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Adult Student Persistence In Online Education: Developing A Model To Understand The Factors That Affect Adult Student Persistence In A Course

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ADULT STUDENT PERSISTENCE IN ONLINE EDUCATION:
DEVELOPING A MODEL TO UNDERSTAND THE FACTORS THAT AFFECT
ADULT STUDENT PERSISTENCE IN A COURSE

A Dissertation Presented
by
RAYMOND J. MCGIVNEY

Submitted to the Graduate School of the
University of Massachusetts Amherst in partial fulfillment
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Education
Educational Policy and Leadership
ADULT STUDENT PERSISTENCE IN ONLINE EDUCATION:
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To my children, Aelish, Rylin, and Malleigh, you are the lights of life!
To my wife, Xan, your support, understanding, and love have helped make these ten years the most wonderful years of my life. You are a true inspiration!
The purpose of this study is to investigate the factors that influence the persistence of adult students in online undergraduate courses at the community college level. Quantitative analysis of survey results from 476 students enrolled in online courses at two community colleges indicate that desire to complete the degree, previous experience in online courses and assignment completion are the strongest predictors of course completion. The findings from this research also provide the basis for making recommendations for future research and improving policy and practice. Finally, the results of this study suggest the basis for developing new models for understanding persistence in online courses.
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CHAPTER 1
INTRODUCTION

Online learning in higher education continues to develop and proliferate as a medium for instructional delivery; it is clearly no longer in its infancy. Support for this assertion can be found in the sheer number of students who are bypassing the traditional classroom environment for the convenience of “anytime, anywhere” education; numbers that have continued to increase sharply. From a national perspective, 90% of all public two-year and four-year institutions are offering some form of distance education (NCES, 2006). According to an earlier report by the National Center for Educational Statistics (2002), there were 3,077,000 enrollments in distance learning courses for the 2000-2001 academic year. From an institutional specific perspective, online enrollments at Pennsylvania State University have risen from a few hundred students in 1998 to close to 5,000 in 2003, and at Virginia Technical University enrollments have risen from 1,000 students in 1998 to 3,400 students in 2003 (Carnevale & Olsen, 2003). In terms of a financial indicator, online education is a $5 billion a year industry (Blumenstyk, 2005). This growing sector has served adult students particularly well as a majority of the online student population are older than traditionally-aged college students. From a recent study conducted by the Connecticut Distance Learning Consortium (2003), 95% of students registered for all online courses in the state of Connecticut were 25 years or older.

As more students are showing interest in this new form of learning, there are many questions to be answered. Perhaps the most important question relates to the issue of online students persisting at much lower rates than in traditional face-to-face courses. According to Johnson (2003), student persistence is 20% lower in online courses than in
equivalent face-to-face courses. This persistence gap leads to several questions. Does the gap exist because:

- Students who choose this new type of pedagogy are unprepared for the self-regulation and high level of personal motivation that is required in online courses?
- The students who opt for online courses may have other demands on their time that distract from their educational pursuits?
- Students are unable to navigate the added institutional barriers associated with not being physically present on a campus?

Clearly, these questions need to be empirically examined in order to gain a better understanding of non-traditional student persistence in online undergraduate education.

**Overview**

The purpose of this study is to investigate the factors that influence the persistence of adult students in online undergraduate courses at the community college level. Distance learning, adult learning, and undergraduate persistence are three separate, but related, topics that will be examined to help gain insight into which factors affect adult student persistence in online education.

First, the origins of distance learning and how it has evolved through four generations to its present day form is explored as a foundation for understanding this form of postsecondary education. This section also focuses on the benefits of distance education and why it needs to be taken seriously, with particular focus on the contributions of Michael G. Moore (1972, 1973), considered by many to be the father of distance learning theory in the United States. Finally, this section examines two distance
learning theories that are directly related to persistence: transactional distance and human interaction and communication.

The second theme to be examined is the theory of adult learning. Malcolm Knowles’ (1975) was the first theorist who proposed that adult learning styles were drastically different from traditional aged student learning styles. He believed that there needed to be a whole new way of teaching adult students, which he termed andragogy—“art and science of helping adults learn” (Knowles, 1980, p.43). The other main adult learning theory that appears to be directly related to student persistence is the idea of self-directedness (Merriam & Caffarella, 1999; Guglielmino, 1977; Brookfield, 1986; Oddi, 1987). This section concludes with a detailed analysis of the most cited measurement in the self-motivation literature, which is the Self-Directed Readiness Scale, developed by Lucy Guglielmino (1977).

The last theme to be examined is the issue of student persistence. Many of the studies examined in the literature review focus on student persistence over a one-year period. Although, this study is only examining student persistence in a course, the traditional retention literature is the best knowledge-driven starting point we have. One of the first widely cited studies of persistence is William Spady’s 1970 article entitled, *Drop-outs from higher education: An interdisciplinary review and synthesis*. Although the issue of persistence had been examined before Spady, he is considered to be the first to examine persistence via an analytical-exploratory study (Berger & Lyons, 2005). Spady (1970) related dropping out of school to the process of people committing suicide while in college. Spady developed and tested his model of student persistence with traditional aged students in a face-to-face environment. Vincent Tinto (1975, 1987) later
developed his seminal theory on student departure based largely on the work of Spady (1970). Tinto (1975, 1987) claimed that academic and social integration are the two most important factors in predicting persistence. In terms of adult student persistence, Tinto’s (1987) model is helpful, but does not capture all of the idiosyncrasies of adult students that may be related to persistence. Like Spady, Tinto’s model was also originally developed and tested for traditional aged students in a face-to-face environment. Bean and Metzner (1985) proposed the first model for predicting adult student persistence based largely on Tinto’s model, but focused on the external environment much more than social integration. Although Bean’s and Metzner’s model does provide some insight about adult students, it does not address the geographic separation of teacher-student that needs to be addressed in distance learning (Kember, 1995). In an exhaustive literature search, the model that deals with persistence of adult students in an online environment most clearly is the Kember (1995) model. Kember’s model of student persistence is based largely on Tinto’s (1975, 1987) model, but takes into account the differences between traditional full-time residential students and non-traditional distance learning students. Kember’s model focuses less on the internal environment of integration into the university community and more with the external environment and how students are able to “juggle” all of their commitments with school. Kember’s model was originally developed and tested for distance learning conducted via correspondence education.

While the work of Spady and Tinto is foundational in the study of undergraduate persistence, it focuses primarily on student perceptions. Yet, Astin (1984) suggests that student persistence can be directly correlated to students behaviors. Astin’s work is less concerned with boxes and arrows in his theory of persistence and more interested in what
students actually did. For example, how much time did they spend studying each week? Did they meet with study groups or professors on a regular basis? Astin’s model, like many of the previously stated models, was originally developed and tested for traditional aged students in a face-to-face environment.

The final model to be examined was developed by Berger and Milem (1999). This model is unique in that it was the first to combine the two most respected and cited models of student persistence, Astin’s (1984) and Tinto’s (1975) models. Berger and Milem sought a more comprehensive understanding of student persistence by examining both student behaviors and perceptions. This model, like most of the previous models, was developed and tested for traditional aged students in a face-to-face environment. This study will be an opportunity to see if features of the Berger and Milem model can be useful in helping explain student persistence in online education.

This section concludes with an examination of various studies of student persistence in online education. The limitation of these studies is that they examine only single variables such as background characteristics or the influence of academic advising or mentoring on student persistence. Some of the information will clearly be helpful when building the proposed model. However, to gain a clearer understanding of this phenomenon, it is important to develop a more comprehensive model that tries to examine how multiple variables influence a student’s decision to persist in a course.

**Statement of Problem**

Persistence in distance education is a complex phenomenon influenced by a multitude of variables. Gender, age, locus of control, grade-point average, and mode of delivery are only a few that have appeared in recent literature. (Parker, 1999)
With the growth in distance learning enrollments, some researchers are now beginning to examine some of the by-products of this type of learning environment. One of the main areas of research regarding distance learning is student persistence (Serwatka, 2005). A majority of the research to date on online student persistence has focused on finding a causal relationship between one variable and its effect on persistence. Examples include Clow’s (1999) study in which he tried to correlate the student’s perception of sufficient interactions via email with other students and the faculty member to overall persistence in the course and Zajkowski’s (1997) study of employers’ reimbursement of fees and its effect on student persistence in an online course. There is another body of research on this subject whereby researchers try to predict persistence based on multiple student characteristics such as age, gender, socio-economic status (e.g. Kember, 1989; Sweet, 1986; Pugliese, 1994; Fjortoft, 1995). Yet, there is no research to date that has examined student persistence in online learning from a comprehensive approach, that is, one that takes into account student background characteristics along with measures of student behaviors and perceptions. Employing the work of Berger and Milem, (1999) and Kember (1995), this study seeks to use a comprehensive approach to better understand the factors that influence non-traditional student persistence in online courses.

**Purpose of the Study**

As noted above, the purpose of this study is to better understand the factors that influence non-traditional student persistence in online courses. As stated previously, this is such a new area of research that there are no direct prior studies to draw upon. Instead, we must adapt previous persistence models that focused on more traditional students over
a longer period of time than the temporal frame defined simply by one course. The model tested in this study relies heavily on Berger and Milem’s (1997) original model, which was the first attempt at examining, not only student perceptions with regard to persistence, but also measuring student behaviors while also controlling for individual student differences in background characteristics. Two of the main areas Berger and Milem focus on in their model are Astin’s (1984) concept of behavioral involvement and Tinto’s definition of perceived integration.

Berger and Milem’s initial attempt at testing this model was conducted at a highly selective, private, traditional-aged, residential institution, with a population that is very different demographically from students that typically enroll in on-line courses. In contrast, this study is conducted at public community colleges, which have a large non-traditional population. A key point to understand is that the Berger and Milem model also focused on year-year retention across multiple courses rather than in-course persistence as this study will do.

In order to build on Berger and Milem’s model, I will attempt to integrate some of the features of the Kember Model (1995), in an attempt to address two important issues that are specific to this understudied context: distance learning and adult students. Kember’s Model is one of the most cited in terms of research on persistence in distance education. However, Kember’s Model, which relies heavily on Tinto’s Model, only takes student perceptions into account and ignores behavioral factors. The model I am proposing will integrate Berger and Milem’s Model with Kember’s Model to create a new model for attempting to understand in course persistence in online education.
For the purpose of this study, I will be relying on not only survey questions used by Berger and Milem, but also incorporating a variety of survey questions that Kember used in his study of student persistence in distance learning. The drawback to Kember’s model, and many of the other current models that attempt to explain persistence, is that they rely too heavily on Tinto’s model, whereas Berger and Milem combine Tinto’s constructs with Astin’s findings to provide a more holistic view of the issue of persistence. The proposed model attempts to combine these two models into one integrated model of student persistence in online education.

**Research Questions**

Given the purpose of this study, the research questions are:

1. What are the factors or student characteristics that contribute to non-traditional online student persistence in a course?

2. What are the factors or student characteristics that impede non-traditional online student persistence in a course?

**Significance of Study**

By definition, students can only succeed in distance learning if they finish the courses in which they are enrolled. Therefore, in order for online learning to be successful, the issue of student persistence must be addressed. Kember’s position is “whether or not students complete a degree for which they have enrolled is a cause for interest or concern for several parties” (1995, p. 22). Students who enroll in a course or program and complete their intended goals will usually gain satisfaction and material benefits. As one measure of the increased value of a college degree, a student who completes a baccalaureate degree versus someone with a high school diploma will earn
on average $900,000 more over their life span (U.S. Census Bureau, 2002). On the other hand, students who fail to complete a course of study may be left disillusioned and discouraged and may never enroll in college courses again.

Another reason online persistence needs to be examined is because of the sheer number of students who fail to complete a course. According to Johnson (2003), some community colleges are reporting dropout rates 20% higher in online courses than in face-to-face classes. Carr and Ledwith (2003) found that some institutions experience a 40% dropout rate in their online learning courses. While there has been some work in the area of non-traditional student persistence in online courses, more needs to be done in order to fully understand this important topic.

**Assumptions**

As with any study, there are many assumptions that must be addressed prior to proceeding with the remainder of this thesis. One of the major points to address is that the goal of this study is to gain a better understanding of why students persist or fail to persist in an online course at two local community colleges, not to explain persistence in online programs universally. Another assumption is the fact that this study is looking at in-course retention and is not examining persistence towards degree completion. An additional assumption is that many of the constructs used to develop the theory in this study are taken from traditional studies of persistence, which examined strictly face-to-face students over a longer time period than one semester. A final assumption is that retention (the percentage of students who complete courses at a particular institution) and persistence (the successful completion of a course by a particular student) are separate,
but related concepts (Berger & Lyon, 2005). A greater understanding of individual student persistence can hopefully help improve institutional retention rates.

**Limitations**

As stated previously, persistence in online learning is a relatively new field so there will be limitations to this study. One of the major limitations with this study is that the data will be collected at only two institutions. Both of the institutions are community colleges. This group of students may be vastly different (age, full-time employment) than students at a residential four-year institution. Another limitation of this study is that it will only look at persistence for one semester in one course. In an ideal situation it would be best to study retention of online students throughout their entire degree program.

**Definitions**

With the study of online student persistence being a relatively new field of investigation in post-secondary research, it seems imperative to future research to provide definitions. As Berger and Lyons (2005) point out, it is extremely important to come up with common definitions so that researchers can measure comparable data in future studies. Not only are the definitions important, but it may also be useful for future researchers to understand the descriptive statistics associated with each definition. A variety of terms used in this paper are specific to distance learning, student persistence, and adult learning theory. Below is a brief list of these terms along with their definitions to aid the reader in gaining a better understanding about the topics being considered.
**Academic Failure** - Used here to classify those shown in institutional records as having failed to pass their course or program of study. In most institutions these figures also include informal withdrawals (Kember, 1995).

**Academic Integration** – The ability for a student to become engaged in the academic process. For example: a student developing an academic partnership with instructors or classmates via email (community building).

