CIS 110 – Introduction to Computers is a 100-question multiple choice test that was cooperatively developed by members of the Information Technology Department at Gaston College. This panel of technology experts represented over 100 years of experience working and teaching in the field of computers and technology, and each of them had taught one or more sections of the course used in this study for multiple semesters. After developing specific course learning objectives, the panel selected the questions that they felt could effectively measure the level at which these objectives are being met during the class. Each course offered is measured every semester and the outcomes are reviewed biannually.

Role of the Researcher and Ethical Considerations

As both Dean of the division in which CIS - Introduction to Computers is offered and the Chief Distance Education Officer for Gaston College, the researcher was diligent in maintaining a separate role during this study, focusing on the collection and analysis of data. Personal bias can affect the entire research process throughout the collection of data, analysis, and reporting of findings.

Additional steps were taken to assure participating faculty and students that the researcher's role in this project is one of research only and participation was voluntary with no penalty for nonparticipation. Faculty were asked to post the electronic copy of the instrument on the Learning Management System (Blackboard) during the fall semester 2009. Students were asked to complete the survey during the subsequent period. Survey data were collected at the conclusion of that time. Neither the faculty nor the students were required to post or complete the survey.

Data Collection Procedures and Protocol

Gaston College in Dallas, North Carolina was chosen for the site of this study.

Gaston College is a public community college that provides educational opportunities for students in both Gaston and Lincoln Counties in the western region of North Carolina. Both traditional and nontraditional students attend the college in the seated and online course format.

The survey was administered during fall semester 2009 to students enrolled in CIS 110 – Introduction to Computers. This course introduces computer concepts and software and is required in many of the college associate degree programs. Students that are planning to transfer to four-year universities are also enrolled. Thirty-six sections were offered during the semester, 18 in the seated format with a one hour web component and 18 online, with a total potential enrollment of 900 students. After registration ended and enrollment was verified for the term, 720 unduplicated students were enrolled in the course.

The 68-question survey was available online to each student enrolled in both the online and seated courses. Students were encouraged to participate but allowed to decline. The first 9 questions obtained categorical data. Both the Online Technologies Self-Efficacy Survey and the Motivated Strategies for Learning Questionnaire had Likert-type response choices. Scores from the standardized final assessment were obtained at the end of the semester from college records.

The results of the surveys and college data were used to determine which combination of the independent variables can predict student performance in the course with a focus on online delivery. The data were analyzed using the Social Package for the Social

Sciences (SPSS) Version 17. Multiple regression, correlation, and descriptive analysis were employed to determine the best set of predictor variables.

Participant Selection

The latest data from the North Carolina Community College System (NCCCS, 2008) show that in 2006-07, over 30% of curriculum students in the state were enrolled in some form of distance education, an increase of 25% over the previous academic year. During the 2009-08 academic year, 27% of curriculum students at Gaston College were enrolled in a course where the majority of instruction was conducted over the internet (Gaston College, 2009). With an average age of 27 years, a majority of these students are considered nontraditional. It is important for community college administrators, faculty, and students to be aware of the factors that contribute to success in the online environment.

Students who take CIS 110 – Introduction to Computers, are enrolled in both two-year associate degree and general college transfer programs. The course is popular and a large number of sections are offered each semester in both the traditional and online format. The fall 2009 enrollment of 720 students is an adequate representation of the general student population of Gaston College, with 11% of the total college enrollment of 6500.

Data Analysis and Coding

The survey items were analyzed using a correlational research design, particularly multiple regression, which allows a researcher to glean information about the relationship between several independent variables and a dependent variable (Fraenkel & Wallen, 1990). “When a correlation is found to exist between two variables, it means that scores within a certain range on the one variable are associated with scores within a certain range on the other variable” (p. 275). Correlations can either be negative or positive. A positive

correlation is represented by high scores on one variable associated with high scores on another, or with low scores on one variable associated with low scores on another.

Conversely, a negative correlation is represented by high scores on one variable associated with low scores on the other, or vice versa. If a relationship does exist, it becomes possible to predict a score on one of the variables knowing the value of another. The variable that is used to make the prediction, the predictor variable, is represented by the survey data being collected. The variable about which the prediction is made, the criterion variable, is represented by the student's performance on the standardized final assessment. As part of the data analysis, these variables were identified and correlation coefficients produced to help determine the relationship between them. These coefficients were also used to check the reliability and validity of the scores obtained from the survey instrument. Multiple regression was used to determine the best combination of two or more of the predictor variables and their correlation to the criterion variable.

Trustworthiness of the Results

Reliability is defined as “the degree with which the scores on the survey instrument are consistent with what each section of the instrument is suppose to measure” (Fraenkel & Wallen, 1990, pg. G-7). The trustworthiness of the results of this study is affected by several factors. External validity is imperfect since the results are limited to students in only one community college. Internal validity is restricted due to the representation of only one course within the institution and the fact that the study was only conducted during one semester. Given the number of variables that could relate to student success in the online course environment, this study focuses only on a few. Since participation was voluntary, the number of responses were not guaranteed. Additionally, the data that were gathered were

assumed to be accurate in terms of student responsiveness. Because the learning objectives for CIS 110 - Introduction of Computers are the same regardless of mode of delivery, the results assume that students in the online and seated classes were exposed to the same material during the course of their studies and that the teaching methods in all courses were similar.

Summary

This chapter provided an overview of the procedures and methodology used in this study. The chapter included the research questions and design, along with the procedures used for data collection and analysis. Chapter 4 reports the findings of the data analysis including descriptive statistics.

CHAPTER 4: RESULTS

The purpose of this study was to examine how entry characteristics of demographics and background (including age, gender, marital status, employment status, number of children, and student status), technology self-efficacy, and motivation relate to a student's performance in an online community college class. The following four research questions guided the study:

1. To what extent do demographic and educational characteristics of age, gender, marital status, employment status, number of children, and student status predict student performance on a standardized final assessment in an entry level technology course?
2. To what extent do technology skills predict student performance on a standardized final assessment in an entry level technology course?
3. To what extent does level of self motivation predict student performance on a standardized final assessment in an entry level technology course?
4. Do predictors for online class success differ from those for success in traditional seated classes?

In this chapter, the descriptive statistics and findings are presented based on the collected data. The Statistical Package for the Social Sciences (SPSS) Version 17 was used to conduct the statistical analyses.

Descriptive Statistics

A survey was administered during fall semester 2009 to students enrolled in CIS 110 – Introduction to Computers. Thirty-six sections were offered, with a possible enrollment of 900 students. Eighteen of the sections were in the online format and 18 sections were offered as seated classes with a one-hour online component. After registration ended and enrollment was verified for the term, 720 unduplicated students were enrolled in the course.

The 68-question survey was made available online and offered to all enrolled students. While they were encouraged to participate, there was no penalty for nonparticipation. Four hundred and one students completed the survey, for a participation rate of 56%. Forty-two of the surveys were unusable due to invalid student identification data, which was required to compare survey results to student performance on the final exam. The final participation rate was 368 or 51%. Two hundred and fifty-one, or 65% of students in the seated sections participated, while 117 or 35% of students in the online sections completed the survey. Thirteen of the students in the seated sections and 6 students in the online sections that participated dropped or withdrew from the course and did not take the final exam; therefore, their answers to the survey were not included in the analysis. The final population size (N) for the sample was 349, with online and seated student participation at 111 and 238 respectively. Table 1 presents the demographics of the sample.

Table 1. Demographics of Sample, $N = 349$

Demographic		Online	Seated	Total Sample %
Gender	Female	77%	66%	69%
	Male	23%	34%	31%
Age	Younger than 25	49%	58%	54%
	25 – 29	9%	10%	10%
	30 – 39	20%	12%	15%
	40 – 49	22%	15%	17%
	50 or older	0%	5%	4%
Marital Status	No	62%	73%	69%
	Yes	38%	27%	31%
Hours worked each week	0 – 9	43%	48%	47%
	10 – 19	10%	14%	13%
	20 – 29	15%	16%	15%
	30 – 39	11%	12%	12%
	40 or more	21%	10%	13%
Dependents	No	48%	62%	57%
	Yes	52%	38%	43%
Courses enrolled	1	8%	6%	7%
	2	15%	6%	9%
	3	20%	13%	16%
	4	36%	61%	52%
	5 or more	21%	14%	16%
How long since college?	Last semester	38%	33%	35%
	Within last year	12%	8%	9%
	1 – 5 years	13%	6%	8%
	6 – 10 years	4%	4%	4%
	Over 10 years	9%	7%	7%
	Never	24%	42%	37%
Online courses taken	0	56%	70%	66%
	1	9%	14%	13%
	2	14%	7%	9%
	3	10%	5%	6%
	4	3%	1%	2%
	5 or more	8%	3%	4%

A standardized final examination is given to all students in CIS 110 at the end of each semester and was used to measure student performance in this study. The 100-question evaluation instrument is available in Appendix F. Table 2 presents the statistics associated with the instrument administered during the fall semester 2009.

Table 2. Statistics of Standardized Final Assessment

Students	Mean	Standard Deviation
Seated Sections	79.04	10.160
Online Sections	93.47	2.620
Overall	86.34	6.364

Reliability of the Final Evaluation Instrument

The college uses a final examination instrument to assist in the evaluation of the overall level of student success in the course being studied to determine if the learning objectives are being met. The final assessment in CIS 110 – Introduction to Computers is a 100-question multiple choice test that was cooperatively developed by faculty within the Information Technology Department at Gaston College. The panel of experts represented over 100 years of experience working and teaching in the field of computers and technology, and each of them had taught the course used in this study multiple times over multiple semesters. The students' score on the final examination is the dependent variable in this study while demographics, technology experience, and self motivation are the independent variables.

The internal consistency of the dependent variable as a measure of student success was analyzed using Cronbach's alpha, a statistic that is commonly used to prove reliability of such an instrument. Cronbach's alpha measures the internal consistency of test scores over different parts of an instrument, producing pairwise correlations between items on the

exam in the form of a number between zero and one (Fraenkel & Wallen, 1990). A reliability rating in the range of 0.6-0.7 is generally considered acceptable, while 0.8 or higher is considered good. Reliabilities of 0.95 or higher are not desired, since a level this high may indicate redundancy. The instrument in this study has an internal consistency of .900. This alpha coefficient was obtained through an analysis of the detailed data from 393 examinations completed at the end of fall semester 2009, the term used in this study.