**Asynchronous communication** - asynchronous communication does not require that all parties involved in the communication be present and available at the same time. Examples of this include e-mail (the receiver does not have to be logged on when the sender sends the e-mail message); discussion boards, which allow conversations to evolve and community to develop over a period of time; and text messaging over cell phones. [http://www.definethat.com/define/270.htm](http://www.definethat.com/define/270.htm)

**Distance education** - distance education is planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, special methods of communication by electronic and other technology, and special organizational and administrative arrangements. [http://www.outreach.psu.edu/de/what_is_de.html](http://www.outreach.psu.edu/de/what_is_de.html)
**Functional navigation** - the ability for a student to understand and overcome the barriers to complete a course. Examples include: a student’s ability to log into the class website without problems or a student understanding how to apply for financial aid.

**Non-traditional student** - Defined by the National Center for Education Statistics

- Delays enrollment (does not enter postsecondary education in the same calendar year that he or she finished high school);
- Attends part time for at least part of the academic year;
- Works full time (35 hours or more per week) while enrolled;
- Is considered financially independent for purposes of determining eligibility for financial aid;

http://nces.ed.gov/

**Online learning** - any learning experience or environment that relies upon the Internet/WWW as the primary delivery mode of communication and presentation.

http://www.intelera.com/glossary.htm

**Persistence** – refers to the desire and action of a student to stay within the system of higher education from beginning year through degree completion. (Berger & Lyons, 2005). For this study persistence will refer to a student completing a course.

**Persistence in a course** – refers to the desire and action of a student to stay enrolled in a course from the first class to the end of the semester.
Retention – refers to the ability of an institution to retain a student from admission to the university through graduation (Berger & Lyons, 2005).

Social Encouragement: social encouragement refers to the degree to which the student is able to integrate the demands of part-time study with the continuing commitments of work, family and social life (Kember, 1995).

Success: a student has been awarded a passing grade in a course.

Synchronous communication - direct communication, where all parties involved in communication are present at the same time (an event), is a form of synchronous communication. Examples include a telephone conversation, a company board meeting, a chat room event, and instant messaging.

http://www.definethat.com/define/270.htm

Transactional Distance - refers to the idea that distance is pedagogical, not geographic, in nature.

Withdrawal – refers to the departure of a student from a college or university campus (Berger & Lyons, 2005). For this study the unit of analysis will be one course.

Conclusion

As online learning enrollments continue to grow, it is imperative that the research pertaining to it continues to grow at the same pace. Simply being satisfied with increased
enrollments is shortsighted. Institutions need a model to address why some students persist in this environment while others fail. This study will show a variety of factors that need to be examined in the student departure puzzle ranging from academic integration to social encouragement to functional navigation. Once there is a clearer understanding of what it takes for students to succeed, then policy decisions and academic and social support programs can be implemented to allow these students to do well.
CHAPTER 2

REVIEW OF THE LITERATURE

**Introduction**

The purpose of this section is to review the past and current literature relevant to this study. This section begins with a brief look back at the history of distance education and then proceeds with an examination of some of the relevant theories of distance education related to this study. The second section examines some of the central theories of adult learning relevant to the topic of adult student persistence. An examination of a variety of different theories of persistence is then provided before the conclusion to this chapter, which summarizes with a synthesis of the review of literature.

**Distance Learning**

History of Distance Learning

The history of distance learning is usually organized in terms of periods of emerging technologies (Moore, 1996; Nipper, 1989). The first generation of distance learning dates back to the 1800s and deals primarily with what is referred to as correspondence education. The second generation (1900s – 1950s) refers to the transition from solely print-based courses to the integration of radio, television, telephone, films, and audiotapes into the curriculum. The third generation of distance learning, which began in the 1970s, focused on the teleconferencing technology systems (satellites) and evolved to the use of the personal computer. The fourth (and current) generation is characterized by the digitization of information, the World Wide Web, and two-way video conferencing. Unfortunately, even though there is a compelling history that details
each of the four periods from a technological perspective, the issue of persistence is not found anywhere in the literature until the fourth generation. However, for this study, it may still be useful to examine the dramatic changes from paper and pen correspondence education to synchronous two-way streaming video from anywhere in the world. This approach is intended to provide the reader with an illuminating history of how the distance learning technologies have changed over time.

**First generation 1840s-1890s**

The roots of distance learning can be traced back to Great Britain in the year 1840 when Sir Isaac Pitman taught shorthand by correspondence. This development of the first distance learning course was directly related to the beginning of the “Penny Post” in England (Moore, 1996). This marks the beginning of not only distance learning, but also the beginning of technology and entrepreneurialism tied to the educational system. The next major development in the history of distance learning occurred in 1856 when a Frenchman, Charles Touissant, and a German, Gustav Langenscheidt, began teaching written languages via correspondence (Moore, 1996; Watkinson, 1991). The first example of correspondence learning on a large scale in the United States started with Anna Eliot Ticknor in 1873, who established the Society to Encourage Study at Home. During its twenty-four years of operation, she helped educate more than seven thousand students throughout the country (Moore, 1996). Ticknor, who came from a privileged background, devoted her life to educating women who were not afforded the opportunity to receive a formal education. The first university to use distance learning was the University of Chicago (1890s) with the development of its extension division, which was created to offer university courses by mail (Schlosser & Anderson, 1994). The main
drawback to this type of technology (mailing materials) was that it was a slow process that allowed for very limited interaction. As stated earlier, there were no known studies of persistence from this period, but given what we know today, high interaction between teacher and student is essential for improving persistence (Astin, 1984). Thus, one may assume retention rates were likely to be low throughout these earliest attempts at distance learning.

**Second generation 1900s-1950s.**

The next wave in instructional media was the development of instructional films, first created in 1910. The public school system of Rochester, NY, became the first to use these films. High school students would leave their institutions and attend a central building to view films. At that time, there was also the first of many unfounded notions that distance education would revolutionize the educational process. For example, Thomas Edison, proclaimed in 1913 that: “Books will soon be obsolete in the schools. . . . It is possible to teach every branch of human knowledge with the motion picture. Our school system will be completely changed in the next ten years” (Saettler, 1968, p.98). Yet, such predictions remain nothing more than unfulfilled speculations.

The next use of media in a distance learning model occurred in the 1920s with the advent of the use of radio for delivering educational programming for the University of Wisconsin (Purdy, 1983). Radio, like earlier instructional films, was thought at the time to be capable of revolutionizing higher education. Students would now be able to take classes with the best instructors without leaving home. Students would also be able to learn a variety of subjects that may now have been offered at the local college or university. Another perceived benefit would be the tremendous cost savings of not
having to build campuses and residence halls. Pittman (1986) quoted a statement in a 1927 presentation to the Federal Radio Commission from the State University of Iowa that revealed the optimism with which radio was regarded “…it is no imaginary dream to picture the school of tomorrow as an entirely different institution from that of today because of the use of the radio in teaching” (p. 40). Yet, again, this promise failed to materialize in any large-scale manner.

The introduction of television was the next type of technology used for educational programming and this occurred in the 1930s through the 1950s. The year 1934 marks the first time in history when television was used for an educational purpose. At this time, the University of Iowa was the first institution on record to attempt to provide educational programming via the television. The first credit courses offered were in the subjects of oral hygiene and identifying constellations. Just five years later the University of Iowa had broadcast nearly 400 educational programs (Unwin & McAleese, 1988).

After World War II, when television frequencies were established, 242 of the 2053 channels were set aside for educational purposes only. Moreover, there were examples of educational institutions partnering with commercial stations such as the relationship formed between Johns Hopkins University and the National Broadcasting Corporation (NBC). In this partnership, Johns Hopkins, instructors would provide the content and lecturer and NBC would coordinate the production and airing of the program. Students who participated in the educational program would be eligible to receive college credit from Johns Hopkins (Moore & Kearsley, 1996). Once again, during the period from the 1900s-1950s, there is no evidence that anyone was examining student
persistence in any of the various distance learning formats. Given our current knowledge about the complexity of learning and the existence of multiple learning styles, the use of radio, television, and films had to be an improvement for many students over traditional correspondence courses. However, this type of technology was still very much one-way that allowed the teacher to present to students, but did not allow students to interact with their instructors or other students. This provided little opportunity for student involvement and interaction, concepts that have come to be recognized as essential for student persistence.

**Third generation 1960s.**

In the 1960s, satellites used for educational programming were at the core of the next media wave. This new technology was being developed at the same time two important programs were being developed. The first was the University of Wisconsin’s Articulated Instructional Media (AIM) project and the creation of the British Open University. The AIM’s project was the first attempt to analyze distance learning from a systems perspective. This included finding ways to integrate the different learning media that were available at the time and conducting the first tests to identify the effectiveness of different types of technologies (Wedermeyer & Najem, 1969). The British Open University was the first program to succeed in taking distance learning to a large scale. The British Open University was created based on the findings of the AIM project and was established as the only open admissions, undergraduate, distance-learning university in England. Shortly after the success of the Open University, two new distance learning schools opened: Canada’s Athabasca University and the University of South Africa.
The advent of satellite technology, like previous technologies (films and radio), was another example of overly optimistic outlooks of its capabilities. The Carnegie Commission on Higher Education (1979) predicted that by the year 2000, more than 80 percent of off-campus and 10-20 percent of on-campus instruction would take place via satellite delivery. At this time, retention was just beginning to become an issue of concern for scholars and practitioners alike. Spady and others began examining persistence from the perspective of the four-year residential student. At this point, individuals involved with distance learning were so busy trying to “make things work” that they had no time to examine persistence (Kember, 1995).

**Fourth generation 1970s-today.**

The Internet began to be developed in the late 1970s and early 1980s as a joint venture between telecommunications companies, the National Science Foundation, and a handful of universities. By the late 1980s, the Internet could provide vast amounts of information on a wide variety of topics. The text-only based Internet, which relied on software programs like Gopher, was extremely useful, but still limited because it did not incorporate sound or graphics.

The World Wide Web, which was created by Marc Andreeson, at the National Supercomputer Lab in 1993, changed the information landscape forever (Inglis, Ling & Joosten, 1999). Using the same infrastructure as the Internet, World Wide Web technology gave colleges and universities the ability to integrate sound and graphics into what was originally simply text. The Internet’s graphic component, known simply as “The Web,” has been described as profoundly important as Gutenberg’s printing press of the 1400s (Dewar, 1998). The World Wide Web now has the ability for users to watch
live audio and video directly over the Internet on their personal computers. The number of people connected to the Internet is growing exponentially. A report from the Internet World Stats (2008) states the number of people connected to the Internet in 2000 was over 360 million users, with estimates that this number will grow to 1.4 billion in 2008. According to Global Reach the actual figures as of 2005 are 729 million users connected to the Internet (Global Reach, 2006). Clearly, the Internet and the World Wide Web have begun to permeate not only the educational world, but all segments of our increasingly inter-connected and global society.

**Synthesis of the History of Distance Learning**

The evolution of distance learning from simple correspondence courses to “state of the art” streaming video courses has been remarkable. Although the technology has improved, important questions remain. Researchers are still unsure what type of technology works best in which situation, or what type of student learns best through what type of instructional design. Without knowing how best to teach students, persistence rates are sure to suffer.

We are now in what is considered the fourth generation of technology this is the first time in distance learning history that people are beginning to examine the issue of persistence. Although there have been some studies conducted, there is still no grounded theory to draw on as we strive to systematically improve our knowledge about this increasingly important topic. Much of the existing literature (e.g. Berger & Milem, 1997; Tinto, 1987; Astin, 1984) on student persistence has shown that the interaction with peers and faculty is one of the major keys to persistence. Yet, distance learning tends to limit
this type of interaction and we have not even begun to adequately examine how this impacts persistence and other indicators of academic success.

**Benefits of Distance Learning to Institutions and Society**

Recent statistics suggest that more and more institutions are offering distance learning as an option for students’ education. Dasher-Alston and Patton (1998) reported that in 1995 the Middle States Commission on Higher Education found that 25 percent of its more than 500 member institutions were exploring, were planning to offer, or had organized distance learning courses. By 1996, that number had increased to 35 percent. The Middle States Commission projects that in 1998 that number will exceed 50 percent. (Dasher-Alston & Patton, 1998). Institutions are beginning to offer not only courses, but also provide complete degree programs exclusively online.

Some of the perceived benefits for offering online courses are that they allow students access to a larger and more diverse selection of courses. This is especially important for students who cannot attend a college or university due to either geographic restrictions or physical handicaps. Another perceived benefit for offering online courses is that it standardizes the curriculum. All students regardless of institution or instructor are learning the same information (Walsh & Reese, 1995).

Financial costs savings has been promoted as another perceived benefit for offering distance learning. For example, it has been suggested that institutions can now post course materials online and eliminate the need for their instructors from having to travel from campus-to-campus to teach the same course (Walsh and Reese, 1995).
Other arguments support distance learning as an option for an increasing number of students. One of the most persuasive was advanced by Diane Laurillard (1999) who reported the following:

According to Sir John Daniel, Vice Chancellor, Open University, half the world’s population is now under 20. Our traditional concept of campus teaching will deny higher education to nearly all of these youngsters. Yet providing them with education and training is not just a pressing issue for the countries concerned. This is a time bomb ticking under our collective security. Without vigorous action many of these young people will grow up to be unemployed, unconnected, and unstable. (p. 2)

We are now living in a global environment and Americans need to be concerned with not only educating our own citizens, but also our neighboring citizens from other countries. Colleges and universities need to seize the drastically improving technologies to enhance their vision of “whom” they should serve and how they should be educated. Distance learning can surely play a part in helping achieve this goal (Laurillard, 1999).

**Benefits and Drawbacks to Distance Learning for Students**

Despite the aforementioned possibility and promise of online learning; like its less technologically sophisticated distance learning predecessors, there are a variety of both advantages and disadvantages to taking online courses. Two of the major advantages are choice and flexibility. In terms of choice, students are no longer restricted to taking courses at locations that are within driving distance to them (Hammer & Shale, 1998). This increased form of access opens up a world of possibilities for students who in the past were forced to attend colleges in their local communities. In today’s online environment, a student living in a rural town could have the same online educational access as if he or she were living in a metropolitan hub. Furthermore, the flexibility of online courses allows students to take courses at their pace. This provides an obviously
ideal situation for traveling professionals and parents with children. This type of learning does not necessitate that students be required to drive to a campus and attend a course for three hours a week in an actual classroom.

Despite such advantages, there are also drawbacks for students taking online courses. Two of the most significant drawbacks are related to communication and socialization. One of the major problems with distance learning is the difficulty in communicating via email; it has been noted that some distance-education professors say they are surprised at how often students misinterpret messages online (Chronicle of Higher Education, 2002). Without face-to-face contact, there seems to be a greater chance of miscommunication. Another drawback for students is that it appears to be much more difficult to start and build relationships strictly via email. W. Allen Martin, a professor of sociology at the University of Texas at Tyler, reminds us, “we're social animals.” He added that face-to-face instruction "is what students need, and not being at the end of a cable" (Chronicle of Higher Education, 2002, p.A28).

While many would argue that distance learning should be an integral part of the higher education landscape; it is also important to consider, in more detail, the definition of and theories inherent in distance learning including: the theory of transactional distance and the theory of interaction and communication.

**Definition of Distance Learning**

Desmond Keegan’s (1990, p. 44) definition of distance learning provides a good starting point for understanding what we mean by this key concept:

1) The quasi-permanent separation of teacher and learner throughout the length of the learning process, which distinguishes it from face-to-face learning.
2) The influence of an educational organization both in the planning and preparation of learning materials and in the provision of student-support services, which distinguishes it from private study and teach-yourself programs.

3) The use of technical media (print, audio, video, or computer) to unite teacher and learner and carry the content of the course.

4) The provision of two-way communication so that the student may benefit from or even initiate dialogue, which distinguishes it from other uses of technology in education.

5) The quasi-permanent absence of the learning group throughout the length of the learning process so that people are usually taught as individuals and not in groups, with the possibility of occasional meetings for both didactic and socialization purposes.

However, Moore (1972) was the first person to define distance learning. He wrote that distance learning was:

the family of instructional methods in which the teaching behaviors are executed apart from learning behaviors, including those that in contiguous teaching would be performed in the learner’s presence, so that communication between the learner and the teacher must be facilitated by print, electronic, mechanical, or other devices. (p. 76)

Moore (1972) was also the first person to notice the absence of a theory to account for teaching and learning at a distance. Moore (1972) understood that if the field was going to succeed, distance learning needed to be grounded in principles that could be explained. According to Moore,

As we continue to develop various non-traditional methods of reaching the growing number of people who cannot or will not attend conventional institutions,
but who choose to learn apart from their teachers, we should direct some of our resources to the macro-factors: describing and defining the field; discriminating between the various components of this field; identifying the critical elements of the various forms of teaching and learning; and building a theoretical framework which will embrace this whole area of education. (1973, p.661)

Keegan (1986) concurs with Moore’s notion that in order for distance learning to succeed, building a theory is essential. According to Keegan (cited in Simonson, Schlosser, & Hanson, 1999), “a firmly based theory of distance learning is one that can provide the touchstone against which decisions—political, financial, educational, and social—can be made with confidence” (p.61). Holmberg (also cited in Simonson, Schlosser, & Hanson) further discussed the level of importance in developing a theory for distance learning and the necessity of having a strong theory in place to make decisions.

One consequence of such understanding and explanation will be that hypotheses can be developed and submitted to falsification attempts. This will lead to insights telling us what in distance learning is to be expected under what conditions and circumstances, thus paving the way for corroborated practical methodological application. (1999, p.61)

Given this need, I will examine two theories of distance learning that are directly related to the issue of student persistence in online courses – Moore’s Theory of Transactional Distance and Holmberg’s Theory of Interaction and Communication.

**Theories of Distance Learning**

**Theory of Transactional Distance**

One of the most powerful theories for distance learning is transactional distance -- a theory developed by Michael Moore (1996). The term transactional distance refers to the idea that distance is pedagogical, not geographic, in nature. In other words, when we are referring to distance education, it is not the separation of teacher and student in terms of where each is located, but how they deal with that separation from a teacher-student
interaction standpoint and from a course design standpoint. What must be examined from a pedagogical standpoint are ideas of how to account for instructional design and interaction procedures in distance learning courses. Boyd and Apps (1980) discussed the concept of transaction as follows: “It connotes the interplay among the environment, the individuals, and the patterns of behaviors in a situation” (p.5). According to Moore (1996), “The separation actually dictates that teachers plan, present content, interact, and perform the other processes of teaching in significantly different ways from the face-to-face environment” (p.200). Moore adds that "the transactional distance is such that special organizational and teaching behaviors are essential. How special will depend on the degree of the transactional distance" (p.201).

Moore (1996) classifies these special teaching behaviors into two clusters: dialog and structure. In Moore's (1996) theory, structure and dialog collectively measure transactional distance. If the course has substantial structure and there is no teacher-learner dialog, the transactional distance is high. In a course where there is more dialog and less structure, the transactional distance is lower. The transactional distance differs from program to program. The strength of the course structure and the degree of dialog can dictate what students are supposed to learn, how they can study, and what types of materials they need.

It seems that Moore would argue in order to minimize the transactional distance between teacher and student, it is best to create an environment that is more similar to what one may find in a typical graduate seminar course. In this type of course, there may be very little structure. Often students are given the opportunity to follow their interests
and research agendas. There is also very little in the form of lecturing and much more in terms of conversations between classmates and instructor.

**Theory of Interaction and Communication**

Borje Holmberg (1988) proposed the idea of guided didactic conversation, which he refers to as empathy. Holmberg argues that the most important factor in the success of a distance learning program is the interaction between the teacher and the student. According to Simonson et al. (1999), Holmberg argues “his theory had explanatory value in relating teaching effectiveness to the impact of feelings and belonging and cooperation and to the actual exchange of questions, answers, and arguments in mediated communication” (p.67). Holmberg (2003, p. 80) believes the following four hypotheses are important for distance students:

1) The stronger the conversational characteristics the stronger the students’ feelings of personal relationship to the supporting organization;

2) The stronger the students’ feelings that the supporting organization is interested in making the learning matter personally relevant to them, the greater their personal involvement;

3) The stronger the students’ feelings of personal relationship to the supporting organization and of being personally involved with the learning matter, the stronger the motivation and the more effective the learning;

4) The more independent and academically experienced the students, the less relevant the conversational characteristics.
Holmberg’s (2003) theory of interaction and communication is vital to improving persistence in distance education courses. When students feel they are part of their institution their chances of persistence increase. Holmberg’s (2003) other main point emphasizes the importance of making the subject matter to the individual.

**Synthesis of Distance Learning Theories**

The two distance learning theories demonstrate how designers/teachers can create and conduct their online courses to be the most effective for their students. Another major issue that needs to be addressed when courses are being designed is “knowing the audience”. The majority of students who are currently taking courses online are part-time, non-traditional students. The next section will focus on theories of how adults learn. It will describe several factors that instructional designers and teachers should consider when creating/teaching their online courses.

**Adult Learners**

As we have evolved as a society, our need to increase our level of education has increased. According to Hayes (1990), when we were an agrarian society, “Adulthood was considered to be a period of relative stability, or worse yet, a period of gradually declining physical and mental capacities, culminated by disengagement from social roles and relationships” (p. 25). As we moved to an industrial society, there was a need for technical training and educational programs to be able to understand the new technologies. As we enter the information age, some would argue knowledge is the most valuable commodity. This type of assertion can be supported by data from the National Center for Education Statistics. For example, in 1991, 33% of adults in the United States took part in some sort of educational program; that number has increased to 46% in 1999.
There was a 28% increase in the number of all United States residents’ aged 24 or older who participated in some form of adult education in an 8-year period (Creighton, S. and Hudson, L., 2002, p. 13). This trend is occurring at the same time that many state institutions are facing dramatic cuts in funding. This is where distance learning may be able to provide a vital role, not only for the students, but also, for the institutions trying to serve them. Hammer and Shale write,

The demand for higher education exists as a result of a relatively sharp increase in the number of women students and the greater number of working people participating in higher education. The data suggests that distance learning with new media and methods serves a new population. A distance-learning university is especially suited for people for whom traditional forms of education are either inappropriate or inaccessible; for example, people who are fully employed, geographically isolated, handicapped, or those whose preference is not to enter a youth-oriented environment but to study on their own. (1998, pp.19-20)

As resources decrease for public higher education and the need for adult education increases, the obvious question is: How can we best construct education programs for a wide range of adults? The first item to note is that adult students are capable and should learn at the same rate as typical undergraduate students. In a study conducted by Thorndike, Bregman, Tilton, and Woodyard (1928), which examined students between the ages of 14-50 on various memory and learning tasks, the researchers found, “teachers of adults of age twenty-five and forty-five should expect them to learn at nearly the same rate and in nearly the same manner as they would have learned the same thing at twenty” (pp. 178-179). Lorge (1947) found a flaw with the earlier study by Thorndike et al. (1928). In his study, where he not only controlled for previous education but also switched the focus away from timed tests, Lorge (1947) found that adults up to age 70 did as well as younger students. Schaie and Willis (1986) have found that as we
age, we perform better on some tests and less well on others, which in the end had a zero net effect. These studies have shown that adults are as capable of learning as traditional aged students, yet they also show that there may be differences in the way they learn compared to their younger counterparts. The following theories help explain the difference in the way adults learn as compared to traditional aged students. The greatest of these differences is the concept of andragogy as defined by Knowles (1975).

Adult Learning Theories

Andragogy Theory

Given that this study is examining persistence in online courses at community colleges and given that the average age of students who participated in this study was 37, it is essential to gain a better understanding of the differences between full-time, traditional aged students and non-traditional students in order to better understand why these students choose to persist or not. Malcolm Knowles (1975, 1980) was the first theorist to argue that adult students were dramatically different than traditional aged students. He argued that the word pedagogy did not accurately describe what was taking place in a classroom full of adult students. In 1975, Malcolm Knowles used the word “andragogy”—the art and science of helping adults learn—to describe adult learning.

Knowles (1975, 1980) defined the self-directed learning process as one in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes (1975 p. 18).

Knowles’ (1980) seminal work in andragogy set forth many assumptions about adult learners. Davenport posits that the following four ideas are at the heart of andragogy: As a person matures:
1. Self-concept moves from dependency towards self direction;

2. An accumulating reservoir of experience is acquired; this becomes an increasing resource for learning;

3. Readiness to learn is increasingly oriented towards the person’s social goals; and

4. The orientation is towards learning less subject-centered and increasingly problem-centered. (1987, p.18)

According to Pratt (1993),

Andragogy appears to rest on two implicit principles of learning: First, knowledge is assumed to be actively constructed by the learner, not passively received from the environment; and second, learning is an interactive process of interpretation, integration, and transformation of one’s experiential world (p. 17).

Knowles, unlike some other theorists, lays out methodological/practical tenets or, as he refers to it, as “andragogical process design”. In order to actually implement a learning environment that is focused towards adult learning, Knowles writes that there are seven elements that need to be considered. They include:

1. setting

2. involving learners in mutual planning

3. involving participants in diagnosing their own needs for learning

4. involving learners in formulating their learning objectives

5. involving learners in designing learning plans

6. helping learners carry out their learning plans, and

7. involving learners in evaluating their learning. (Knowles, 1984, p.17)
One of the major, but often overlooked, points of Knowles’ work is understanding that the relationship between students and instructor or facilitator is the real key to student success. Knowles’ concept of andragogy was the beginning of an entirely new field. Another key theory that followed andragogy was the idea of the self-directed learner.

**Self-directed learner theory**

Stephen Brookfield is a preeminent theorist in self-directed learning. To Brookfield (1986), self-directed learning is a cognitive process grounded in reflection and action “whereby we learn how to change our perspectives, shift our paradigms and replace one way of interpreting the world by another” (p. 19). Brookfield argues that successful self-directed learners needed to be field-dependent learners. Brookfield (1986) states that field dependent learners, are aware of context, extrinsically oriented, responsive to external reinforcement, are cognizant of the effects that their learning has on others, and view things holistically. Field independent learners are more likely to be inner-directed, individualistic, analytical, socially independent, and possess a strong sense of self-identity. This idea proposed by Brookfield (1986) contradicted the idea held for years that learners were field independent. According to Brookfield (1986),

> We have to rethink very critically the notion that the single-mindedness, planning capability, and goal orientation characteristics of field independent learning are somehow superior to the field dependent’s awareness of contextuality (p. 42).

In a similar vein, Lucy Guglielmino (1977) argues that the academically successful adult student is a self-directed learner. According to Guglielmino, “Self direction in learning can occur in a wide variety of situations, ranging from teacher-directed classroom to self-planned and self-conducted learning projects” (1977, p.34).
Guglielmino argues that not all learners will be equal when it comes to their success with self-directed learning because factors such as attitudes, backgrounds, beliefs, and abilities, ultimately determine whether self-directed learning will take place in a given learning situation. The self-directed learner more often chooses or influences the learning objectives, activities, resources, priorities and levels of energy expenditure than does the other-directed learner (1977, p.34).

**Measurement of Self-Directed Learning**

The most widely used scale for measuring self-directed learning was developed by Lucy Guglielmino (1977). Guglielmino developed the Self Directed Learning Readiness Scale (SDLRS) to measure the level of self-directedness with a given student. Guglielmino, who relied on 14 experts in the field of adult education to develop her model, asked each of these experts to name and rate characteristics they considered important for self-direction in learning. Characteristics that were commonly reported and then used in her survey instrument include:

1. openness to learning opportunity
2. self-concept as an effective learner
3. initiative and independence in learning
4. informed acceptance of responsibility for one’s own learning
5. love of learning
6. creativity
7. future orientation
8. ability to use basic study skills and problem solving skills
The SDLRS scale is a 41-item Likert scale instrument that Guglielmino stated had a 0.87 reliability using the Chronbach-Alpha coefficient. As stated previously, the SDLRS is the most widely used instrument for measuring self-directed learning; however, there are some critics of the model. Among them, Brockett (1985) questioned two things specifically. The first problem Brockett identified was the instrument design and the assumptions on which the instrument was based. The second concern Brockett voiced was in the way Guglielmino defined self-directed learning readiness and its lack of a theoretically sound basis as an operationalized construct.