The comprehensive final exam contains questions that measure the level at which 6 primary learning outcomes are being met including: 1) proper use of terminology in relation to information technology, 2) identification of legal, ethical, social, and security issues related to the different areas of information technology, 3) utilization of current software packages and operating systems, 4) understanding of computer hardware including the categories of computers, input devices, printers, storage, and communication devices, 5) explanation of how to access and connect to the Internet, how to view pages and search for information on the Web and, 6) an understanding of the interrelationship between hardware, application software, system software, and servers. Table 3 presents the course learning outcomes, the corresponding exam questions that measure each outcome, and the calculated reliability of the exam questions used to measure the indicated outcome.

Table 3. CIS 110 – Course Learning Outcomes

		Reliability
Final Exam Overall Alpha Coefficient		.900
Learning Outcome	Exam Question for Outcome Measurement	
Proper use of terminology in relation to information technology	1, 3, 4, 9, 14, 15, 24, 33, 39, 65, 69, 70, 71, 72, 75, 77, 78, 80, 97, 100	.712
Identification of legal, ethical, social, and security issues related to the different areas of information technology	56, 87, 88, 89, 90, 91, 92, 93, 95, 96	.617
Utilizing current software packages and operating systems	13, 21, 22, 23, 30, 31, 32, 34, 35, 36, 37, 81, 82, 83, 84, 85, 86, 98, 99	.638
Understanding computer hardware including the categories of computers, input devices, printers, storage, and communication devices	38, 40, 41, 42, 43, 44, 45, 46, 48, 49, 50, 51, 52, 53, 54, 55, 57, 58, 59, 60, 63, 64, 94	.665
Explaining how to access and connect to the Internet, how to view pages and search for information on the Web	5, 6, 7, 8, 16, 17, 18, 19, 20, 25, 26, 27, 28, 29, 73, 74, 76	.466
Explaining how to access and connect to the Internet, how to view pages and search for information on the Web	2, 10, 11, 12, 47, 61, 62, 66, 67, 68, 79	.404

Analysis of the independent variables of demographics, technology experience, and self motivation as they relate to the final exam are presented in the following sections.

Demographics

A one-way ANOVA statistical test was used to determine the extent that the demographic and educational characteristics of gender, age, marital status, employment status, number of children, and student status relate to student performance on a standardized final assessment in an entry level technology course in a local community

college. The results of the tests of the online and seated classes are provided at $p < .05$ in Appendix G.

There were no significance relationships between any of the categories of demographics in the seated classes and the performance on the final exam; however, in the online classes there were differences in age and length of time since the student had attended college prior to the current semester. The Tukey post hoc test provided the following significance differences based on age in the online classes.

Table 4. Multiple Comparison of Age ($N=9$)

Group 1	Group 2	Sig.
25 – 29 years of age	30 - 39 years of age	.048
25 – 29 years of age	40 – 49 years of age	.024

The low response rate in the 25 – 29 age category ($N=9$, 8%) is a distinct limitation of this statistic; therefore, it cannot be trusted to provide valid data.

The Tukey post hoc test also provided the following significance differences in the online classes based on length of time since the student had attended college prior to the current semester.

Table 5. Multiple Comparison of Last College ($N=4$)

Group 1	Group 2	Sig.
6 – 10 years since college	Last semester since college	.004
6 – 10 years since college	Within the last year since college	.027
6 – 10 years since college	1 – 5 years since college	.005
6 – 10 years since college	Over 10 years	.004
6 – 10 years since college	First semester in college	.037

The low response rate in the 6 – 10 years since college ($N=4$, 4%) is also a limitation of this statistic and thus cannot be trusted to provide valid data.

Technology

A Pearson correlation was conducted to determine the level that technology skills relate to student performance on a standardized final assessment in an entry level technology course in a local community college using the 28 technology-based responses from the survey. The results of the tests of the online and seated classes are provided below. Table 6 reports the results of the analysis at $p < .05$.

Table 6. Correlation: Technology

	Online, N=111		Seated, N=238	
	<i>r</i>	Sig.	<i>r</i>	Sig.
Open Browser	-0.127	0.185	-0.101	0.119
Read text from web site	-0.254	*0.007	-0.048	0.464
Link to a web site	-0.200	*0.036	0.058	0.374
Type URL to a web site	-0.136	0.157	-0.006	0.930
Bookmark a web site	-0.229	*0.016	-0.096	0.141
Print a web site	-0.118	0.221	-0.031	0.632
Conduct internet search	-0.128	0.184	-0.115	0.075
Download image from web site	-0.147	0.125	-0.027	0.681
Copy and paste text from a Web site	-0.079	0.412	-0.088	0.175
Use nickname in a chat room	-0.135	0.160	0.025	0.704
Read messages from a chat room	-0.112	0.244	-0.007	0.913
Answer messages from a chat room	-0.045	0.638	0.001	0.994
Interact in private chat room	-0.003	0.979	0.003	0.967
Logging on and off an e-mail system	0.000	*0.000	-0.077	0.234
Send an e-mail to one person	-0.005	0.958	-0.017	0.790
Send an e-mail to more than one person	-0.104	0.278	-0.037	0.571
Reply to an e-mail	-0.005	0.958	-0.010	0.882
Forward an e-mail	-0.117	0.064	-0.022	0.738
Delete e-mail	-0.348	*0.000	-0.003	0.959
Create address book	-0.068	0.483	-0.052	0.425
Save and view a file from an e-mail	-0.297	*0.002	-0.082	0.207
Attaching a file to an e-mail and send	-0.157	0.102	-0.041	0.530
Sign on and off Blackboard	-0.211	*0.027	0.006	0.930
Post a message to a discussion board	-0.239	*0.012	-0.006	0.927
Read a message on a discussion board	-0.257	*0.007	-0.055	0.396
Reply to a message on a discussion board	-0.219	*0.021	-0.017	0.795
Download a file from Blackboard	-0.235	*0.013	-0.087	0.179
Upload a file to Blackboard	-0.372	*0.000	-0.07	0.282

Note. * indicates significance.

None of the factors indicated a significant difference in the success of students in the seated course; however, 11 factors were significant for the online students. (Logging on and off an e-mail system was not used in further data analysis because all online students answered that they were “very confident” with the process.) A Likert-type response was used for this portion of the survey with 1 representing “Very Confident,” 2 representing “Somewhat Confident,” 3 representing “Not Very Confident,” and 4 representing “Not Confident At All.” Table 7 shows the correlational direction and significance of each of these 9 factors.

Table 7. Significant Technology Factors: Online

Survey Item	<i>r</i>	Sig.
Read text from web site	-0.254	0.007
Link to a web site	-0.200	0.036
Bookmark a web site	-0.229	0.016
Delete e-mail	-0.348	0.000
Save and view a file from an e-mail	-0.297	0.002
Sign on and off Blackboard	-0.211	0.027
Post a message to a discussion board	-0.239	0.012
Read a message on a discussion board	-0.257	0.007
Reply to a message on a discussion board	-0.219	0.021
Download a file from Blackboard	-0.235	0.013
Upload a file to Blackboard	-0.372	0.000

Each of these factors indicates a negative correlation with the final exam grade suggesting that the less confident online students were with each of the 11 factors, the lower their final exam grade.

Motivation

Using the 31 motivation-based responses from the survey, a Pearson correlation was also conducted to determine the level that motivation relates to student performance on a standardized final assessment in an entry level technology course in a local community

college. The results of the test of the online and seated classes are provided in Table 8 reporting at $p < .05$.

Table 8. Correlation: Motivation

	Online, <i>N</i> =111		Seated, <i>N</i> =238	
	<i>r</i>	Sig.	<i>r</i>	Sig.
I prefer class work that is challenging so I can learn new things.	-0.323	*0.001	0.000	0.995
If I study, I will be able to learn the material in this class.	-0.056	0.566	-0.053	0.416
When I take a test I think about how poorly I am doing compared with other students.	0.126	0.196	0.117	0.072
I think I will be able to use what I learn in this course in other courses.	-0.035	0.724	-0.091	0.164
I believe I will receive an excellent grade in this class.	-0.238	*0.014	-0.111	0.088
I'm certain I can understand the most difficult material presented in the readings for this course.	-0.275	*0.004	-0.031	0.632
Getting a good grade in this class is the most satisfying thing for me right now.	0.170	0.081	0.048	0.465
When I take a test I think about items on other parts of the test I can't answer.	-0.022	0.821	0.012	0.858
It is my own fault if I don't learn the material in this course.	-0.060	0.538	-0.028	0.674
It is important for me to learn the course material in this class.	0.001	0.995	0.018	0.788
The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.	0.206	*0.033	-0.026	0.688
I'm confident that I can learn the basic concepts taught in this course.	-0.335	*0.000	-0.028	0.666
If I can, I want to get better grades in this class than most of the other students	0.120	0.217	-0.060	0.355
When I take tests I think of the consequences of failing.	-0.013	0.891	-0.037	0.576
I'm confident I can understand the most complex material presented by the instructor in this course.	-0.157	0.105	-0.051	0.437
In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.	-0.178	0.067	-0.062	0.343
I am very interested in the content area of this course.	-0.121	0.214	-0.020	0.764
If I try hard enough, then I will understand the course material.	-0.106	0.279	-0.098	0.135
I have an uneasy, upset feeling when I take an exam.	0.192	0.047	0.114	0.079
I'm confident I can do an excellent job on the assignments and tests in this course.	-0.229	*0.018	-0.021	0.750

Table 8 (continued)

	Online, <i>N</i> =111		Seated, <i>N</i> =238	
	<i>r</i>	Sig.	<i>r</i>	Sig.
I expect to do well in this class.	-0.180	0.063	-0.051	0.435
The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.	0.016	0.867	-0.118	0.070
I think the course material in this class is useful for me to learn.	0.049	0.617	-0.100	0.124
When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade.	0.033	0.739	0.043	0.511
If I don't understand the course material, it is because I didn't try hard enough.	-0.190	0.050	0.001	0.990
I like the subject matter of this course.	-0.061	0.533	-0.002	0.980
Understanding the subject matter of this course is very important to me.	0.070	0.471	-0.052	0.430
I feel my heart beating fast when I take an exam.	0.224	*0.020	0.123	0.059
I'm certain I can master the skills being taught in this class.	-0.134	0.170	-0.087	0.186
I want to do well in this class because it is important to show my ability to my family, friend, employer, or others.	0.211	*0.029	0.009	0.794
Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.	-0.251	*0.009	-0.120	0.066

Note. * indicates significance.