**Synthesis of Adult Learning Theories**

The theories of andragogy and self-directed learning are both important theories that are still being developed. With the large increase in adult students enrolling in higher education, this field of inquiry will surely expand, and the resulting research can help us to understand how we can improve persistence rates of adult students.

What researchers like Knowles, Brookfield, and Guglielmino have shown us thus far is that adult students do in fact learn differently from traditional aged students. When examining which factors influence adult student persistence in online education, we need to be aware of this fact. Issues such as allowing the student to take ownership of their education or the level of transactional distance present in a course are key factors that appear to influence persistence.

It seems apparent that one of the major factors in whether or not a student persists in an online environment depends greatly on their ability to be independent learners and self-motivated. The research from Guglielmino with the creation of the SDLRS will hopefully help institutions and students identify who may or may not be suitable to enroll.
in online courses. However, this type of knowledge alone is insufficient to better understand and improve student persistence; a point that is elaborated upon more fully in the following section.
**Student Persistence**

Models or theories can be useful in trying to understand why students persist at much lower rates in online courses than in face-to-face courses. There are several theories and models we can use to provide the necessary insight into this issue. For the purposes of this study, five different models seem particularly insightful, they include: Tinto’s Model, Adult Student Persistence Models, Distance Learning Persistence Models, Astin’s Theory, and Berger and Milem’s Theory. The first to be examined is probably the most cited model of student persistence (Braxton, 2000), which is the Tinto Model (1975). Although Tinto’s Model is useful when developing a model of student persistence, it was created to examine factors influencing student persistence for strictly residential students. The second model to be examined is persistence models developed for adult students. The main model that will be studied in this area is Bean and Metzner’s Model (1985). Bean and Metzner’s Model is derived from Tinto’s Model, but it is geared towards adult students who are by nature commuters and deal with a variety of different issues than traditional aged students. The third model that will be examined are persistence models for distance learning environments. The two main models that will be examined are the Billings Model (1988) and Kember’s Model (1995). Billings and Kember attempt to take the strengths of Tinto’s Model and apply them to correspondence education. The fourth model to be examined is Astin’s theory of student persistence. Astin’s theory, unlike the previous researchers, has no grounding based on Tinto’s work. Astin’s model, unlike all of the previous models mentioned, is concerned with student involvement and behaviors (rather than emphasizing student perceptions) and their influence on student persistence. Finally, the work of Berger and Milem Model (1997) is
addressed as they were the first to combine Tinto and Astin’s model into one comprehensive model that investigated the influence of both student behaviors and perceptions while also controlling for individual student characteristics.

Tinto’s Model of Student Persistence

Tinto’s model (1975) appears to be “the best starting point of a model of persistence applicable to open learning and distance education courses.” (Kember, 1995, p.35) Tinto’s model is the most widely respected, widely cited, and widely tested empirically (Bean & Metzner, 1982). Many of the earlier studies before the work of Tinto simply examined single variables and tried to explain persistence based on those variables. These early studies found that even when they combined variables and used multiple regression designs they still were able to only explain small proportions of the variance (Kember, 1995). Tinto’s model, as can be seen below, uses path analysis to explain the variance.
Figure 2.1: Tinto's Model of Student Persistence

Tinto’s model was derived from earlier work by Spady (1970) who developed a longitudinal model of student persistence. According to Kember,

A longitudinal model is attractive in that it has provision for interpreting effect on the student of the course and support services provided by the institution and the degree to which study is compatible with the student’s lifestyle. It recognizes the potential impact of interventions by the institution and events in the student’s life rather than merely relating the dropout phenomenon to a set of apparently predestined variables. (1995, p.35)

Tinto’s model relied heavily on two other scholars’ work, which were Van Gannep’s (1960) studies on rites of passage and Durkheim’s (1961) theory of suicide. Tinto was able to use these two sociological models to better understand the student departure puzzle. Van Gannep’s (1960) theory on right of passage incorporated the
following three steps: separation, transition, and incorporation. Tinto believed that Van Gannep’s three stages in any rite of passage were quite similar to the movement of students beginning the college process. The first phase of separation deals with leaving one’s local community for an entirely brand new community. Some students will be able to make the transition while others simply will not. The second stage of transition requires students to assimilate themselves into the college community on both a social level and an academic level. The greater the difference between the norms of the students’ backgrounds and the institutional norms, the harder this process will be. The final phase of the process is incorporation. At this stage students become fully integrated into the fabric of their institution from both a social perspective and an intellectual perspective.

As Tinto (1975) notes, Durkheim’s (1961) theory of suicide is one of the more interesting parallels to student departure. Durkheim described four different behavioral reasons for suicide: altruistic, anomic, fatalistic, and egotistical. Tinto argued the reason for suicide most closely associated with student departure was egotistical. According to Kember (1995), “Tinto believed egotistical suicide is the form which is most relevant to student persistence because it is symptomatic of individuals who become isolated from society’s communities because of an inability to integrate and establish membership” (p. 38). Durkheim postulates that suicide could occur if two forms of integration were not present. The first was social integration—the individual was able to form personal relationships with other members of their society. The second was values integration—the individual is able to find commonalities with the values of the new community. Tinto (1975) argues that dropout was more likely to occur among students who were unable to
establish membership into their institutions’ social network, or who were unable to rectify differences in previous beliefs and norms from that of the institutions beliefs and norms.

As noted in the Figure 2.1, the first part of Tinto’s model deals with a student’s pre-entry characteristics. Tinto (1993) states’ that individuals enter their respective colleges with wide ranging backgrounds, which include differences in family and community backgrounds, personal attributes, skills, financial resources, dispositions, and various types of pre-college experiences.

The second part of the Tinto (1993) model deals with the issue of commitment from both a personal perspective and an institutional perspective. This part of the model tries to identify an individual’s personal commitment to succeeding in a particular field or career. At this stage in the model, a student’s level of commitment to his or her particular institution is measured.

The third part of the model examines integration from both an academic perspective and a social perspective. Are students able or willing to integrate into their new environments or should they try another fit with a different institution? Although this model was developed to identify persistence patterns in full-time residential students its applicability to distance learning situations is quite valid. According to Kember, Tinto’s model “has not only been used to interpret attrition studies in face-to-face teaching but has been cited in studies related to distance learning [(e.g. Thompson (1984), Sweet (1986), and Taylor et al. (1986) have all used Tinto’s model for persistence studies (1995, p.35)].
Student Progress Model Related to Adult Students

Although Tinto’s model is an extremely useful tool, other models largely based on Tinto’s model are more applicable to part-time adult students. Bean and Metzner (1985) developed a model for non-traditional students, which they defined as:

1. Older than 24;
2. Not living on campus;
3. Attending part-time;
4. Not greatly influenced by the social environment of the institution; and
5. Primarily interested in taking courses, receiving certification, or earning a degree.

Bean and Metzner’s (1985) model was based on the following four themes: academic performance, intent to leave, background and defining variables, and environmental variables. Bean and Metzner (1985) suggest, “the chief difference between the attrition process of traditional and non-traditional students is that non-traditional students are more affected by the external environment than by the social integration variable affecting traditional student attrition” (p. 485). Bean and Metzner’s model is one of the first that examines how much of a role the external environment had on a student’s success in persisting. At this point it seems like a relatively simple idea to include the external environment, but up to their study little was written on its effects. For this study it is especially important to factor in the external environment (e.g.: job, family, social commitments) since all participants will never be interacting with classmates face-to-face.
Student Progress Model Related to Distance Learning

**Billings Model**

Billings (1988) proposed a model based on Bean’s model and Tinto’s model to explain persistence in correspondence courses at the university level. Prior to her work, other researchers attempted to examine persistence in a distance learning environment, but she was the first to examine it using a linear longitudinal model. In an effort to make Bean’s and Tinto’s model more applicable for distance learning students, she included family and employment related variables. Billings’ model (Moore & Kearsley, 1996) represents a series of relationships among causal, additive, and correlational variables. Causal variables include organizational variables such as GPA, class level, experience with correspondence courses, and classmate support. Additive variables include outcome/attitudinal variables such as practical value, educational goals, loyalty, satisfaction with course/lessons, difficulty with a course, feedback, and isolation. Correlational variables include environmental variables such as employment, employer support, family responsibilities, family support, and proximity to instructor.
Billings (1988) asserts that, “attrition from correspondence courses is not unique to the medium of instruction, but rather it is more similar to drop out from any undergraduate program” (p.32). This study by Billings focuses on the fact that any retention model that will be useful must be longitudinal. The process that leads a student to decide whether to persist is usually not triggered by one event; rather it is a series of events that ultimately make a student decide if they are going to continue with their education.

**Kember’s Model**

According to Moore and Kearsley (1996), “Kember presents a model for student progress that focuses specifically on adult learners in distance education courses” (p. 209). In his seminal work on persistence in distance learning, *Open Learning Courses for Adults a Model of Student Progress* (1995), Kember proposes his model, tests his
model, and replicates his model for validity. He bases his model (see figure 2.3) largely on what many believe to be the preeminent model for examining persistence, the Tinto Model. Kember argues that the Tinto model is ideal for the typical 18-22 year old residential student, but needs significant modifications to be of any use for open learning courses. Kember is proposing that factors (including juggling school responsibilities with those related to full-time employment, spouses, family care, etc.) outside the academy that play a significant role in whether a student will persist or not differ dramatically from what most 18-22 year olds face.

Kember’s model, like Tinto’s model, is a longitudinal model that uses path analysis to determine statistical significance, but that is where the similarities to the two models end. Kember’s Model is designed for open learning courses, which usually do not include the 18-22 year old residential student. Kember is looking at entry characteristics such as age, years worked, sex, marital status, salary, and qualification/educational background.

Kember’s model then branches off in two paths, which he refers to as the positive path and the negative path. Students on the positive path will proceed to the social

![Figure 2.3: Kember’s Model of Student Persistence in a Course](image-url)
integration stage of the model, which measures factors such as enrollment encouragement, study encouragement, and family environment. If students are on the positive path, they will proceed to the academic integration stage of the model, which measures factors such as a serious approach to learning, an intrinsic motivation for taking the course, and positive course evaluation. If students are on the negative path at the entry characteristics stage, they progress to the external attributes stage of the model, which measures items such as insufficient time, unexpected events, and distractions. If students continue on the negative path, they then proceed to the academic incompatibility stage of the model, which measures items such as surface approach to learning, extrinsic motivation and negative course evaluation.

All students, whether on the positive or negative track, factor in their grade point average and then face one of the more interesting notions of this model, which Kember refers to as a cost-benefit analysis. During the cost-benefit analysis stage students need to weigh the benefits from staying enrolled in the course versus the benefits from dropping the course.

**Astin’s Theory of Student Persistence**

All of the models mentioned to this point were largely based on Tinto’s earlier work. One of the major drawbacks with Tinto’s model, and others that followed his work, is that these models relied heavily on student perceptions and failed to take student behavior into account. Astin’s theory of persistence is based largely on the notion that student involvement is what influences student’s decisions to persist or not. Astin argues that the more students get involved, either socially or academically, the greater their chances of persisting. According to Berger and Milem (1997), “Astin was clearly
describing involvement as behavioral in meaning” (p.387). Astin (1984) suggested the following five postulates for his theory on student persistence:

1) Involvement refers to the investment of physical and psychological energy in various “objects”. The objects may be highly generalized (the student experience) or highly specific (preparing for a chemistry examination).

2) Regardless of its object, involvement occurs along a continuum. Different students manifest different degrees of involvement in a given object, and the same student manifests different degrees of involvement in different objects at different times.

3) Involvement has both quantitative and qualitative features. The extent of a student’s involvement in, say, academic work can be measured quantitatively (how many hours the student spends studying) and qualitatively (does the student review and comprehend reading assignments, or does the student simply stare at the textbook and daydream?)

4) The amount of student learning and personal development associated with any educational program is directly proportional to the quality and quantity of student involvement in that program.

5) The effectiveness of any educational policy or practice is directly related to the capacity of that policy or practice to increase student involvement.

**Milem and Berger’s Modified Model of Student Persistence**

In 1997, Berger and Milem created a modified model of student persistence. Their model (see figure 2.4), which was the first of its kind, was based on arguably the two most preeminent persistence theorists in all of higher education, Tinto and Astin.
Milem and Berger theorized that by integrating Tinto’s theory of student departure with Astin’s theory of involvement they would get a clearer understanding of what allows students to persist. Although their study was conducted at a private, mostly residential campus, it still has strong applicability towards this study because of its unique ability to combine the strengths and eliminate the weaknesses of Tinto’s and Astin’s model.

Berger and Milem (1999) later revised their earlier model (1997) to include, not only the direct effects of the variables on one another, but also to measure the indirect effects of the variables on each other. According to Berger and Milem (1999), “specification of both direct and indirect effects provides a more complete picture of how different constructs within a model affect each other” (p. 642).

The variables they use for this model were a blend between Tinto’s idea of academic integration and Astin’s idea of the importance of involvement. The variables they used were:

1) student background characteristics
2) initial commitment (IC1)
3) mid-fall behavioral/involvement measures
4) mid-fall perceptual measures
5) mid-spring behavioral/involvement measures
6) academic and social integration
7) subsequent commitment (IC2)

One of the major findings of their research was that students were more likely to persist at an institution if their values, beliefs, and norms were more congruent with the typical values of their institution. “For example, students who were least like the dominant peer group on campus, particularly with regard to race and political attitudes were least likely to persist” (1999, p. 661). Most importantly, they confirmed that examining both perceptual and behavioral constructs improved the explanatory power of the model. Although one of the limitations of this study was that it was conducted at a highly selective private institution, it still provides a useful example of the interaction of Tinto’s and Astin’s models.

**Synthesis of Retention Models and Theories**

All of these models and theories of persistence provide useful insights into developing a new theory of student departure for online courses. The common themes that seem to be at the core for attempting to understand persistence in an online environment include background characteristics, academic involvement, and ability to incorporate responsibilities and relationships of the external environment (Berger & Milem, 1997; Tinto, 1987; Astin, 1984; Kember, 1995; Billings, 1988; Bean & Metzner, 1985).

All of the models presented validate the importance of incorporating students’ background characteristics as a key component of any model. The *background*
characteristics provide some starting points and insight as to the students’ mindsets when they are beginning a college course.

The next concept that appears necessary to include in a model of persistence of online courses is academic involvement. I chose the term academic involvement because it seemed to follow the idea of Berger and Milem that it is useful to integrate Tinto’s and Astin’s models. Academic integration takes into account behaviors that Astin showed were essential. In an online environment the notion of academic involvement will vary somewhat from the more traditional classroom environment. Academic involvement in this type of environment will include the type of interactions students have with faculty and study groups, with the understanding that these interactions will be done electronically.

Bean and Metzner and others have shown the importance the external environment plays for improving retention for non-traditional students. Online students, as stated previously, are typically older students who have full-time jobs and other responsibilities such as raising a family. For this type of student, the external environment (work/family) is crucial in terms of support received (Bean and Metzner, 1985; Kember, 1995).

The last major idea or theme of the proposed model is the notion of functional navigation. This idea builds upon Tinto’s (1975) and Berger’s (2000) assertions that students must be able to navigate the basic academic, social and organizational structures if they are to persist. In the context of online learning, issues that will be addressed in this area range in topics from financing a college education to instructional design to technology readiness to having an up-to-date computer.
Other Factors Related to Student Persistence

The previous discussion of key models has focused primarily on what happens to students while enrolled in a college or in a class as the key determinant of persistence. However, as demonstrated by most of these studies – we need to take a variety of personal characteristics into account in order to understand persistence. These include finance and technological readiness; and because this study focuses on online learning, issues of instructional design must also be addressed. Each are explained more fully below.

Economic Influences on Persistence

Since the early 1980’s, the link between a student’s ability to afford higher education and their ability to persist has been closely examined (Cabrera, Nora, & Castenada, 1992). The “ability to pay” model is one of the most recognized models and it was developed by Cabrera, Stampen, and Hansen in 1990. In this model, the researchers believed that a student’s ability to afford higher education was a precondition for both cognitive and non-cognitive outcomes. The reasoning was that if a student did not need to worry about finances, then it would allow them more time to devote to both academics and the social life in college. By not working on campus or off campus, students would be free to experience the college life.

Another financial persistence model that is widely cited is the college choice-persistence nexus model (St. John, Paulsen, & Starkey 1996). This model was designed to incorporate a student’s perceived ability to pay with student-institution fit perspective. This model examined persistence as a three-stage process. At this first stage, socioeconomic background and academic ability were believed to affect a student’s
decision on whether to attend college or not. At the second stage, a student would begin
to conduct a cost-benefit analysis on various institutions and would develop an initial
commitment to an institution that was favorable. The third stage is when the student
actually entered college. At this point things such as the type of college attended, social
experiences encountered, academic performance either strengthened or weakened a
students decision on persistence.

These two models, the ability to pay model and the college choice nexus model
are both comprised of tangible and intangible factors. The tangible factors are whether a
student can afford a college education and all its associated costs. The second factor is
more intangible. It is the student’s self-perceived ability to afford higher education. It is
important to note that institutions need to be aware that there are tangible and intangible
factors related to a students’ ability to persist when it comes to finances.

**Instructional Design/Pedagogy**

One of the more often overlooked notions of teaching online courses is that you
teach the same way as you have in face-to-face environments. However, research shows
that this does not work (Gold, 2001). The entire pedagogy changes for online education,
making it vastly different from face-to-face instruction. Because the subject is so new,
there is very little theory regarding what works in terms of teaching strategy for online
learning. However, there is a tool that was developed at the University of California,
Chico campus (http://www.csuchico.edu/celt/roi/). The tool analyzes online
effectiveness with six different measurements:

- learner support and resources
- online organization and design
- instructional design and delivery
- assessment and evaluation of student learning
- innovative teaching with technology
- faculty use of student feedback

The rubric is based on a scale of either baseline, effective or exemplary. This tool produced by UC Chico provides useful insights into which practices have an effect on effective distance learning pedagogy, which in turn may have an effect on student persistence (Sloan, 2001).

**Technology Readiness**

Similar to instructional design, there is still little theory in terms of technology readiness for online students. This is an issue that can really be separated into two sections. The first section is the technological hardware requirements for the course. This is usually an institution specific requirement. For example a typical online course may require the following:

1) Pentium III 600 MHZ processor or higher
2) MS Windows XP
3) 500 MB on system drive and 1.5 GB available space on installation drive
4) CD-ROM or DVD-ROM drive
5) USB ports for flash drive accessibility
6) Super VGA monitor (1024x768 or higher resolution display)
7) Mouse
The second issue has more to do with a students’ comfort level with the computer. Institutions should attempt to understand what computer skills students’ currently possess. The skills below appear to be the most commonly required:

1. Proficiently navigate through the WWW, use search engines, and perform assorted e-mail and word processing tasks.

2. Know how to use a word processing program like Microsoft Word.

3. Know how to Copy and Paste from one screen to another.

4. Know how to "bookmark" (add "Favorites") to my bookmark file.

5. Familiar with organizing my e-mail, bookmarks, and word documents into files and folders.

6. Familiar with using threaded discussion boards and/or chat rooms.

7. Know how to send and receive attachments.

8. Basic knowledge of Windows operating system.

[Links provided]

Some institutions, like Washburn University, offer actual training programs to assist students in learning the technical skills required to be successful in a distance learning environment.

If institutions of higher education want to seriously begin to understand why students are persisting at lower rates in online courses, a new way of looking at the
problem must be developed. The generic heading used in this study “functional navigation” begins to address some changes in an attempt to gain a fuller understanding of why students do not persist. The specific issues of instructional design and technology readiness are important issues to examine when dealing with online courses.

**Summary of Relevant Literature**

It is important to reexamine some figures to understand the enormity of this situation. With the development of the World Wide Web and faster Internet speeds, online education is exploding. In terms of a financial indicator, online education is a $5 billion a year industry according to the *Chronicle of Higher Education*, (January 7, 2005). Additionally, a majority of all online students are non-traditional. From a recent study conducted by the Connecticut Distance Learning Consortium (2003), 95% of students registered for all online courses were 25 years or older. Research clearly demonstrates that distance learning is continuing to grow at remarkable rates and it is the non-traditional population that is mainly attracted to this form of learning, whether for convenience or simply choice. It is commendable that institutions are trying to fill an ever growing niche, but the problem remains that we need to learn more about how well these institutions are actually succeeding in educating these students. As Johnson (2003) notes, there is a 20% higher dropout rate in online courses versus face-to-face courses. Institutions need to get a better idea on how to increase persistence. If they do not, they can surely expect that policy holders (i.e. board members and legislators) are going to be demanding answers.

By drawing upon distance learning theory, adult learning theory, and student persistence theory the building blocks are in place to better examine why students are
persisting at such low rates in online education. Using the literature in this chapter as a reference, I will develop a theoretical model and test it for validity. A survey will be developed and administered to attempt to address the issue of understanding the barriers of adult student persistence in online education.
CHAPTER 3
METHODOLOGY

Introduction

This chapter will describe the research methodology employed in this study. In particular, this chapter will discuss the following components of the project:

1) Conceptual Framework
2) Narrative of the Model
3) Research Questions
4) Research Design
5) The Setting
6) Population of the Study
7) Data Collection
8) Survey Instrument
9) Limitations Regarding Validity
10) Data Analysis

The purpose of this chapter is to provide other researchers with a clear understanding of how and why this study was conducted so that they might judge the appropriateness of the research design for their use and be able to replicate this study.

Conceptual Framework

The conceptual framework described in this chapter is aligned with the research literature presented in Chapter Two. Given that distance learning is still in its infancy, the research on student persistence in online courses is limited at best. A review of the
handful of research studies that have been published revealed that most merely examined single variables and their effect on student persistence. Also, there have been no studies that have looked at how behavioral and perceptual factors affect online student persistence.

The proposed model in this study will be based largely on the work of Berger and Milem (1997, 1999), and Kember (1995). Berger and Milem’s model was chosen because it was groundbreaking work that incorporates the ideas of the two most respected researchers in the area of student persistence [i.e.: Tinto (1993) and Astin (1984)]. Berger and Milem’s model draws heavily on Tinto’s notion of student perceptions and the back-and-forth interactions students have with peers and faculty. Further, Berger and Milem’s model incorporates Astin’s notion of tracking student behaviors. Astin firmly asserts in order to study student persistence, researchers must understand what students are doing on a day-to-day basis (e.g. how many hours a student studies or how much time they spend with peers).

Kember’s work also guided the design of this study. Kember’s model, which built on the work of Tinto, is probably the most widely-known model in the area of tracking student persistence in distance learning. Kember’s model is appropriate for this study because it addresses distance learning from a pedagogical standpoint and the unique issues adult students face such as demanding work schedules and parental responsibilities.

Based on the research by Berger and Milem, and Kember, this study will propose a new model of student persistence that addresses the population of non-traditional students enrolled in distance learning courses. The proposed model will be a blend between Berger and Milem’s, Kember’s and some newly added concepts.
From this conceptual framework, the following model (Figure 3.2) was developed for studying persistence of adult students in online education:
The intention of this narrative is to provide a descriptive outline for the proposed model for predicting adult student persistence in online education. The model is composed of four primary blocks that contain the independent variables for this study:
background characteristics, academic integration, social encouragement; and functional navigation. The fifth and final block contains the lone dependent variable, student persistence. One of the major differences in this model, compared to other retention models, is that it measures not only student perceptions, but also student behaviors.

The purpose of the first section in this model, as in many other retention models, is to describe the background characteristics of the student population. This model examines a variety of typical variables one would normally see in a retention model: parent’s level of education, salary, age, etc. However, this model also attempts to measure background characteristics specific to online learning, such as previous numbers of online courses taken and completed.

The second section of this model examines academic integration from both a behavioral and perceptual perspective. Academic integration attempts to measure a student’s ability to “fit in” academically with peers and instructors, and gain insight into the student’s overall ability to succeed in the course. The survey questions attempt to examine not only what students are feeling about the online course but also specific information regarding their behavior related to the online course. For example, a behavioral question may examine how often the student emailed their instructor each week and then ask a follow-up perceptual question regarding whether they believed the instructor replied to email questions in a timely fashion. This section deals with areas such as interactions with instructor; interactions with peers; course assignments; interactions with tutors; time spent on course; course evaluation; instructor evaluation; satisfaction with experience, etc.
The third section of this model examines social encouragement from both a behavioral and perceptual perspective. The survey questions in this section attempt to examine students “ability to juggle” school, work and family responsibilities. For example, a behavioral question in this section surveys how many hours the student spends at work per week. A perceptual question in this same area might attempt to address how the student views his or her employer’s support of them pursuing their education. An example of this type of question might ask the student to rate the level of emotional support he or she is receiving from their employer to return to school.

The fourth section of this model deals with functional navigation from both a behavioral and perceptual perspective. The survey questions in this section attempt to examine the student’s ability to navigate the possible barriers in completing an online course. An example of a behavioral question in this section is asking students if they have access to a computer from home. An example of a perceptual question might ask the students to rate the ease of navigation of the class website.

The final section of this model examines the dependent variable in this equation, which is persistence. At the end of the semester, the institutional research offices where the study is being conducted will provide a list of all of the student’s final grades.

**Research Questions**

The research questions for this study are:

1. What factors or student characteristics contribute to non-traditional students’ persistence in online courses?

2. What factors or student characteristics impede non-traditional students’ persistence in online courses?
Research Design

This quantitative study will employ an exploratory factor analysis, descriptive statistics, correlations analysis, mean comparisons and multiple logistic regression to determine which factors influence student persistence. As noted by Costello and Osborne (2005), exploratory factor analysis (EFA) is a widely accepted method for analyzing data. As noted by Garson (2005), “EFA seeks to uncover the underlying structure of a relatively large set of variables. The researchers’ a priori assumption is that any indicator may be associated with any factor. This is the most common form of factor analysis. There is no prior theory and one uses factor loadings to intuit the factor structure of the data” (p. 1). Exogenous variables in the model include the measures of student background characteristics. All the other variables are being considered as endogenous.

The Setting

The study draws its sample from two community colleges in Connecticut. The first college, which has a student population of over 3,600 students, is located in suburban central Connecticut. The average age of the student is 27 years old. The gender distribution is 61% female and 39% male. Seventy eight percent of the student body is classified as white and 22% are considered non-white. The college currently offers over 30 courses online. The online courses are offered during a traditional academic semester. All of the courses are conducted asynchronously so there is no specified meeting time. Blackboard course software is the vehicle used to deliver the course content. There are in-person orientation sessions before the semester begins to train students on Blackboard.
The second college, which has a student population of over 1,900 students, is also located in central Connecticut. The average age of the student is 40 years old. The gender distribution is 60 percent female and 40 percent male. Sixty-nine percent of the student body is white and 31 percent are non-white. This institution offers certificate and associates degrees. The college began offering distance learning courses in 2002. Presently, there are 40 online courses per semester. The courses cover a variety of topics ranging from Principles of Management to Technical Writing.

There were a total of 55 classes that were surveyed with subjects including, art history, accounting, biology, criminology, communications, English, finance, history, mathematics, management, nursing, philosophy, political science, psychology, and sociology. All of the courses are conducted asynchronously so there is no specified meeting time. *Web CT/Vista* is the course management software that is used to deliver the content of this course. Students are given the option of training for the online courses before the semester begins.

**Population of the Study**

There were 476 students who were surveyed for the Fall 2006 semester. There were 375 females and 101 males surveyed. The ethnic breakdown was the following: 77% white and 23% non-white. The average age of the student was 37 years old. The chart below shows a breakdown of the numbers of students by age:

<table>
<thead>
<tr>
<th>Age</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-25</td>
<td>81</td>
</tr>
<tr>
<td>26-30</td>
<td>66</td>
</tr>
</tbody>
</table>
The response rate for this survey was 52 percent. In order to make this a confidential survey, student identification numbers were used to track their progress.