None of the factors indicated significant relationships in the success of students in the seated courses; however, nine factors were significant for the online students. In the case of motivation, some of the factors represent a positive correlation and others a negative correlation. A Likert-type response was used for this portion of the survey with 1 representing "Always True of Me," 2 representing "Often True of Me," 3 representing "Sometimes True of Me," 4 representing "Rarely True of Me," and 5 representing "Never True of Me." Table 9 shows the correlational direction and significance of each of these nine factors.

Table 9. Significant Motivation Factors: Online

Survey Item	<i>r</i>	Sig.
I prefer class work that is challenging so I can learn new things.	-0.323	0.001
I believe I will receive an excellent grade in this class.	-0.238	0.014
I'm certain I can understand the most difficult material presented in the readings for this course.	-0.275	0.004
The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.	0.206	0.033
I'm confident that I can learn the basic concepts taught in this course.	-0.335	0.000
I'm confident I can do an excellent job on the assignments and tests in this course.	-0.229	0.018
I feel my heart beating fast when I take an exam.	0.224	0.020
I want to do well in this class because it is important to show my ability to my family, friend, employer, or others.	0.211	0.029
Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.	-0.251	0.009

Stepwise multiple regression was used to identify the best combination of significantly related student characteristics that could be used to further predict student success in a community college online class. Since none of the factors identified in the survey were related to success in the seated sections, no predictive statistics were completed on seated section results. The 11 significant technology factors in addition to the nine significant motivation factors from the online classes were analyzed, but none of the demographic characteristics were included since they indicated no significance as a result of the one-way ANOVA analysis previously conducted. Three separate regression analyses were conducted; all significant technology and motivation variables together, significant technology factors only, and significant motivation factors only.

In an analysis of all significantly-related variables including both technology and motivation variables, the three predictors of uploading a file to Blackboard, deleting an e-mail, and reading a message on a discussion board resulted in an adjusted coefficient of

determination (r^2) of .250 which indicates that the predictors explain 25% of the variance on the final exam outcome. Although Model 3 does not have the largest F value, it explains the most variation, indicating that the score on the final exam may be predicted by the combination of these three variables. The results are shown at $p < .05$ in Table 10.

Table 10. Results of Stepwise Regression: Technology and Motivation

	Predictor Variable (s)	r^2	Adjusted r^2	F	Sig.	B	Beta
Model 1	(Constant)	.136	.128	16.420	.000	101.818	
	Upload a file to Blackboard					-10.225	-.369
Model 2	(Constant)	.243	.228	16.505	.000	184.244	
	Upload a file to Blackboard					-9.677	-.349
	Delete an e-mail					-82.445	-.327
Model 3	(Constant)	.271	.250	12.649	.000	201.616	
	Upload a file to Blackboard					-8.274	-.299
	Delete an e-mail					-84.030	-.333
	Read a message on a discussion board					-17.008	-.176

In each of these cases, the regression coefficient was negative, indicating that there is an inverse correlation between how confident a student feels about their ability to perform these tasks and their score on the final exam. Because of the direction of the scale of the survey items, the inverse correlation suggests that a higher level of confidence resulted in a higher score.

In an analysis of the 11 significant technology variables, the three predictors of uploading a file to Blackboard, deleting an e-mail, and reading a message on a discussion board resulted in an adjusted coefficient of determination (r^2) of .252. Again, Model 3 does not have the largest F value, but it does explain the most variation, indicating that the score on the final exam may be predicted by the combination of these three technology variables. The correlation indicates that in all three cases, the more confident students were with their technical ability, the better they performed on the final exam. The results are shown at $p < .05$ in Table 11.

Table 11. Results of Stepwise Regression: Technology

	Predictor Variable (s)	r^2	Adjusted r^2	F	Sig.	B	Beta
Model 1	(Constant)	.139	.131	17.395	.000	102.062	
	Upload a file to Blackboard					-10.302	-.372
Model 2	(Constant)	.244	.230	17.314	.000	184.530	
	Upload a file to Blackboard					-9.742	-.352
	Delete an e-mail					-82.523	-.326
Model 3	(Constant)	.273	.252	13.255	.000	201.905	
	Upload a file to Blackboard					-8.334	-.301
	Delete an e-mail					-84.105	-.332
	Read a message on a discussion board					-17.027	-.176

In an analysis of the nine significant motivation variables, the three predictors result in an adjusted coefficient of determination (r^2) of .171. Table 12 describes each of these variables and their corresponding abbreviation.

Table 12. Abbreviations of Motivation Variables

Motivation Variable	Abbreviation
I'm confident that I can learn the basic concepts taught in this class.	Learn Basics
I believe I will receive an excellent grade in this class.	Overall Grade
I prefer classwork that is challenging so I can learn new things.	Prefer Challenge

Model 3 explains the most variation, indicating that the score on the final exam may be predicted by the combination of these three variables, with an adjusted coefficient of determination (r^2) of 17%. The results are shown at $p < .05$ in Table 13.

Table 13. Results of Stepwise Regression: Motivation

	Predictor Variable	r^2	Adjusted r^2	F	Sig.	B	Beta
Model 1	(Constant)	.112	.103	13.057	.000	109.132	
	Learn Basics					-18.651	-.334
Model 2	(Constant)	.158	.141	9.633	.000	100.243	
	Learn Basics					-18.824	-.337
	Overall Grade					5.297	.215
Model 3	(Constant)	.194	.171	8.207	.000	108.059	
	Learn Basics					-14.257	-.255
	Overall Grade					4.893	.198
	Prefer Challenge					-6.020	-.209

These results indicate that the more a student believes in their ability to learn the concepts in the class, the higher their grade will be on the final exam. Likewise, students who prefer a challenge also do well. Conversely, the less a student believed they would

receive a good grade in the class as a whole, the better they performed on the final examination.

Summary

In Chapter 4, the descriptive statistics of the sample were presented. Information regarding the reliability of the dependent variable, the final assessment, was discussed. The ANOVA testing and results used to analyze the demographic and educational characteristics were described. Correlations were computed for the predictor variables of technology and motivation and items were determined to be included in the stepwise multiple regression model. The results of the regression analysis were presented. Chapter 5 includes a summary of the findings, conclusions, and recommendations for future research.

CHAPTER 5: FINDINGS, CONCLUSIONS, & RECOMMENDATIONS

This chapter summarizes the findings of the study, presents conclusions, and makes recommendations for further research. The conclusions are presented to suggest ways to increase the success rate of online students. Assumptions made in conducting the study are listed and discussed. Limitations are discussed as they relate to the findings of the study.

Summary of Findings

The purpose of this study was to examine how entry characteristics of demographics and background (including age, gender, marital status, employment status, number of children, and student status), technology self-efficacy, and motivation predict a student's performance in an entry-level community college class. The predictors were then used to identify whether or not likely differences exist in the characteristics between the seated and online sections of the course. Demographics, technology self-efficacy, and motivation were the independent variables in this study, while student performance on the standardized final exam was the dependent variable.

The sample included 349 enrolled during fall 2009 in 36 sections of CIS 110 – Introduction to Computers. Eighteen of the sections were offered completely online and 18 sections were offered in the seated format with a one-hour online component. The survey was completed by 111 of the students in the online sections and 238 of the students in the seated sections. The majority of all students (69%) were female, were younger than 25 years of age (54%), unmarried (69%), worked 0 – 9 hours per week (47%), did not have dependents (57%), were enrolled in 4 courses during the semester (52%), had never attended

college (37%), and had never taken an online course before (66%). Of the students in the online sections, 77% were female, 49% were younger than 25 years of age, 62% were unmarried, 43% worked 9 or less hours per week, 52% had dependents, 36% were taking a total of 4 courses, 38% were enrolled last semester, and 56% had never taken an online course.

The 68-question instrument used in the study had three components; a 9-question demographic component, a 28-question technology self-efficacy section, and a 31-question section on motivation. A one-way ANOVA was used to determine if any of the demographic characteristics could be used to predict success in the class at $p < .05$. Pearson's correlation was used at $p < .05$ to determine if technology self-efficacy or motivation significantly correlated with student success. Once significance was identified for any of the variables, stepwise multiple regressions were used to determine which combination of student characteristics could best predict student success in a community college class and whether or not those characteristics were different for students in the seated and online sections.

The following sections will present the research findings based on the first three research questions: 1) To what extent do demographic and educational characteristics of age, gender, marital status, employment status, number of children, and student status predict student performance on a standardized final assessment in an entry level technology course? 2) To what extent do technology skills predict student performance on a standardized final assessment in an entry level technology course? 3) To what extent does level of self motivation predict student performance on a standardized final assessment in an entry level technology course? Findings related to question 4 - Do predictors for online class success

differ from those for success in traditional seated classes? - will be integrated into each of these three sections.

Question One: Demographics

The results of the survey indicated that among all demographic and educational variables, only two variables, age and time since college, could possibly be used as predictors. In the Tukey post hoc comparison for age, a .048 significance between the 20 – 29 age group and the 30 – 39 age group was found, as well as a .024 significance between the 20 – 29 age group and the 40 – 49 age group. The number of respondents in the 20 – 29 age group ($N=9$, 8%), makes the data untrustworthy; therefore, these results were not used in the stepwise logistic regression analysis. The same was true for years since college. The Tukey post hoc comparison revealed the following: a .004 significance between those that had been out of school 6 – 10 years and those that attended college last semester; a .027 significance between those that had been out of school 6 – 10 years and those that had been in college within the last year; a .005 significance between those that had been out of school 6 – 10 years and those that attended college 1-5 years ago; a .004 significance between those that had been out of school 6 – 10 years and those that attended college over 10 years ago; and a .037 significance between those that had been out of school 6 – 10 years and those that had never attended college prior to the semester used in the study. The number of respondents in the 6 – 10 years since college group ($N=4$, 4%), also makes the data untrustworthy. Therefore these predictors were not used in the stepwise multiple regression analysis.

There are many studies that use demographics as a predictor of community college student success with varying results, particularly in online courses (Halsne & Gatta, 2002;

Menager-Beeley, 2001; Noble, 2002; Phipps & Merisotis, 1999; Ross & Powell, 1990; Rovai & Baker, 2005; Wojciechowski & Bierlein-Palmer, 2005). The demographics used in this study are among the most often used predictors.