**Data Collection**

An online survey was developed and posted to a secure web server utilizing encrypted software. Students were contacted via email three weeks after the semester had begun and asked to complete the survey. Students who did not fill out the survey immediately were then contacted via email twice per week for three weeks as a reminder to complete the survey.

**Survey Instrument**

A questionnaire was developed to collect data on the non-traditional students enrolled in online courses to gain a better understanding of what factors affect student persistence. This survey drew heavily on the work of two separate studies: Berger and Milem’s study (1997) and Kember’s study (1995).

The questionnaire was designed to address the research questions and attempted to gather information on background characteristics, academic integration, social encouragement, and functional navigation. The questions attempted to address both student perceptions and student behaviors.

The survey is divided into four sections. The first section of the survey deals with academic integration from both a perceptual level and a behavioral level. There are 31
questions on topics such as interaction with instructor, interaction with peers, interaction with tutors, time spent on course, completing course assignments, course evaluations, instructor evaluations, satisfaction with experience, and learning preferences. The second section of the survey deals with social encouragement from both a perceptual level and behavioral level. There are 16 questions covering topics such as time spent on things other than school, time spent for family responsibilities, interpersonal relationships with friends, interpersonal relationships with family, interpersonal relationships at work. The third section of the survey deals with functional navigation from both a perceptual level and behavioral level. There are 22 questions that attempt to elicit information on things such as computer access, financial concerns, computer experience, ability to navigate class website, and motivation level. The last section deals with background characteristics. There are 14 questions that attempt to elicit information on areas such as race, gender, prior educational history, professional history, and educational goals.

The study uses a five-point Likert scale (strongly agree, agree, neutral, disagree, or strongly disagree) for a majority of the questions. For questions that can be quantifiable, for example (I work X amount of hours per week at my job) actual numbers are used. The complete instrument contains 83 questions and is available in Appendix A. Additional student data was gathered separately directly from each institution’s administrative computer system.

Dr. Elizabeth Williams, Associate Coordinator, Student Assessment, Research, and Evaluation Office, University of Massachusetts at Amherst reviewed this instrument. Once the instrument had been reviewed, a pilot test was conducted to test any flaws with the instrument before it was fully implemented.
**Limitations**

There are several limitations to this study. The first limitation of this study is that it will be conducted over the course of one semester. To gain a better perspective on student persistence in online education a study should be conducted that follows students from matriculation to graduation. The institutions involved are similar in nature. It may be difficult to generalize the results of this study to different types of institutions. Another limitation is that it is solely examining persistence in students 21 years or older.

There are many pedagogical and technological limitations in this study as well. The courses used in this study were taught in a completely asynchronous format utilizing discussion boards as the primary method of interaction. It would be interesting to compare persistence rates in courses that have some synchronous contact as well as examining courses that use advanced technologies such as two-way video to communicate. However, since this is such a heterogeneous population we need many studies of different types of students in different types of courses at different types of institutions to start building a knowledge base because no one study can sufficiently capture the complexity of possible influences.

**Data Analysis**

Quantitative data analysis techniques were used to analyze the survey responses. The responses from questionnaires were downloaded directly from the web into a comma separated value file, which then were converted and analyzed using SPSS statistical software. Each variable was given a value and correlations between variables were examined via exploratory factor analysis, descriptive statistics, correlations, mean comparisons and logistic regression.
Conclusion

This study attempts to provide a model for predicting factors that influence persistence of adult students in online courses at two Connecticut institutions. A web-based survey was distributed and the data was analyzed using SPSS. The findings from this study provided insight into what factors affect adult student persistence. From these findings, policy decisions can then be made to improve the rate of student persistence.
CHAPTER 4
DATA ANALYSIS AND RESULTS

Introduction

The purpose of this chapter is to present the results of the multivariate analysis used in this study. To this end, this chapter is comprised of five sections. The first section summarizes the results of the factor analysis that was used to generate multi-item indicators of the key constructs that serve as independent variables in the multivariate analysis used to examine the main research question. The second section provides definitions for all of the variables used in this study, as well as the means, and standard deviations for each of those variables. The third section examines the relationships among the variables through an examination of bi-variate correlations. The fourth section provides the results of the logistic regression analysis. Finally, paired t-tests were used to follow up some of the key findings from the logistic regression analysis. More specifically, the T-tests were used to examine the mean differences between students who persisted and those who did not and between “online veterans” and those students with little or no online experience. The chapter concludes with a review of the key findings from the data analysis.

Factor Analysis

A typical first step in data analysis that is commonly used in college impact research is exploratory factor analysis (Cabrera & Castaneda, 1993; Mallette, Cabrera & Berger, 2000). Exploratory factor analysis is the preferred practice when researchers are trying to discover patterns and relationships among single-item indicators variables in
order to reduce complexity while developing more robust multi-item indicators that are empirically consistent and coherent (Fabrigar, L.R., Wegener, D.T., Strahan, E.J. 1999).

Sixty-four items were analyzed in the initial exploratory factor analysis. Based on the conceptual framework, the items were categorized into three sub-groups: behavioral (22 single items); perceptual (35 single items); and motivational (7 single items). The results of the literature review conducted in chapter two indicates that these three areas (student behaviors, student perceptions and student motivation) appear to have the greatest influence on student persistence.

The 64 items were rotated orthogonally, using the varimax method - a common approach when there is little reason to believe that there is a high degree of covariance among the items (Long, 1997). The factor analysis resulted in the identification of 19 factors having common patterns of associated relationship. Once these 19 factors were selected, they were tested for internal reliability using the Chronbach Alpha Reliability scale. Chronbach’s alpha reliability test is used to determine the reliability of multi-item indicators. This test indicates the extent to which a set of test items can be treated as measuring a single latent variable (Allen & Yen, 2002). Eleven of the original 19 factors (four behavioral; six perceptual; and one motivational) were comprised of items that all loaded at the .30 or above with several loading at the .80 or higher level. The seven factors that loaded below .30 were eliminated. Some of the individual items that made up the seven factors were still able to be used in the operational model.

The behavioral items consisted of 22 items that generated four factors (course commitment, classmate communication, assignment completion, and social involvement). The behavioral items explained 61.56 percent of the total variance.
The perceptual items consisted of 35 items that generated 6 factors (academic satisfaction, workplace support, tutorial support, website satisfaction, technological self-efficacy, classmate interactions). The perceptual items explained 61.47 percent of the total variance.

The motivational items consisted of 7 items that generated one factor (independent learner). The motivational items explained 61.97 percent of the total variance. Table 4.1 - 4.3 Summarizes the Results of the Factor Analysis

Table 4.1:
Results of Factors Analysis and Alpha Reliabilities for Student Behaviors

<table>
<thead>
<tr>
<th>SCALE NAME</th>
<th>Item Names</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>COURSE COMMITMENT</td>
<td>How many posts in a week</td>
<td>0.82</td>
</tr>
<tr>
<td></td>
<td>Responses per week to discussion board</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td>How many times logged into class website per week</td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td>How many hours online per week for course</td>
<td>0.69</td>
</tr>
<tr>
<td></td>
<td>How many times per week log into Internet for research</td>
<td>0.68</td>
</tr>
<tr>
<td>ALPHA RELIABILITY</td>
<td></td>
<td>0.81</td>
</tr>
<tr>
<td>CLASSMATE COMMUNICATION</td>
<td>How often do you email classmates</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>How often do you receive email from classmates</td>
<td>0.84</td>
</tr>
<tr>
<td>ALPHA RELIABILITY</td>
<td></td>
<td>0.75</td>
</tr>
<tr>
<td>ASSIGNMENT COMPLETION</td>
<td>How often do you complete reading on time</td>
<td>0.86</td>
</tr>
<tr>
<td></td>
<td>How often do you complete homework on time</td>
<td>0.84</td>
</tr>
<tr>
<td>ALPHA RELIABILITY</td>
<td></td>
<td>0.72</td>
</tr>
<tr>
<td>SOCIAL INVOLVEMENT</td>
<td>Hours per week on social obligations</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>Hours per week socializing with friends</td>
<td>0.82</td>
</tr>
<tr>
<td>ALPHA RELIABILITY</td>
<td></td>
<td>0.53</td>
</tr>
</tbody>
</table>
Table 4.2: 
Results of Factors Analysis and Alpha Reliabilities for Student Perceptions

<table>
<thead>
<tr>
<th>SCALE NAME</th>
<th>Item Names</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACADEMIC SATISFACTION</td>
<td>Instructor presents information clearly</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>Instructor presents information in engaging way</td>
<td>0.84</td>
</tr>
<tr>
<td></td>
<td>Instructor is prepared for course</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td>I would recommend the course to a friend</td>
<td>0.78</td>
</tr>
<tr>
<td></td>
<td>Instructor gives thoughtful feedback</td>
<td>0.72</td>
</tr>
<tr>
<td></td>
<td>It is easy to contact instructor</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>I find the course interesting</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>The course was worth the money</td>
<td>0.50</td>
</tr>
<tr>
<td>ALPHA RELIABILITY</td>
<td></td>
<td>0.84</td>
</tr>
<tr>
<td>CONTINUED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WORKPLACE SUPPORT</td>
<td>Coworkers supportive of me going to school</td>
<td>0.87</td>
</tr>
<tr>
<td></td>
<td>Most coworkers have college degrees</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td>My supervisor is supportive of me going to school</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td>I need a college degree to advance at work</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>My work schedule makes it diff. to get homework done</td>
<td>0.49</td>
</tr>
<tr>
<td>ALPHA RELIABILITY</td>
<td></td>
<td>0.88</td>
</tr>
<tr>
<td>TUTORIAL SUPPORT</td>
<td>Tutors readily available</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>Tutors knowledgeable about subject</td>
<td>0.82</td>
</tr>
<tr>
<td>ALPHA RELIABILITY</td>
<td></td>
<td>0.69</td>
</tr>
<tr>
<td>WEBSITE SATISFACTION</td>
<td>Easy to find information on college website</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>Website for course easy to use</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td>Online student services easy to find</td>
<td>0.52</td>
</tr>
<tr>
<td>ALPHA RELIABILITY</td>
<td></td>
<td>0.55</td>
</tr>
<tr>
<td>TECHNOLOGICAL SELF-EFFICACY</td>
<td>Comfortable with basic computer applications</td>
<td>0.91</td>
</tr>
<tr>
<td></td>
<td>Comfortable searching for information on the web</td>
<td>0.90</td>
</tr>
<tr>
<td>ALPHA RELIABILITY</td>
<td></td>
<td>0.85</td>
</tr>
<tr>
<td>CLASSMATE INTERACTIONS</td>
<td>Classmates readily accessible to discuss assignments</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>Most classmates are actively involved with online discuss.</td>
<td>0.68</td>
</tr>
</tbody>
</table>
There were opportunities to get together with classmates 0.59

**ALPHA RELIABILITY**

0.59

Table 4.3:
Results of Factors Analysis and Alpha Reliabilities for Student Motivation

<table>
<thead>
<tr>
<th>SCALE NAME</th>
<th>Item Names</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>INDEPENDENT LEARNER</td>
<td>Enjoy solving problems</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>Love to learn</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>Work well on my own</td>
<td>0.67</td>
</tr>
<tr>
<td><strong>ALPHA RELIABILITY</strong></td>
<td></td>
<td>0.85</td>
</tr>
</tbody>
</table>

The three scales (student behaviors, student perceptions, student motivations) that were generated as a result of the factor analysis provide a means for clarifying the best way to operationalize the construct into multi-item indicators from the battery of single-item indicators on the survey, which in turn had been developed from the review of literature. Each of these scales represents key independent variables used in the model that was analyzed for this study.

The behavioral factors include course commitment, classmate communication, assignment completion, and social involvement. The course **commitment scale** is a measurement that identifies how much work and time a student is putting into the course. The **classmate communication** scales measures how often students communicate with each other via email. The **assignment completion** scale measures how often a student completes readings and homework assignments on time. The **social involvement** scale
measures the amount of time a student spends on activities outside of work, school and family commitments.

The perceptual factors include academic satisfaction, workplace support, tutorial support, website satisfaction, technological self-efficacy, and classmate interaction. The academic satisfaction scale measures student’s satisfaction with the course and instructor. The workplace support scale measures how supportive coworkers and supervisors are of the student continuing their education. The tutorial support scale measures student’s satisfaction with tutors availability and knowledge about the particular subject matter. The website satisfaction scale measures students satisfaction with the availability of useful content on the web as well as ease of navigation. The technical self-efficacy scale measures a student’s comfort level with computer technology software as well as their ability to conduct research via the Internet. The classmate interaction scale measures a student’s satisfaction with the availability of other classmates as well as their level of satisfaction with the interactions.

There was only one motivational factor identified as being significant (.30 or higher), it was the independent learner scale. The independent learner scale measures students’ desire to learn, as well as ability to be alone, in the learning process.

**Descriptive Statistics for Variables used in the Regression Analysis**

Table 4.4 describes the definitions for all of the variables used in the correlation and logistic regression analysis. The mean and standard deviation is given for each definition. For some of the variables standardized scores were used. This is a common technique when items were scored on different metrics (Berger, 1997).
<table>
<thead>
<tr>
<th><strong>Independent Variable Name</strong></th>
<th><strong>Background Entry Characteristics</strong></th>
<th><strong>Mean (raw score)</strong></th>
<th><strong>S.D.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Single item measuring students’ age.</td>
<td>36.98</td>
<td></td>
</tr>
<tr>
<td>Gender (male)</td>
<td>Single item measuring students’ gender 1 (female) 2 (male)</td>
<td>1.21</td>
<td></td>
</tr>
<tr>
<td>Previous Online Experience</td>
<td>Single item measuring how many online courses students’ have completed. Ranged from 0 to 70 courses.</td>
<td>5.70</td>
<td>8.44</td>
</tr>
<tr>
<td>Average High School Grade</td>
<td>Single item measuring students’ self-reported average grade in high school (A=6, B=5, C=4, D=3, F=2, do not wish to respond=1).</td>
<td>4.86</td>
<td>.91</td>
</tr>
<tr>
<td>Previous College Exp.</td>
<td>Single item measuring students’ prior college experience 0 (no credits) to 5 (16 courses or more).</td>
<td>4.56</td>
<td>.88</td>
</tr>
<tr>
<td>Independent Learner</td>
<td>Three-item scale. Items include (1) enjoy solving problems, (2) love to learn, (3) work well on my own.</td>
<td>0.00</td>
<td>2.36</td>
</tr>
<tr>
<td>Household Income</td>
<td>Single item measuring family income during the previous year 1 (less than $10,000) to 7 ($100,000 or more)</td>
<td>4.80</td>
<td>1.61</td>
</tr>
<tr>
<td>Ethnicity (non-white)</td>
<td>Single item identifying students’ ethnicity, 1 (non-white) 2 (white).</td>
<td>1.76</td>
<td>0.42</td>
</tr>
<tr>
<td>Desire to Complete Degree</td>
<td>Single item measuring students’ desire to complete degree 1 (not applicable) to 6 (strongly agree)</td>
<td>5.68</td>
<td>1.04</td>
</tr>
</tbody>
</table>

*Academic Integration – Behavioral*
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Mean (stand. score)</th>
<th>S.D.</th>
<th>Mean (raw score)</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Commitment</strong></td>
<td>Five-item scale. Items include (1) number of posts a student writes per week, (2) number of responses to post by a student per week, (3) how many times logged into class website per week, (4) how many hours online per week for course, (5) how many times per week does student log into Internet for research.</td>
<td>0.01</td>
<td>3.00</td>
<td>18.21</td>
<td>2.69</td>
</tr>
<tr>
<td><strong>Classmate Communication</strong></td>
<td>Two-item scale. Items include (1) how often do you email classmates, (2) how often do you receive email from classmates.</td>
<td>0.00</td>
<td>1.81</td>
<td>9.10</td>
<td>1.78</td>
</tr>
<tr>
<td><strong>Assignment Completion</strong></td>
<td>Two-item scale. Items include (1) how often do you complete reading assignments on time, (2) how often do you complete homework assignments on time.</td>
<td>0.00</td>
<td>1.78</td>
<td>11.06</td>
<td>2.50</td>
</tr>
<tr>
<td><strong>Academic Integration – Perceptual</strong></td>
<td>Eight-item scale. Items include (1) instructor presents information clearly, (2) instructor presents information in engaging way, (3) instructor is prepared for course, (4) I would recommend the course to a friend, (5) instructor gives thoughtful feedback, (6) it is easy to contact instructor, (7) find the course interesting, (8) course worth the money.</td>
<td>-0.02</td>
<td>5.98</td>
<td>40.48</td>
<td>6.11</td>
</tr>
<tr>
<td><strong>Tutorial Support</strong></td>
<td>Two-item scale. Items include (1) tutors readily available, (2) tutors knowledgeable about subject matter.</td>
<td>0.00</td>
<td>1.85</td>
<td>5.24</td>
<td>3.32</td>
</tr>
<tr>
<td><strong>Classmate Interactions</strong></td>
<td>Three-item scale. Items</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
include (1) classmates readily accessible to discuss assignments, (2) most classmates are actively involved, (3) there were opportunities to get together with other classmates. 

<table>
<thead>
<tr>
<th>Social Encouragement – Behavioral</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Work hours/per week</strong></td>
<td>Single item measuring students’ hours worked per week</td>
</tr>
<tr>
<td><strong>Commute time</strong></td>
<td>Single item measuring students’ commute time per day</td>
</tr>
<tr>
<td><strong>Family Obligations</strong></td>
<td>Single item measuring the amount of time student spends on family responsibilities per day.</td>
</tr>
<tr>
<td><strong>Social Involvement</strong></td>
<td>Two-item scale. Items include (1) hours per week on social obligations, (2) hours per week socializing with friends.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social Encouragement – Perceptual</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Workplace Support</strong></td>
<td>Five-item scale. Items include (1) coworkers are supportive of me going to school, (2) most coworkers have college degrees, (3) my supervisor is supportive of me going to school, (4) I need a college degree to advance at work, (5) my work schedule makes it difficult to get school work done.</td>
</tr>
<tr>
<td><strong>Family Support</strong></td>
<td>Single-item measuring family support of students education 1 (not applicable) to 6 (strongly support).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Functional Navigation – Behavioral</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internet Connection</strong></td>
<td>Single-item measuring students’ connection to the Internet. 1 (no connection) to 3 (cable/dsl)</td>
</tr>
<tr>
<td>Variable Description</td>
<td>Scale Information</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Technological Self-Efficacy</strong></td>
<td>Two-item scale. Items include (1) student comfort level with basic computer applications, (2) student comfort level searching for information on the web.</td>
</tr>
<tr>
<td><strong>Functional Navigation – Perceptual</strong></td>
<td>Three-item scale. Items include (1) easy to find information on college website, (2) website for course easy to use, (3) online student services easy to find.</td>
</tr>
<tr>
<td><strong>Financing Education</strong></td>
<td>Single-item measuring students’ ability to afford college, 1 (no problem) to 6 very difficult.</td>
</tr>
<tr>
<td><strong>Dependent Variable Name</strong></td>
<td>Single-item measuring if a student completed course, 1=did not persist and 2=did persist</td>
</tr>
</tbody>
</table>

**Demographic Characteristics of the Sample**

The sample in this study is similar to what one would expect. The average age of students in this study was approximately 37 years old. This is actually slightly higher than the national average age of community college students, which is 27 years old (Sheldon & Grafton, 1978). There were many more females (79%) than males (21%) who completed this survey. This number is also skewed higher than most community college institutions male/female breakdown (41%) male and (59%) female (AACC, 2006).

Many students claimed to be independent learners with a raw score of 16.35 out of 18. Average family income was between $35,000 and $50,000. A majority of the
students is Caucasian (77%) versus non-white (23%). A majority of the students indicated a strong desire to complete their degree (mean 5.68 out of 6). Many of the students are employed full-time with the average student working over 35 hours per week. An area of disparity is time spent on family responsibilities per day. Some students stated that they spend no time on family responsibilities and other students stated they spent 16 hours a day on family responsibilities with the overall mean being 4.04 hours per day. Social involvement also took up a great deal of time per week. On average, students spend close to ten hours per week on social obligations or socializing with friends. The range was fairly dramatic for this item with some students spending no time per week socializing and other students spending over 50 hours per week socializing although the standard deviation was only 1.86. Workplace support also was an interesting variable. The mean is 21.44 out of 30 with a standard deviation of 6.23. So there is greatly varying degrees of workplace support.

One of the more surprising findings about this group of students is their persistence rate (90%). As a majority of the research shows, student persistence in online courses is traditionally lower than in face-to-face courses. However, after looking more closely at who completed this survey it became clear that a majority of the students (76%) had completed 16 or more courses in their lifetime. This finding strengthens the idea that as students gain more experience in college, the more likely they are to persist. The remaining breakdown of prior course experience is as follows: six students had no college credits, ten students had completed one to three courses, fifty-three students had completed eleven to fifteen courses.
When conducting research, a common statistical technique used to understand associations is correlation analysis. By conducting this type of analysis some patterns may begin to emerge among the different variables. There were some interesting associations between several of the variables. In terms of the variable that had the strongest correlation to persistence, it is the students desire to complete their degree ($r=.33^{**}$). Other interesting relationships should also be noted. Students who reported that it was easy balancing social life and school had a negative association with students who stated that friends distracted them from their studies ($r=-.26^{**}$), as well as being distracted by family members ($r=-.29^{**}$). Two other variables that were negatively associated with students who said it was easy balancing school and social life are students who preferred to take a course in-person ($r=-.25^{**}$), as well students who take awhile to get started on tasks ($r=-.24^{**}$).

Students who claim they are distracted by family members had a positive association with the number of hours they reported spending each week on family responsibilities ($r=.25^{**}$), as well as positive association with students who claimed that friends distracted them from their studies ($r=.20^{**}$). There is a negative association between students who thought it was easy to balance a social life and school with those who are distracted by family members when trying to study ($r=-.28^{**}$). There was a strong negative association between those students who stated that their family does not believe an education will benefit them and those who stated that their families were supportive of their education ($r=-.29^{**}$).
There is a positive association between those students who would have preferred to take the course in-person and those who thought the workload was heavier than a face-to-face course ($r=.22**$). A positive association existed between those students who stated they had no difficulty affording school and household income ($r=.22**$).

The issue of financial aid is also interesting. There is a negative association between students who claimed to have difficulty understanding the financial aid process and household income ($r=-.23**$). There is a negative association between students who claimed to have difficulty understanding the financial aid process and those who stated they have trouble affording school ($r=-.21**$).

Students who claimed to be determined to finish the course had a positive association with students who stated it was easy to balance a social life and school ($r=.20**$) but a negative association with students who preferred to take the course in-person ($r=-.20**$).

Another interesting positive association is between how often a student emailed a question to an instructor and how prompt the instructor was in responding ($r=.20**$).

Students’ actual grades also presented some interesting findings. There is a strong positive association between students grades and years of full-time work experience ($r=.21**$). There is a positive association between students’ grades and their determination to finish the course ($r=.28**$). There is a negative association between student grades and those who preferred to take the course in-person ($r=-.25**$). There is also a negative association between student grades as with those who stated they take awhile to get started on tasks ($r=-.24**$)
Analytical Model for Logistic Regression

Based on the factor analysis and the reliability testing an operational model (Figure 4.1) was developed that served as a means for examining the effects of key sources of influence on retention in online courses. The final model consisted of 25 variables. Eleven of these variables were the scales mentioned earlier. The remaining 14 variables were single variable items. The single variable items included: age; gender; previous online experience; average high school grade; previous college experience; desire to complete degree; commute time; family obligations; family support; household income; ethnicity; work hours per week; internet connection; and financing education.

This operational model matches the conceptual model from chapter three. However, this model uses the results of the factor analysis and, is much more detailed as it identifies how each specific measured variable fits into the model.
Figure 4.1: Operational Model for Predicting Adult Student Persistence in an Online Course

**Logistic Regression Analysis**

Binary logistic regression analysis was used to test the operational model. This is a common statistical procedure used when the dependent variable is dichotomous and the independent variables are composed of variables that are measured at a variety of levels (Menard, 2002). The logistic regression model used in this study was used to indicate whether a student would persist or not at a 90% prediction rate. The dependent variable for this study was student persistence. The premise of logistic regression is that researchers can use independent variables to explain the variance for the dependent
variable. As shown in Table 4.5, the model explained 33% of the variance as indicated by the Nagelkerke R Square test statistic. The breakdown of the explained variance is as follows: entry characteristics = 19%; academic integration = 8%; social encouragement = 5%; and functional navigation = 1%.

Previous online experience is the only variable that is statistically significant (.001) throughout the model (entry characteristics stage, B=1.38***; academic integration stage, B=1.35***; social encouragement stage, B=1.34***; functional navigation stage, B=1.34***). As might be expected, desire to complete the degree has an effect in the first block, which is the entry characteristic stage (B = 2.33**) and, second block, which is the academic integration stage (B=1.41**). As the student moves through the model, desire to complete the degree becomes less significant (greater than .05). The only other variable that is statistically significant is assignment completion. This item does not become statistically significant (< or = .01) until stage three of the model, which is social encouragement, B = 1.36**; and, the fourth stage, which is functional navigation, B = 1.40***. It is interesting to note that as desire to complete becomes less important in the model assignment, completion becomes more important at the later stages.
Table 4.5:
Results of Regression Analysis with Persistence as the Dependent Variable (N = 476)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Entry Characteristics</th>
<th>Academic Integration</th>
<th>Social Encouragement</th>
<th>Functional Navigation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>B</td>
<td>b</td>
<td>B</td>
</tr>
<tr>
<td>Age</td>
<td>-0.02</td>
<td>0.98</td>
<td>-0.03</td>
<td>0.97</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.14</td>
<td>0.87</td>
<td>-0.10</td>
<td>0.90</td>
</tr>
<tr>
<td>Prev. Onl. Exp.</td>
<td>0.32</td>
<td>1.38 ***</td>
<td>0.30</td>
<td>1.35 ***</td>
</tr>
<tr>
<td>Ave. HS Grade</td>
<td>-0.09</td>
<td>0.92</td>
<td>-0.38</td>
<td>0.68</td>
</tr>
<tr>
<td>Prev. Coll. Exp.</td>
<td>-0.08</td>
<td>0.92</td>
<td>0.04</td>
<td>1.04</td>
</tr>
<tr>
<td>Ind. Learn.</td>
<td>-0.01</td>
<td>1.00</td>
<td>-0.04</td>
<td>0.96</td>
</tr>
<tr>
<td>Household Inc.</td>
<td>0.02</td>
<td>1.02</td>
<td>-0.02</td>
<td>0.99</td>
</tr>
<tr>
<td>Ethnicity</td>
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<td>0.73</td>
<td>-0.50</td>
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</tr>
<tr>
<td>Desire to Comp.</td>
<td>0.85</td>
<td>2.33 **</td>
<td>0.35</td>
<td>1.41 **</td>
</tr>
<tr>
<td>Course Commit.</td>
<td>0.14</td>
<td>1.15</td>
<td>0.12</td>
<td>1.13</td>
</tr>
<tr>
<td>Classmate Comm.</td>
<td>0.09</td>
<td>1.10</td>
<td>0.07</td>
<td>1.08</td>
</tr>
<tr>
<td>Assign. Comp.</td>
<td>0.27</td>
<td>1.31</td>
<td>0.31</td>
<td>1.36 **</td>
</tr>
<tr>
<td>Acad. Satis.</td>
<td>-0.02</td>
<td>0.99</td>
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<td>0.95</td>
</tr>
<tr>
<td>Tutorial Supp.</td>
<td>0.12</td>
<td>1.13</td>
<td>0.11</td>
<td>1.11</td>
</tr>
<tr>
<td>Classmate Inter.</td>
<td>0.01</td>
<td>1.01</td>
<td>0.01</td>
<td>1.01</td>
</tr>
<tr>
<td>Work Hours</td>
<td>0.02</td>
<td>1.02</td>
<td>0.02</td>
<td>1.02</td>
</tr>
<tr>
<td>Commute Time</td>
<td>0.00</td>
<td>1.00</td>
<td>0.01</td>
<td>1.00</td>
</tr>
<tr>
<td>Family Oblig.</td>
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<td>0.95</td>
<td>-0.05</td>
<td>0.95</td>
</tr>
<tr>
<td>Social Involv.</td>
<td>0.01</td>
<td>0.99</td>
<td>-0.02</td>
<td>0.99</td>
</tr>
<tr>
<td>Workplace Supp.</td>
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<td>1.08</td>
<td>0.08</td>
<td>1.08</td>
</tr>
<tr>
<td>Family Supp.</td>
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<td>1.02</td>
<td>0.05</td>
<td>1.05</td>
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<tr>
<td>Internet Conn.</td>
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<td>-0.94</td>
<td></td>
<td>0.39</td>
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<tr>
<td>Tech. Self-efficacy</td>
<td></td>
<td>0.13</td>
<td></td>
<td>1.14</td>
</tr>
<tr>
<td>Website Satis.</td>
<td></td>
<td>-0.11</td>
<td></td>
<td>0.90</td>
</tr>
<tr>
<td>Financing Ed.</td>
<td></td>
<td>-0.03</td>
<td></td>
<td>0.97</td>
</tr>
<tr>
<td>Nagelkerke R Square</td>
<td>0.19 ***</td>
<td>0.27 ***</td>
<td>0.32 ***</td>
<td>0.33 ***</td>
</tr>
</tbody>
</table>