The results of this study indicated that the demographics of age, gender, marital status, employment status, number of children, and student status were not significant predictors of student performance on the standardized final assessment. Community college students are primarily classified as nontraditional, which Wirt et.al (2002) define as being 25 years of age or older with at least one nontraditional characteristic including delayed enrollment in postsecondary education, part-time attendance for some part of the year, full-time employment while enrolled, being financially independent, having dependents other than a spouse, being a single parent, or having no high school diploma or equivalent. Studies by Noble (2002) and Phipps and Merisotis (1999) found that students defined as nontraditional do not perform as well in the online environment.

While the results of this study contradict those of previous studies that have been conducted at community colleges, the participants of the survey may have had an impact on these findings. For example, while over 51% of the students in the North Carolina Community College System (NCCCS) are over the age of 24, 54% of the participants in this study were younger than 25. Waits and Lewis (2003) report that nearly two-thirds of community college students attend college part time and 50% work full time, but the majority of the participants in this study were taking 4 or more classes and worked less than 10 hours per week. Halsne and Gatta (2002), Ross and Powell (1990), Rovai and Baker (2005), and Wojciechowski and Bierlein-Palmer (2005) found that online students were more likely to be female with work responsibilities. Congruent with these studies, 77% of

the participants in the online classes in this study were women, although only 47% of them worked 20 hours per week or more. Sixty-six percent of the participants in this study had never taken an online class before. This contradicts findings by Menager-Beeley (2001) and Wojciechowski and Bierlein-Palmer (2005) that contend that success in previous online courses is a predictor of future online course success.

The anomaly in the demographics reported in this study may be affected by the economic conditions and an all-time record local college enrollment. During tumultuous economic times, community college enrollment increases for two reasons. First, the cost of tuition is lower as compared to public and private universities. Financial situations cause many parents to make the decision to send their high school graduates to the local community college instead of incurring the expense of a four-year institution (Green, 2009). Second, many older adults have been forced to return to school after being laid off from their jobs in local industry. Government subsidies pay for them to retrain at the community college and many federal and state programs require them to enroll full time. Because of their lack of experience in higher education, these students are reluctant to enroll in online classes.

Question Two: Technology

The results of the 28-question technology survey taken by students in the seated section of the class indicated no significance at the $p < .05$ level; therefore, technology self-efficacy does not significantly correlate to the success of students in the traditional class setting. A Pearson correlation of the survey results from the students in the online section revealed 12 of the 28 factors, or 43%, were of significance. One of these factors, logging on and off an e-mail system, was removed from further analysis because all online students

answered that they were “very confident” with the process resulting in a Pearson correlation coefficient of $r=1$.

Each of the 11 remaining factors indicated a negative correlation with the final exam grade. A four-point Likert-type scale was used for the technology portion of the survey, with 1 representing “Very Confident,” 2 representing “Somewhat Confident,” 3 representing “Not Very Confident,” and 4 representing “Not Confident at All.” The correlation results indicate that the more confident an online student is with each of these factors, the higher the score will be on the final assessment. In summary, the significant factors can be grouped into three categories: the ability to access, use, and bookmark a web site, the ability to use e-mail, and the ability to use the course delivery system.

The 11 technology variables gleaned from the Pearson correlation were analyzed using stepwise multiple regression to identify the best combination of technology-related characteristics that could be used to further predict student success in an online class. The combination of uploading a file to Blackboard, deleting an e-mail, and reading a message posted on a discussion board resulted in an adjusted coefficient of determination (r^2) of .250, explaining 25% of the variation in students’ grades on the final examination.

According to the results of this study, technology does have an impact on student success in online courses. Out of the 28 technology factors, 11 or 36% proved to be significant. This is congruent with studies conducted by Egan and Akdere (2004) and Lim (2001). Lim found that the lack of knowledge of technology was directly related to online student success since a student’s technology self-efficacy, defined as a person’s belief in their own ability to use computers and learn new computer skills, can affect their online educational experience. In Egan and Akdere’s study in 2004, 57 competencies and their

affect on online course success were examined, finding basic computer operation skills and access to be the two most important factors. Levy's (2003) review of literature noted technology training as one of the six factors a college should consider before offering a course online.

Miltiadou and Yu (2000), developers of the Online Technology Self-Efficacy Survey (OTSES) used in this study, found that during spring semester 2000, there was a strong relationship between technology self-efficacy and the final grade of 330 students. Both Wang and Newlin (2002) and Corbeil (2003) reported similar results with the OTSES.

A level of comfort with technology is important to online course success. The basic premise of online learning requires the student to be familiar with basic computer operations. The significant factors gleaned from this study seem to relate directly to a student's ability to access the required online course material including: the ability to access, use, and bookmark a web site, the ability to use e-mail, and the ability to use the course delivery system. These activities seem to be fundamental to a successful online experience. College administrators concerned with student success must continue to consider the technology access and abilities of those who enroll in online classes.

As part of the stepwise multiple regression process, all significantly-related variables including both technology and motivation variables were analyzed, resulting in the three predictors of uploading a file to Blackboard, deleting an e-mail, and reading a message on a discussion board explaining the most variation in the final examination scores overall with an adjusted coefficient of determination (r^2) of .250. These are the same three variables that explained 25% of the variation in the technology factors alone. Results from the

combination stepwise regression analysis further strengthen the idea that a level of confidence with technology is important to online student success.

Question Three: Motivation

The results of the 31-question motivation survey taken by students in the seated section of the class indicated no significance at the $p < .05$ level; therefore, in this study motivation did not seem to make a difference in the success of students in the traditional class setting. A Pearson correlation of the survey results from the students in the online section revealed 9 of the 31 factors, or 29%, were of significance.

Stepwise multiple regression was used to analyze the nine variables to identify the best combination of motivational characteristics that could be used to further predict student success in an online class. The three motivation variables that explained the most variation in students' grades on the final exam with an adjusted coefficient of determination (r^2) of .171 included:

- I'm confident that I can learn the basic concepts taught in this class.
- I believe I will receive an excellent grade in this class.
- I prefer classwork that is challenging so I can learn new things.

The results indicate that the more students believed in their ability to learn the concepts in the class, the higher their grades on the final exam. Likewise, students who prefer a challenge also do well. Conversely, the less students believed they would receive a good grade in the class as a whole, the better they performed on the final exam.

The results of this study indicate that motivation has an impact on student success in online courses. Of the 31 motivation factors, nine or 29% proved to be significant. The results of this study support the findings by Diaz & Cartnal (1999) that online students are

more intrinsically motivated and independent learners and Liu (2007) who found that successful online students accept the responsibility for their own learning. Pillay, Irving, and McCrindle (2006) contend that students who do not have a certain level of motivation will be at a disadvantage in the online classroom.

A review of the nine significant items from the motivation section of the survey indicates that self confidence plays an important role in online student success. The students that had the highest final exam scores also prefer work that is challenging, feel certain they can understand the course material and complete the assignments, and have confidence in their ability to make a good grade in the class. Colleges should make sure students enrolling in online courses understand that their intrinsic and extrinsic motivational traits play an important part in online course success.

Implications for Practice and Policy

The results of this study have implications for both practice and policy within the community college system. Decisions based on these findings could have a direct impact on student success.

Implications for Students

An important result of this study was that none of the technology or motivation factors could be used as predictors of the success of students in the seated course environment; however, technology and motivation were both significant predictors of success in the online setting. The lack of correlation between technology self-efficacy and the success of seated students could be explained by the course content.

Since the course used in this study is an introductory computer course, many of the students may have self-selected into the seated environment due to a lack of experience and

confidence with technology. Although the survey instrument could not be used as a tool to predict success in the seated environment, college leaders should be aware of the reasons students decide to register for a seated course.

The traditional seated course environment is typically very passive and does not require students to be particularly interactive, while the online environment requires students to be actively involved with the delivery mechanism. The results of this study indicate that the level of student technology self-efficacy and motivation can predict their success in the online environment. Based on the findings, the significant technology indicators can be grouped into three distinct areas: 1) interaction with web sites; 2) using e-mail; and 3) using the course delivery system. This indicates that the ability to interact with the delivery system (Blackboard) and the internet technologies is fundamental to success in the online course used in this study. The motivation indicators also have a common thread. Confidence and the students' belief in their abilities to do well play an important role in the level of success in the online environment.

Most community colleges, including the college used in this study, allow students to self-select into online courses. Students take online courses for a variety of reasons, many times for convenience when family and work obligations make it difficult for them to enroll in traditional seated classes. Given the tools to predict how well students will perform in the online environment, college leaders would be remiss if they did not use those tools to share information with students about the technological and motivational indicators associated with online course success.

Since student success could potentially be predicted by these indicators, college administrators may determine that it is appropriate to establish guidelines for student entry

into online courses. For example, students that do not have the proper technology self-efficacy or motivation may be encouraged to complete training that would focus on these characteristics before enrolling in a course offered in the online environment.

Implications for Faculty

Community college faculty who teach in the online environment could use the predictors outlined in this study to identify students who may be at risk for unsuccessful course completion and provide them with additional resources. Also, they should be adept in the use of course delivery tools and methodologies that have been proven to engage online students who are at different technological and motivational levels.

While this study does not focus on variables related to online course delivery, it should be noted that online education presents some challenges for community college faculty. Those who are experienced in traditional classroom teaching often cannot instinctively transition to the online environment. Given the popularity of online courses in community colleges, faculty must be willing to work in this environment and trained to utilize the proven pedagogical and technological tools. College leaders must provide them with the resources necessary to enhance their skills to effectively deliver online instruction.

Implications for Administrators

A surprising outcome of this study is that demographics are not significant predictors of student performance in either seated or online environments. The diversity of the community college student population typically lead college administrators to believe that characteristics such as age, number of dependents, and employment status have a considerable impact on student success. Attempts are made within the community college system to cater to the diversity of the student population and administrators make decisions

based on other study results that indicate that the nontraditional student has a lower course success rate and a higher occurrence of dropping out, particularly in the online environment. That was not the case in this study and would indicate that student demographics may not need to be the primary focus of college leaders in making practice and/or policy decisions.

Because this study is limited in its generalizability, college officials should be cautious in making broad based policy decisions from the reported results alone. Additional factors can contribute to student success in the both the seated and online environment including variations in instructional delivery methods and pedagogy. This study assumes that these variables are held constant. Additional research should be conducted to determine the relevance of the findings to a broad population other than that used in this study before sweeping policies are implemented and enforced. Pilot programs or other initiatives could be put into place to test these findings within different courses and instructional situations.

The study results do suggest that local college administrators should, at the very least, provide students with the information they need to be aware of their technology, motivation, and their potential to be successful online learners. Further, online course preparedness tools could be provided to students who are at risk of being unsuccessful, particularly as the demand for the flexibility and convenience of online courses continues to increase. Additional research should be conducted to determine what factors contribute to the success of students in seated courses, and practice and policy modified to ensure the success of those who choose the traditional environment. As always, decision makers should arm themselves with the best information available to help community college students have a successful educational experience.

Assumptions and Limitations

The study was subject to the following assumptions and limitations:

1. The study used a limited sample. The sample may not be representative of all online students in all community colleges. External validity is limited.
2. The study used only one course for testing which may result in limited generalizability, even within the institution. Internal validity may be limited.
3. The study was conducted during one semester.
4. Given the number of variables that could relate to student success in the online course environment, this study focuses on a limited number of variables.
5. The learning objectives for both the online and seated courses are the same; therefore, the results assumed that students in the online and seated classes had been exposed to the same material during the course of their studies.
6. The results assume that all seated and online courses sections were taught in the very same manner, with all potential variables remaining constant, and that the instructors used the same pedagogy.
7. This study employed only quantitative methods of analysis. Research coupled with student interviews and other qualitative data might produce more detailed or different results.

Recommendations for Future Research

The review of literature revealed that many factors lead to student success in the community college online environment. This study was limited to demographics, technology, and motivation and could be strengthened by additional research.

The study could be replicated with a greater sample size, over multiple semesters, and include additional courses to increase its statistical power. The limitation of one class during one semester limits the validity of this research. Data from multiple community colleges in more diverse areas of the state and country would also strengthen the outcome.

Online education, like its seated counterpart, is complex and can be presented in many forms. This study was limited to one form using an online course management system, presenting multiple sections of one course. Because online learning calls into question many of the underlying assumptions about traditional higher education, future research should include online courses that break traditional barriers that could be a factor in student success. Future studies could compare blended versus purely online courses, more highly structured versus less highly structured courses, and newer online course models that are now being used in higher education. Other forms of online environments could be explored that enable different kinds of interactions between and among students, instructors, and course content, resulting in an entirely different study outcome.

Qualitative research would strengthen the statistics gleaned from the quantitative survey and analysis. A mixed methods approach with qualitative inquiries such as follow-up interviews with students could strengthen this study.

Conclusion

Online education provides opportunities for students who would not typically have access to higher education. Students are drawn to online courses due to their convenience and community colleges are offering more and more online classes to respond to the demand. The traditional community college student is typically older with outside responsibilities including work and family and previous studies have reported that

demographics, technology ability, and level of motivation play a large part in their success in online classes.

While this study found no significance between demographics and student success, the current economy and community college enrollment may have attributed to these results. A significance was found between technology self-efficacy and motivation, particularly as it relates to self-confidence. As the use of the internet to deliver course material increases and the community college student continues to demand the flexibility and convenience of this mode of delivery, administrators and faculty in the community college environment must understand the factors that contribute to online student success. At the same time, students must be aware of the technology and motivational characteristics necessary to be successful in this ever-growing environment. The information provided in this study can assist community college leaders in making decisions and implement policy that will contribute to student success.

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Appendix A: Course Syllabus

Syllabus for CIS 110 - Introduction to Computers Gaston College 201 Highway 321 South Dallas, NC 28034-1499 (704) 922-6200

I. COURSE DESCRIPTION

This course introduces computer concepts, including fundamental functions and operations of the computer. Topics include identification of hardware components, basic computer operations, security issues, and use of software applications. Upon completion, students should be able to demonstrate an understanding of the role and function of computers and use the computer to solve problems.

II. STUDENT OUTCOMES

Upon completion of CIS 110, the student will have demonstrated an appropriate level of competency in the following:

1. Proper use of terminology in relation to information technology
2. Identification of legal, ethical, social, and security issues related to the different areas of information technology
3. Utilizing current software packages and operating systems
4. Understanding computer hardware including the categories of computers, input devices, printers, storage, and communication devices
5. Explaining how to access and connect to the Internet, how to view pages and search for information on the Web
6. Understanding the interrelationship between hardware, application software, system software, and servers

III. CREDITS, HOURS, PREREQUISITES

Number Semester Hours Credit: 3
Number Class (Lecture) Hours Per Week: 2
Number Laboratory Hours Per Week: 2
Number Clinic Hours Per Week: 0
Prerequisite: None
Corequisite: None

IV. STUDENT MATERIALS NEEDED

Textbooks: Custom Edition by Shelly & Cashman (Course Technology)
consisting of

- *Discovering Computers 2010 – Fundamentals Edition (6th Ed)*
- *Microsoft Office 2007 Introductory Concepts and Techniques – Premium Video Edition*

Other Required Materials: As noted by instructor

V. EVALUATION

Evaluation may be based on a combination of student test/quiz scores, homework assignments, computer lab assignments, and other related projects. Attendance, participation in class discussions, and adherence to deadlines may also be included in the course grade.

- A = 90-100 % (Note that A,B,C,D grades may be calculated on different)
- B = 80-89 % (scales through different criteria by individual instructors.)
- C = 70-79 %
- D = 60-69 %
- I = Incomplete. (Written agreement between instructor and student is)
(required. Work must be completed prior to the end)
(of the following semester.)
- F = Unsatisfactory (Course must be repeated.)
- W = Withdrawal
- AU = Audit
- CE = Credit by Exam (Must be completed within the first 10 days of the semester.)

VI. ATTENDANCE POLICY

It is expected that each student will attend every class for which he/she is scheduled. If a student misses a class, he/she is responsible for the material covered during their absence. It is further expected that each student will read the attendance policy provided in the latest edition of the Gaston College catalog. Additional policy information may also be provided at the instructor's discretion.

Please note that children will not be allowed in the classroom or labs. This right belongs only to tuition paying individuals.

VII. WITHDRAWAL POLICY

A student may withdrawal in accordance with Gaston College policy as stated in the Gaston College Academic Catalog which can be found at www.gaston.edu

VIII. COLLEGE POLICY ON ELECTRONIC COMMUNICATION DEVICES

To minimize classroom disruptions and protect the integrity of test-taking situations, electronic communication devices such as telephones and pagers are generally not permitted in instructional areas at Gaston College. See the Gaston College Student Handbook for emergency personnel exceptions.

IX. ADA REQUIREMENTS

In order to receive services under the Americans with Disabilities Act and Section 504, students are responsible for supplying appropriate documentation of a disability to the Counseling Center well in advance of class registration. Students should also schedule a meeting with a counselor in the Counseling Center to discuss individual needs regarding reasonable accommodations. The Counselor for Special Needs may be reached at (704) 922-6224 or in Myers Center Room 231. See the Gaston College Academic Catalog for details.

X. CAMPUS SAFETY ANNOUNCEMENT

Gaston College is very concerned about protecting our students, employees, and visitors at all campuses. You can help the College to protect everyone by reporting any suspicious activities or threats to your instructor, Campus Police, or any other college official. The College takes steps to protect anyone who has reason to believe that he/she is in danger. Also, remember to keep your belongings in secure places at all times. The College offers free and confidential counseling services to students with personal concerns. Students may be referred to local community resources when warranted.

"Together, we can help our campus to be a safer place."

XI. COLLEGE PARTICIPATION REQUIREMENTS

The instructional work of the college is designed for class participation and attendance. The responsibility for class participation and attendance is placed specifically on the individual student. Official college requirements are based on a 90% participation rate. Therefore, if a student has failed to participate in 10% or more of the scheduled class hours or learning activities, a student may be withdrawn by the instructor or assigned a grade of "F" up until the published withdrawal date. For students violating participation requirements after the published withdrawal date, a grade of "F" may be assigned by the instructor. Once an instructor has posted a grade, the student no longer has an option to withdraw from that class.

This policy does not remove the right of faculty to reward or penalize students for participation and attendance issues at any point during the semester. Please review course-specific instructions related to attendance to ensure compliance with stated requirements for this class. Faculty may enforce an alternate policy where required

by divisional or departmental practices, accreditation requirements and other similar issues.

Appendix B: Survey Instrument

Predicting Success in Online Courses

Dear Student,

Gaston College is conducting this survey to determine factors that predict success in online courses. Your help and participation is needed. You are being asked to complete a short 3-part survey (a total of 68 questions) about yourself.

While you need to provide your college ID to complete this survey, this information will only be used to evaluate survey results and will not be used to identify your participation in any way. Your responses and all data will remain confidential.

If you choose not to participate in the study, there will be no penalty.

Thank you.

Student Information

Please answer the following questions.

*** 1. Please provide your student ID. Your ID will only be used to verify enrollment and will not be used to identify you in any way.**

*** 2. What is your gender?**

- Female
- Male

*** 3. What is your age?**

- Younger than 25 years of age
- 25 – 29 years of age
- 30 – 39 years of age
- 40 – 49 years of age
- 80 years of age or older

*** 4. Are you married?**

- No
- Yes

***5. How many hours do you work each week outside the home, on an average?**

- 0 – 9
- 10 – 19
- 20 – 29
- 30 – 39
- 40 or more

*** 6. Do you have children or other family members who depend upon you for support?**

- No
- Yes

*** 7. How many courses are you currently enrolled in to include this course?**

- 1
- 2
- 3
- 4
- 5 or more

*** 8. How long has it been since you last completed a college course?**

- Last semester
- Within the last year
- 1 – 5 years ago
- 6 – 10 years ago
- Over 10 years
- This is my first semester in college

*** 9. Approximately how many online courses have you previously taken (not to include this term)?**

- 0
- 1
- 2
- 3
- 4
- 5 or more

Technology

Please indicate how confident you feel using online technologies in an online class. If you do not understand a statement, please choose “Not Confident At All”.

*** 1. Opening a web browser**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **2. Reading text from a web site**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **3. Clicking on a link to visit a specific web site**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **4. Accessing a specific web site by typing the address (URL)**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **5. Bookmarking a web site**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **6. Printing a web site**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **7. Conducting an internet search using one or more keywords**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **8. Downloading (saving) an image from a web site to a disk**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **9. Copying a block of text from a web site and pasting it to a document in a word processor**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

- * **10. Providing a nickname within a chat room**
 - Very Confident
 - Somewhat Confident
 - Not Very Confident
 - Not Confident At All
- * **11. Reading messages from one or more members of a chat room**
 - Very Confident
 - Somewhat Confident
 - Not Very Confident
 - Not Confident At All
- * **12. Answering a message or providing my own message in a chat room**
 - Very Confident
 - Somewhat Confident
 - Not Very Confident
 - Not Confident At All
- * **13. Interacting privately with one member of a chat room**
 - Very Confident
 - Somewhat Confident
 - Not Very Confident
 - Not Confident At All
- * **14. Logging on and off an e-mail system**
 - Very Confident
 - Somewhat Confident
 - Not Very Confident
 - Not Confident At All
- * **15. Sending an e-mail message to a specific person**
 - Very Confident
 - Somewhat Confident
 - Not Very Confident
 - Not Confident At All
- * **16. Sending an e-mail message to more than one person at the time**
 - Very Confident
 - Somewhat Confident
 - Not Very Confident
 - Not Confident At All
- * **17. Replying to an e-mail message**
 - Very Confident
 - Somewhat Confident
 - Not Very Confident
 - Not Confident At All

* **18. Forwarding an e-mail message**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **19. Deleting messages received via e-mail**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **20. Creating an address book**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **21. Saving a file attached to an e-mail message to a local disk and then viewing the contents of that file**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **22. Attaching a file (image or text) to an e-mail message and then sending it off**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **23. Signing on and off of Blackboard**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **24. Posting a new message (creating a new thread) to a discussion board**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **25. Reading a message posted on a discussion board**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **26. Replying to a message posted on a discussion board**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **27. Downloading a file from Blackboard to a local disk**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

* **28. Uploading a file to Blackboard from a local disk**

- Very Confident
- Somewhat Confident
- Not Very Confident
- Not Confident At All

Motivation

Please rate the following items based on your behavior in this class.

* **1. I prefer class work that is challenging so I can learn new things.**

- Always True of Me
- Often True of Me
- Sometimes True of Me
- Rarely True of Me
- Never True of Me

* **2. If I study, I will be able to learn the material in this class.**

- Always True of Me
- Often True of Me
- Sometimes True of Me
- Rarely True of Me
- Never True of Me

* **3. When I take a test I think about how poorly I am doing compared with other students.**

- Always True of Me
- Often True of Me
- Sometimes True of Me
- Rarely True of Me
- Never True of Me

* **4. I think I will be able to use what I learn in this course in other courses.**

- Always True of Me
- Often True of Me
- Sometimes True of Me
- Rarely True of Me
- Never True of Me

- * **5. I believe I will receive an excellent grade in this class.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **6. I'm certain I can understand the most difficult material presented in the readings for this course.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **7. Getting a good grade in this class is the most satisfying thing for me right now.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **8. When I take a test I think about items on other parts of the test I can't answer.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **9. It is my own fault if I don't learn the material in this course.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **10. It is important for me to learn the course material in this class.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **11. The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me

- * **12. I'm confident that I can learn the basic concepts taught in this course.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **13. If I can, I want to get BETTER grades in this class than most of the other students**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **14. When I take tests I think of the consequences of failing.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **15. I'm confident I can understand the most complex material presented by the instructor in this course.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **16. In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **17. I am very interested in the content area of this course.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **18. If I try hard enough, then I will understand the course material.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me

- * **19. I have an uneasy, upset feeling when I take an exam.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **20. I'm confident I can do an excellent job on the assignments and tests in this course.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **21. I expect to do well in this class.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **22. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **23. I think the course material in this class is useful for me to learn.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **24. When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me
- * **25. If I don't understand the course material, it is because I didn't try hard enough.**
- Always True of Me
 - Often True of Me
 - Sometimes True of Me
 - Rarely True of Me
 - Never True of Me

* **26. I like the subject matter of this course.**

- Always True of Me
- Often True of Me
- Sometimes True of Me
- Rarely True of Me
- Never True of Me

* **27. Understanding the subject matter of this course is very important to me.**

- Always True of Me
- Often True of Me
- Sometimes True of Me
- Rarely True of Me
- Never True of Me

* **28. I feel my heart beating fast when I take an exam.**

- Always True of Me
- Often True of Me
- Sometimes True of Me
- Rarely True of Me
- Never True of Me

* **29. I'm certain I can master the skills being taught in this class.**

- Always True of Me
- Often True of Me
- Sometimes True of Me
- Rarely True of Me
- Never True of Me

* **30. I want to do well in this class because it is important to show my ability to my family, friend, employer, or others.**

- Always True of Me
- Often True of Me
- Sometimes True of Me
- Rarely True of Me
- Never True of Me

* **31. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.**

- Always True of Me
- Often True of Me
- Sometimes True of Me
- Rarely True of Me
- Never True of Me

Appendix C: Motivational Scales and Components

MSLQ Motivational Scales and Components		
Scale	Component	Question
1	Intrinsic Goal Orientation	1,16,22,24
2	Extrinsic Goal Orientation	7,11,13,30
3	Task Value	4,10,17,23,26,27
4	Control of Learning Beliefs	2,9,18,25
5	Self-Efficacy for Learning and Performance	5,6,12,15,20,21,29,31
6	Test Anxiety	3,8,14,19,28

Appendix D: MSLQ Lambda-Ksi Estimates

MSLQ Motivational Component

Lambda-Ksi Estimates

Note: .8 or BETTER indicates well-defined latent constructs

Component	Question	LX estimate
Intrinsic Goal Orientation	1	.64
	16	.69
	22	.66
	24	.55
Extrinsic Goal Orientation	7	.71
	11	.58
	13	.48
	30	.44
Task Value	4	.57
	10	.64
	17	.88
	23	.86
	26	.88
	27	.84
Control of Learning Beliefs	2	.57
	9	.38
	18	.84
	25	.47
Self-Efficacy for Learning and Performance	5	.83
	6	.70
	12	.63
	15	.71
	20	.86
	21	.89
	29	.77
	31	.87
Test Anxiety	3	.60
	8	.42
	14	.62
	19	.88
	28	.76

Appendix E: Permission to Use Surveys

Online Technologies Self-Efficacy Survey

Dear Dr. Yu,

I am a doctoral student at Appalachian State University in North Carolina and working on my dissertation on "Exploring Common Characteristics Among Community College Students Comparing Online and Traditional Student Success."

I am requesting permission to use the Online Technologies Self-efficacy Scale survey as part of my work.

Thank you for your time and for making such an important contribution to the research relating to online education.

Betsy H. Jones

To: jones.betsy@gaston.edu
From: Chong Yu alex.yu@asu.edu

Hi, Betsy, please feel free to use the scale if proper credit (citation) is given. Thanks for your interest in the scale.

Chong Ho Yu, Ph.D.



COMBINED PROGRAM IN EDUCATION AND PSYCHOLOGY

1406 SCHOOL OF EDUCATION
610 E. UNIVERSITY AVENUE
ANN ARBOR, MI 48109-1259
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RECEIPT

October 9, 2009

Betsy H. Jones, Dean
Business and Information Technology
Chief Distance Education Officer
Gaston College
(704) 922-6262 (Office)
(704) 922-2335 (FAX)
jones.betsy@gaston.edu

Dear Dean Jones:

Gaston College is granted permission to use the Motivated Strategies for Learning Questionnaire. The survey will only be used internally, with proper credit given to the authors.

With this payment, you are allowed to use the MSLQ for your needs but making sure you give the authors' credit. Consider this your letter for permission to use the MSLQ for your needs. If you have any further questions, email me at mabien@umich.edu.

Sincerely,

Marie-Anne Bien

Marie-Anne Bien, Secretary
The University of Michigan
Combined Program in Education & Psychology (CPEP)
610 East University, 1413 School of Education
Ann Arbor, MI 8109-1259
PH (734) 647-0626; FAX (734) 615-2164
mabien@umich.edu
<http://www.soe.umich.edu>

Appendix F: Standardized Final Assessment

CIS 110 Final Exam Fall 2009

Identify the choice that best completes the statement or answers the question.

1. A(n) ____ is an informal Web site consisting of time-stamped articles in a diary or journal format, usually listed in reverse chronological order.
 - a. Blog
 - b. Podcast
 - c. chat
 - d. videoconference
2. A(n) ____ is recorded audio stored on a Web site that can be downloaded to a computer or a portable digital audio player.
 - a. Blog
 - b. Podcast
 - c. chat
 - d. videoconference
3. A(n) ____ system is a set of programs that coordinates all the activities among computer hardware devices.
 - a. Operating
 - b. Director
 - c. utility
 - d. management
4. ____ is the process of setting up software to work with a computer, printer, and other hardware components.
 - a. Installing
 - b. Running
 - c. Executing
 - d. Entering
5. A ____ computer is a computer that can perform all of its input, processing, output, and storage activities by itself.
 - a. Mainframe
 - b. Personal
 - c. terminal
 - d. mainline
6. A(n) ____ computer is a special-purpose computer that functions as a component in a larger product.
 - a. smart
 - b. handheld
 - c. embedded
 - d. integral
7. Examples of power users include all of the following *except* ____.
 - a. sales representatives
 - b. engineers and scientists
 - c. desktop publishers
 - d. architects and graphic artists
8. Many large companies use the words, ____ computing, to refer to the huge network of computers that meets their diverse computing needs.
 - a. online
 - b. strategic
 - c. enterprise
 - d. management
9. ____ is a work arrangement in which employees work away from a company's standard workplace and often communicate with the office through the computer.
 - a. Telecommuting
 - b. Teleprocessing
 - c. Telescoping
 - d. Telephering

10. The ____ is a worldwide collection of networks that links millions of businesses, government agencies, educational institutions, and individuals.
- Internet
 - Telnet
 - Web
 - NSFNet
11. A(n) ____ address is a number that uniquely identifies each computer or device connected to the Internet.
- TCP
 - IP
 - NSF
 - DNS
12. Many Web page addresses begin with ____, which stands for Hypertext Transfer Protocol, a set of rules that defines how pages transfer on the Internet.
- htm://
 - http://
 - html://
 - Either A or C
13. A Web page may contain a(n) ____, which is a built-in connection to another Web page or part of a Web page.
- portal
 - directory
 - link
 - index
14. A(n) ____ is a collaborative Web site that allows users to add to, modify, or delete the Web site content via their Web browser.
- portal
 - wiki
 - blog
 - content aggregator
15. The term ____ refers to any application that combines text with graphics, animation, audio, video, and/or virtual reality.
- portal
 - Web app
 - multimedia
 - Java applet
16. To listen to an audio file on your computer, you need special software called a ____.
- host
 - receiver
 - portal
 - player
17. A(n) ____ is a program that extends the capability of a browser.
- plug-in
 - IrDA
 - chat client
 - VoIP
18. Web publishing involves ____.
- planning and maintaining the Web site
 - analyzing and designing the Web site
 - creating and deploying the Web site
 - all of the above
19. An e-mail ____ is a combination of a user name and domain name that identifies a user so he or she can receive Internet e-mail.
- link
 - address
 - reference
 - user clause
20. In e-mail, newsgroups, and chat rooms, use ____, such as :) and :(, to express emotion.
- icons
 - OSPs
 - emoticons
 - spam
21. ____ software is a type of application software that allows users to create and manipulate documents containing mostly text and sometimes graphics.
- Document production
 - Word processing
 - Document manipulation
 - Desktop publishing

22. A query ____.
- provides images, pictures, and video to enhance the database
 - is a request for specific data from a database
 - compares the spelling of words with an electronic dictionary
 - is a predefined formula that performs common calculations
23. ____ software is a type of application software that allows a user to plan, schedule, track, and analyze the events, resources, and costs of a project.
- Business
 - Document management
 - Accounting
 - Project management
24. ____ software is a type of application software that allows users to draw pictures, shapes, and other graphical images with various on-screen tools such as a pen, brush, eyedropper, and paint bucket.
- Paint
 - Pixel manipulation
 - Design
 - Color library
25. One popular type of image editing software, called ____, allows users to edit digital pictures by removing red-eye, erasing blemishes, restoring aged photos, adding special effects, or creating electronic photo albums.
- clip art/image gallery
 - entertainment software
 - photo editing software
 - paint software
26. Homeowners or potential homeowners can use ____ to assist them with the design, remodeling, or improvement of a house, deck, or environment.
- computer-aided design software
 - project management software
 - image editing software
 - home design/landscaping software
27. Some computer and chip manufacturers use the term ____ to refer to a personal computer processor chip.
- microprocessor
 - parallel processor
 - coprocessor
 - perpendicular processor
28. A(n) ____ equals approximately one billion bytes.
- megabyte
 - exabyte
 - gigabyte
 - terabyte
29. Memory ____ helps speed the processes of the computer because it stores frequently used instructions and data.
- indexing
 - pipelining
 - cache
 - rasterizing
30. ____ refers to memory chips storing permanent data and instructions.
- ROM
 - Flash memory
 - CMOS
 - RAM
31. ____ time is the amount of time it takes the processor to read data, instructions, and information from memory.
- Processing
 - Connection
 - Access
 - Meter
32. A(n) ____ is a device, such as a printer or scanner, that connects to the system unit and is controlled by the processor in the computer.
- graphics unit
 - output system
 - peripheral
 - video card

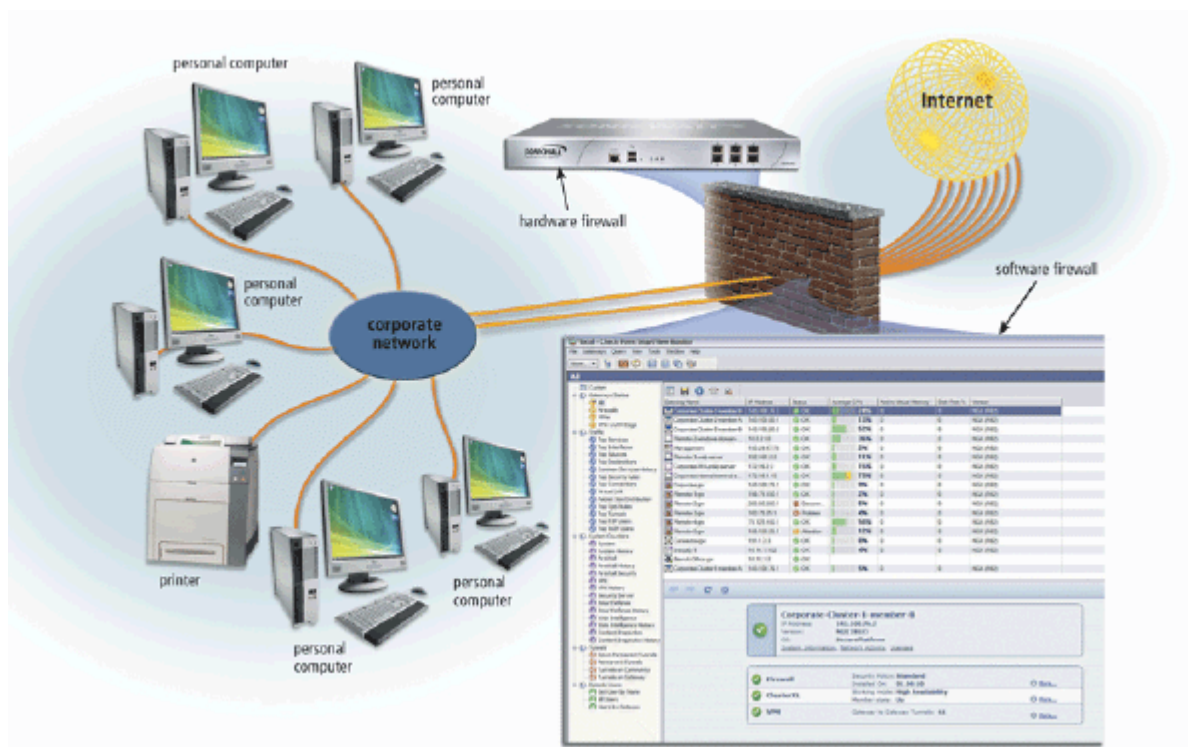
33. A(n) ____ bus allows the processor to communicate with peripherals.
- expansion
 - index
 - interpolated
 - power
34. The power ____ is the component of the system unit that converts the wall outlet AC power into the DC power a computer needs.
- supply
 - surge
 - spotter
 - changer
35. A(n) ____ is an input device that contains keys users press to enter data and instructions into a computer.
- keyboard
 - light pen
 - gamepad
 - stylus
36. A(n) ____ is a freestanding computer that includes a touch screen.
- encoder
 - kiosk
 - modem
 - telemeter
37. The Wii ____ is a motion-sensing input device that uses Bluetooth wireless technology to communicate with the Wii game console.
- Tooth
 - Bluetool
 - Remote
 - gamepad
38. Voice ____ is the process of entering input by speaking into a microphone.
- recognition
 - input
 - concatenation
 - indexing
39. A(n) ____ is the smallest element in an electronic image.
- bit
 - candela
 - pixel
 - nit
40. A(n) ____ conference is a meeting between two or more geographically separated people who use a network or the Internet to transmit audio and video data.
- video
 - distance
 - dynamic
 - professional
41. A(n) ____ scanner works in a manner similar to a copy machine except it creates a file of the document in memory instead of a paper copy
- thermal
 - drum
 - flatbed
 - rolling
42. ____ is data that has been processed into a useful form.
- Concatenation
 - Recognition
 - Output
 - Input
43. ____ is the number of horizontal and vertical pixels in a display device.
- Pixel depth
 - Color index
 - Bit depth
 - Resolution
44. Printer resolution is measured in ____.
- pixels
 - dots per inch
 - hertz
 - pages per minute
45. A(n) ____ printer is any category of printer that forms characters and graphics on a piece of paper without actually striking the paper.
- character
 - laser
 - nonimpact
 - ink-jet

46. A(n) ____ printer is a type of nonimpact printer that forms characters and graphics by spraying tiny drops of liquid ink onto a piece of paper.
- plasma
 - thermal
 - ink-jet
 - dot-matrix
47. The ____ requires any company with 15 or more employees to make reasonable attempts to accommodate the needs of physically challenged workers.
- Sarbanes-Oxley Act
 - ADA
 - Workers' Protection Act
 - W3C Act
48. Which of the following is *not* a secondary storage medium?
- CD
 - RAM
 - DVD
 - flash memory card
49. Which is a magnetic storage medium?
- DVD
 - hard disk
 - ExpressCard
 - flash memory card
50. A(n) ____ is a duplicate of a file, program, or disk that can be used in case the original is lost, damaged, or destroyed.
- cache
 - backup
 - home site
 - baseline
51. A(n) ____ disc can be read, written to, and erased.
- CD-ROM
 - CD-R
 - DVD-ROM
 - DVD+RW
52. A typical CD-ROM holds up to ____ of data.
- 1 MB
 - 1 GB
 - 1 TB
 - 1 PB
53. A(n) ____ stores data on a thin microprocessor embedded in the card.
- ThumbCard
 - AccessCard
 - ExpressCard
 - smart card
54. Which has the longest life expectancy?
- microfilm
 - hard disks
 - CDs
 - DVDs
55. Which of the following is *not* an operating system function?
- starting the computer
 - managing programs
 - word processing
 - establishing an Internet connection
56. A(n) ____ interface controls how you enter data and instructions and how information is displayed on the screen.
- control
 - utility
 - user
 - management
57. In a(n) ____, the user types commands or presses special keys on the keyboard to enter data and instructions.
- command-line interface
 - menu-driven interface
 - performance-monitor interface
 - graphical user interface (GUI)

58. With a(n) ____ interface, users interact with menus and visual images such as buttons and other graphical objects to issue commands.
- command-line interface
 - menu-driven interface
 - performance-monitor interface
 - graphical user interface (GUI)
59. ____ means the operating system automatically configures new devices as you install them.
- Virtual memory
 - Operational buffering
 - Page logging
 - Plug and Play
60. A(n) ____ OS is an operating system that organizes and coordinates how multiple users access and share resources on a network.
- client
 - multitasking
 - integrated
 - server
61. A network ____, the person overseeing network operations, uses the network operating system to add and remove users, computers, and other devices to and from the network.
- administrator
 - owner
 - client
 - master
62. A(n) ____ is a unique combination of characters, such as letters of the alphabet or numbers, that identifies one specific user.
- user name
 - password
 - client
 - cycle
63. A(n) ____ is a private combination of characters associated with the user name that allows access to certain computer resources.
- folder
 - password
 - user name
 - cipher
64. Which of the following is *not* a type of operating system?
- wireless
 - stand-alone
 - server
 - embedded
65. To defragment a disk means to ____.
- slow it down
 - diagnose problems with it
 - reorganize it
 - repair it
66. A pop-up ____ is a filtering program that stops pop-up ads from displaying on Web pages.
- blocker
 - driver
 - stopper
 - monitor
67. Compressed files sometimes are called ____ files.
- skipped
 - controlled
 - zipped
 - defragmented
68. ____ is a scam in which a perpetrator attempts to obtain your personal and/or financial information.
- Phishing
 - Zippping
 - Pharming
 - Authenticating
69. A(n) ____ is an internal network that uses Internet technologies.
- workgroup
 - sharenets
 - intranet
 - ATM

70. Which is the fastest type of line?
- ISDN
 - CATV
 - T3
 - ATM
71. A(n) ____ card is a USB network adapter, ExpressCard module, PC Card, or flash card that enables a computer or device to access a network.
- channel
 - network
 - communications
 - licensed
72. The amount of data, instructions, or information that can travel over a communications channel sometimes is called the ____.
- dimensionality
 - resolution
 - bandwidth
 - broadband
73. Physical transmission media used in communications include ____ cable.
- twisted-pair
 - coaxial
 - fiber-optic
 - all of the above
74. The core of a(n) ____ cable consists of dozens or hundreds of thin strands of glass or plastic that use light to transmit signals.
- coaxial
 - twisted-pair
 - fiber-optic
 - integrated
75. The data ____ specifies the kind of data a field can contain and how the field is used.
- type
 - scope
 - size
 - identifier
76. ____ is the process of comparing data with a set of rules or values to find out if the data is correct.
- Concatenation
 - Validation
 - Digit checking
 - Integration
77. Which statement does not apply to the database approach?
- it requires less memory than file processing systems
 - it increases the data's integrity
 - programs are easier and faster to develop than with a file processing system
 - it allows nontechnical users to access and maintain data
78. More complex DBMSs maintain a(n) ____, which is a listing of activities that change the contents of the database.
- report
 - index
 - glossary
 - log
79. A(n) ____ database stores data in tables that consist of rows and columns.
- relational
 - hierarchical
 - object-oriented
 - multidimensional
80. The term ____ refers to online or Internet-based illegal acts.
- malware
 - cyberthreat
 - cybercrime
 - cyberextortion

81. All of the following are common ways computers become infected with malware, *except* _____.
 - a. opening infected files
 - b. running an infected program
 - c. booting the computer with infected removable media inserted in a drive or plugged in a port
 - d. installing a software package from a CD
82. Currently, more than ____ known viruses, worms, and Trojan horse programs exist.
 - a. 11,000
 - b. 22,000
 - c. 151,000
 - d. 180,000
83. ____ protects a computer against viruses by identifying and removing any computer viruses found in memory, on storage media, or on incoming files.
 - a. An anti-spam program
 - b. E-mail encryption
 - c. An antivirus program
 - d. E-mail filtering
84. If an antivirus program cannot remove an infection, it often _____.
 - a. quarantines the infected file
 - b. reports the user computer
 - c. disables the drive the file is on
 - d. removes the user from its registry



85. ____ detection software automatically analyzes all network traffic, assesses system vulnerabilities, identifies any unauthorized access (intrusions), and notifies network administrators of suspicious behavior patterns or system breaches, including violations of firewalls like the ones in the accompanying figure.
 - a. Violation
 - b. Password
 - c. Intrusion
 - d. Traffic

86. Which of the following is *not* an example of a biometric device?
- smart card
 - face recognition system
 - hand geometry system
 - fingerprint scanner
87. A(n) ____ protector uses special electrical components to provide a stable current flow to the computer and other electronic equipment.
- Joule
 - spike
 - surge
 - hash
88. Computer ____ are the moral guidelines that govern the use of computers and information systems.
- logistics
 - mechanics
 - ethics
 - rights
89. Information ____ refers to the right of individuals and companies to deny or restrict the collection and use of information about them.
- rights
 - acceptable use
 - restrictions
 - privacy
90. As related to the use of computers, ____ is defined as gaining unauthorized access or obtaining confidential information by taking advantage of the trusting human nature of some victims and the naivety of others.
- DoS
 - social engineering
 - DRM
 - scamming
91. ____ include anyone for whom the system is being built.
- Users
 - Producers
 - Managers
 - Standards
92. Project ____ is the process of planning, scheduling, and then controlling the activities during the development cycle.
- direction
 - management
 - clustering
 - analysis
93. ____ software is mass-produced, copyrighted, or prewritten software available for purchase.
- Custom
 - Packaged
 - Demand
 - Requested
94. Application software developed by the user or at the user's request is called ____ software.
- packaged
 - optimized
 - custom
 - remastered
95. ____ is a special formatting language that programmers use to format documents for display on the Web.
- Java
 - JavaScript
 - HTML
 - XML
96. A ____ is an individual business activity, such as a deposit, payment, order, or reservation.
- message
 - process
 - transaction
 - job

97. A(n) _____ is an information system that generates accurate, timely, and organized information, so managers and other users can make decisions, solve problems, supervise activities, and track progress.
- a. ERP
 - b. DSS
 - c. MIS
 - d. TPS
98. A(n) _____ helps users analyze data and make decisions.
- a. DSS
 - b. TPS
 - c. ERP
 - d. MIS
99. A(n) _____ system is an information system that captures and stores the knowledge of human experts and then imitates human reasoning and decision making.
- a. AI
 - b. decision tree
 - c. knowledgebase
 - d. expert
100. _____ is the application of human intelligence to computers.
- a. AI
 - b. CI
 - c. BI
 - d. IE

Appendix G: One-Way ANOVA Demographics

One-way ANOVA: Gender

	Online					Seated				
	<i>N</i>	Mean	SD	<i>F</i>	Sig.	<i>N</i>	Mean	SD	<i>F</i>	Sig.
Gender				2.641	0.107				2.473	0.117
Male	85	85.27	26.926			82	71.74	21.837		
Female	26	93.96	6.820			156	76.43	21.828		

One-way ANOVA: Age

	Online					Seated				
	<i>N</i>	Mean	SD	<i>F</i>	Sig.	<i>N</i>	Mean	SD	<i>F</i>	Sig.
Age				3.563	0.017				0.776	0.542
<25	54	83.15	28.384			135	72.09	20.282		
25-29	9	82.22	41.230			24	73.92	23.825		
30-39	24	93.46	6.846			29	77.90	23.329		
40-49	24	96.17	4.260			39	71.73	27.335		
50+	0	0.00	24.040			13	80.00	12.483		

One-way ANOVA: Marital Status

	Online					Seated				
	<i>N</i>	Mean	SD	<i>F</i>	Sig.	<i>N</i>	Mean	SD	<i>F</i>	Sig.
Marital Status				1.038	0.310				0.611	0.435
Married	69	85.49	25.630			173	72.68	20.334		
Single	42	90.29	21.127			65	75.17	25.700		

One-way ANOVA: Employment Status

	Online					Seated				
	<i>N</i>	Mean	SD	<i>F</i>	Sig.	<i>N</i>	Mean	SD	<i>F</i>	Sig.
Hours				1.128	0.347				0.188	0.945
0-9	47	86.91	24.702			115	72.92	23.724		
10-19	12	76.59	36.644			34	75.00	21.058		
20-29	17	84.65	32.264			36	71.78	19.660		
30-39	13	91.54	7.310			30	75.60	16.401		
40 or more	22	93.55	6.307			23	72.65	24.483		

One-way ANOVA: Number of Children

	Online					Seated				
	<i>N</i>	Mean	SD	<i>F</i>	Sig.	<i>N</i>	Mean	SD	<i>F</i>	Sig.
Children				2.463	0.119				0.889	0.347
No	56	83.58	28.855			146	72.29	20.832		
Yes	58	90.71	18.194			92	75.04	23.517		

One-way ANOVA: Courses Currently Taking

	Online					Seated				
	<i>N</i>	Mean	SD	<i>F</i>	Sig.	<i>N</i>	Mean	SD	<i>F</i>	Sig.
Courses				1.619	0.175				0.724	0.576
1	9	96.33	2.693			15	78.93	8.022		
2	18	95.83	7.406			15	66.20	22.527		
3	23	87.35	20.191			32	74.00	21.452		
4	40	80.98	32.280			142	73.82	21.407		
5+	21	88.14	21.576			34	71.50	27.743		

One-way ANOVA: Last Attended College

	Online					Seated				
	<i>N</i>	Mean	SD	<i>F</i>	Sig.	<i>N</i>	Mean	SD	<i>F</i>	Sig.
Last College				3.350	0.008				0.496	0.779
Last Semester	44	90.95	16.399			77	72.69	19.777		
In last year	14	85.57	25.488			18	72.28	27.375		
1-5 years	13	93.54	6.333			16	72.69	29.371		
6-10 years	4	78.25	55.788			11	75.09	26.197		
Over 10 years	9	96.44	4.746			16	81.50	11.165		
Never attended	27	82.00	30.894			100	72.68	22.098		

One-way ANOVA: Number of Online Courses

# Online	Online					Seated				
	<i>N</i>	Mean	SD	<i>F</i>	Sig.	<i>N</i>	Mean	SD	<i>F</i>	Sig.
				0.995	0.425				0.353	0.880
0	60	83.48	29.121			168	72.48	23.022		
1	11	91.73	12.354			35	73.40	21.241		
2	16	95.13	4.288			16	76.63	22.366		
3	12	84.92	27.793			10	76.90	9.826		
4	3	88.33	12.503			3	76.67	11.504		
5+	9	96.33	2.500			6	81.50	8.167		

BIOGRAPHICAL SKETCH

Elizabeth Hord Jones was born in Cleveland County in North Carolina on October 4, 1958. She attended public school in Lawndale, North Carolina, and graduated from Burns High School in May 1976. She attended Gaston College and was awarded an Associate of Applied Science Degree in Computer Science in 1979 where she was subsequently hired as a computer programmer. She received her Bachelor of Science degree in 1989 from Gardner-Webb University while working at Gaston College as the Director of Technology Services. After accepting a full-time teaching position in the Information Technology Department at Gaston College in 1998, she received her Master of Arts degree in Educational Media from Appalachian State University in 2001. Subsequently, she received an Education Specialist degree in Higher Education in 2006 and a Doctor of Education in Educational leadership in 2010, also from Appalachian State University.

Ms. Jones is currently serving as the Dean of Business and Information Technology as well as the Chief Distance Education Officer at Gaston College. She lives in Kings Mountain, N.C., is married to Mark Jones, and has two children, Charlie, 24 and Michelle, 21.