* p < or = .05, ** p < or = .01, *** p < or = .001

**Independent Sample T-tests**

Given the fact that persistence was the key variable of interest in this study and,
given the significant role that previous online experience played as a predictor of
persistence in the logistic regression; these variables were used to define comparison groups for paired t-tests as a means for better understanding how these different groups of students fared with regard to other key indicators. Paired t-tests were conducted (Table 4.6) using SPSS to examine mean differences between key variables between persistors and non-persistors and some interesting associations were identified. There was a very strong association (.001) between students who persist and the following variables: previous online experience, students desire to complete degree, students course commitment, rate of assignment completion, number of hours worked per week, hours spent on family obligations, and workplace support. There was a strong (.01) association between student persistence and classmate interaction, as well as technological self-efficacy.
Table 4.6: Independent Sample T-Tests - Persistence

<table>
<thead>
<tr>
<th></th>
<th>t-value</th>
<th>Mean Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.01</td>
<td>1.65</td>
</tr>
<tr>
<td>Gender</td>
<td>0.47</td>
<td>0.30</td>
</tr>
<tr>
<td>Prev. Coll. Exp.</td>
<td>-0.29</td>
<td>-0.04</td>
</tr>
<tr>
<td>Prev. Online Exp.</td>
<td>-3.80***</td>
<td>-4.88</td>
</tr>
<tr>
<td>Ave. HS Grade</td>
<td>0.40</td>
<td>0.06</td>
</tr>
<tr>
<td>Ind. Learner</td>
<td>-1.14</td>
<td>-0.42</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-0.22</td>
<td>-0.01</td>
</tr>
<tr>
<td>Household Inc.</td>
<td>0.52</td>
<td>0.13</td>
</tr>
<tr>
<td>Desire to Comp.</td>
<td>-7.70***</td>
<td>-1.16</td>
</tr>
<tr>
<td>Course Commit.</td>
<td>-4.54***</td>
<td>-2.09</td>
</tr>
<tr>
<td>Classmate Commit.</td>
<td>-1.84</td>
<td>-0.52</td>
</tr>
<tr>
<td>Assign. Compl.</td>
<td>-4.70***</td>
<td>-1.27</td>
</tr>
<tr>
<td>Acad. Satis.</td>
<td>-1.70</td>
<td>-1.56</td>
</tr>
<tr>
<td>Tutorial Supp.</td>
<td>-1.04</td>
<td>-0.30</td>
</tr>
<tr>
<td>Classmate Inter.</td>
<td>-2.51**</td>
<td>0.01</td>
</tr>
<tr>
<td>Work Hours</td>
<td>-3.95***</td>
<td>0.00</td>
</tr>
<tr>
<td>Commute Time</td>
<td>-0.55</td>
<td>0.58</td>
</tr>
<tr>
<td>Family Oblig.</td>
<td>2.88**</td>
<td>0.00</td>
</tr>
<tr>
<td>Social. Inv.</td>
<td>0.07</td>
<td>0.95</td>
</tr>
<tr>
<td>Workplace Supp.</td>
<td>-3.90***</td>
<td>0.00</td>
</tr>
<tr>
<td>Family Supp.</td>
<td>-1.02</td>
<td>0.31</td>
</tr>
<tr>
<td>Internet Conn.</td>
<td>0.71</td>
<td>0.48</td>
</tr>
<tr>
<td>Tech. Self-efficacy</td>
<td>-2.76**</td>
<td>0.01</td>
</tr>
<tr>
<td>Website Satis.</td>
<td>-1.93</td>
<td>0.05</td>
</tr>
<tr>
<td>Financing Ed.</td>
<td>0.66</td>
<td>0.51</td>
</tr>
<tr>
<td>Online Veteran</td>
<td>-4.76***</td>
<td>0.00</td>
</tr>
</tbody>
</table>

*p< or = .05, **p< or = .01, ***p< or = .001
Another t-test was conducted (Table 4.7) between online veterans (3 or more courses) and students new to online course (2 or fewer). This test also produced some interesting associations. Online veterans had a very strong (.001) association with the following variables: previous college experience, previous online experience; and desire to complete their degree. Online veterans had a strong (.01) association with students who were committed to the course. Online veterans had an association (.05) with the following variables: number of hours worked per week and website satisfaction.
Table 4.7: Independent Sample T-Tests – Online Veterans

<table>
<thead>
<tr>
<th>Independent Sample T-Tests -Online Veterans</th>
<th>t-value</th>
<th>Mean Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-1.10</td>
<td>-1.22</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.28</td>
<td>-0.01</td>
</tr>
<tr>
<td>Prev. Coll. Exp.</td>
<td>-4.02***</td>
<td>-0.37</td>
</tr>
<tr>
<td>Prev. Online Exp.</td>
<td>-9.46***</td>
<td>-7.68</td>
</tr>
<tr>
<td>Ave. HS Grade</td>
<td>0.12</td>
<td>0.01</td>
</tr>
<tr>
<td>Ind. Learner</td>
<td>0.73</td>
<td>0.18</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>0.65</td>
<td>0.03</td>
</tr>
<tr>
<td>Household Inc.</td>
<td>0.40</td>
<td>0.15</td>
</tr>
<tr>
<td>Desire to Comp.</td>
<td>-3.90***</td>
<td>-0.41</td>
</tr>
<tr>
<td>Course Commit.</td>
<td>-2.70**</td>
<td>-0.83</td>
</tr>
<tr>
<td>Classmate Comm.</td>
<td>-0.81</td>
<td>-0.15</td>
</tr>
<tr>
<td>Assign. Compl.</td>
<td>-1.30</td>
<td>-0.23</td>
</tr>
<tr>
<td>Acad. Satis.</td>
<td>-0.58</td>
<td>-0.37</td>
</tr>
<tr>
<td>Tutorial Supp.</td>
<td>-1.47</td>
<td>-0.28</td>
</tr>
<tr>
<td>Classmate Inter.</td>
<td>-1.50</td>
<td>-0.35</td>
</tr>
<tr>
<td>Work Hours</td>
<td>-2.50*</td>
<td>-4.45</td>
</tr>
<tr>
<td>Commute Time</td>
<td>-0.46</td>
<td>-1.73</td>
</tr>
<tr>
<td>Family Oblig.</td>
<td>1.05</td>
<td>0.34</td>
</tr>
<tr>
<td>Social. Inv.</td>
<td>0.53</td>
<td>0.09</td>
</tr>
<tr>
<td>Workplace Supp.</td>
<td>-1.74*</td>
<td>-0.69</td>
</tr>
<tr>
<td>Family Supp.</td>
<td>0.63</td>
<td>0.06</td>
</tr>
<tr>
<td>Internet Conn.</td>
<td>-0.22</td>
<td>-0.01</td>
</tr>
<tr>
<td>Tech. Self-efficacy</td>
<td>-1.10</td>
<td>-0.22</td>
</tr>
<tr>
<td>Website Satis.</td>
<td>-2.13*</td>
<td>-0.51</td>
</tr>
<tr>
<td>Financing Ed.</td>
<td>2.58**</td>
<td>0.37</td>
</tr>
<tr>
<td>Persist</td>
<td>-4.76***</td>
<td>-0.14</td>
</tr>
</tbody>
</table>

*p< or = .05, **p< or = .01, ***p< or = .001
**Review of Data Analysis**

The purpose of this study was to try and identify what factors affect adult student persistence in online education. The following sets of factors were analyzed: background characteristics; academic integration (behavioral and perceptual); social encouragement (behavioral and perceptual); functional navigation (behavioral and perceptual).

By using a combination of both descriptive and multivariate statistical methods it provides us a clearer understanding of what variable or combination of variables lead to adult student persistence in online education. Based upon the logistic regression analysis, the factors that have the most influence on adult student persistence in online education are previous online experience, desire to complete degree, and assignment completion. The correlation study gives us some additional relationships among variables that also need further discussion (ex. students who have the greatest difficulty affording school have the least knowledge of the financial aid process). Chapter five will allow for discussions on what policies can be developed to help increase adult student persistence in online education.
Chapter 5

SUMMARY AND CONCLUSIONS

The goal of this study is to identify factors that affect adult student persistence in online courses at two community colleges. Currently, there are no models available that use both behavioral, and perceptual items to examine student persistence in online courses. Yet, as demonstrated by Berger and Milem (1997) in their research of traditional student retention, it is important to analyze student departure by examining both behavioral, as well as perceptual sources of influence. Therefore, this study uses a combination of both behavioral, as well as perceptual, indicators to provide a more complete understanding of the sources of influence that affect online student persistence.

This study has been informed by a review of literature that framed the conceptual model and served as the foundation for the survey instrument. In order to test this model, 476 students at two institutions completed, an online survey and data from the completed surveys were analyzed with a variety of statistical techniques, including exploratory factor analysis, correlation analysis, regression analysis and t-tests.

This chapter is divided into four sections in order to summarize the findings from this study and address the subsequent implications. The first section provides a review of the entire study. The second section presents the key findings from this study. The third section re-examines the research questions and provides policy and practice recommendations aimed at increasing the likelihood of student success in online courses. The final section provides suggestions for future research, as well as a discussion of the limitations of this study.
Review of the Study

As demonstrated in Chapter One, low online student persistence rates continue to be one of the most serious issues within this format of learning. This study is designed to address this problem by providing institutions with practical knowledge they can use to assess online persistence within specific courses.

Chapter Two reviewed three separate, but related, bodies of literature: distance learning theory; adult learning theory; and undergraduate student persistence theory. The section on distance learning provided an overview on the history of distance learning, as well as key theories in this field. One of the important findings from examining distance learning literature from a historical perspective was that it showed the dramatic change in distance learning with the advent of the Internet and the ability for students to connect with one another around the world. The research in this section confirmed the point that the more students were able to communicate with one another the more likely they were to persist.

The adult learning section focused on the work of Knowles’ (1975) concepts of andragogy, the science of teaching adult students. Since a majority of students taking online courses are adults, it is important that instructors gear their teaching styles towards adult learners. One of Knowles’ suggestions is to allow students to define their personal learning outcomes in each of their courses he posits that adult learners are much more likely to persist if they feel they have some control over their educational destiny. Knowles’s other major point is that faculty need to foster strong relationships with their students. In an online environment this means that instructors need to stay in regular communication with their students.
The final section of the literature review analyzed a variety of retention concepts from seminal works by Astin (1984), Berger and Milem (1997), Kember (1995) and Billings (1988). Student background characteristics, academic involvement by students, the influence of the external environment, and functional navigation were four common themes identified in the literature review as having an effect on student persistence.

Chapter three then began with a description of the conceptual framework that was used to develop the proposed model for this study. Drawing on the literature reviewed in chapter two, there were four key areas that were included in the proposed model: background characteristics; academic integration (behavioral and perceptual items); social encouragement (behavioral and perceptual items); and functional navigation (behavioral and perceptual items). This chapter also described the institutions where the study was conducted, as well as a description of the sample population (476 students). This chapter concluded with a detailed description of the survey instrument, as well data collection and analysis techniques that were used.

Chapter four reported the results of the data analysis. Exploratory Factor Analysis (EFA) was used to develop robust multiple item indicators that reflect the underlying structure of key variables and provide more reliable measures of behaviors and perceptions among this sample. Once the factor analysis was complete, a correlation analysis was conducted to understand how individual variables related to one another. There were twelve variables that correlated with student persistence including: hours worked per week, hours in a typical day devoted to family responsibilities, number of meetings with classmates face-to-face, time spent on computer at work, course required for major, number of children cared for, number of previous online courses completed,
determination to finish the course, desire to complete degree, coworkers support, supervisors support, and highest degree attained. The strongest relationship found was the link between student persistence and a student’s desire to complete his or her degree.

Once the EFA and correlation analysis were complete, the conceptual model was tested using logistic regression analysis. Three variables proved to be statistically significant (previous online experience, desire to complete degree, and assignment completion). These variables accounted for 33% of the total explained variance with previous online experience accounting for a majority of that variance.

Given that previous online experience explained so much of the variance in the regression analysis, it was important to isolate this variable using a t-test to see what differences existed between new students (fewer than 3 courses) and veteran students (3 courses or more). The results of this analysis indicated that there were eight variables that were statistically significant between the two groups, including previous college experience, previous online experience, desire to complete degree, hours at work, workplace support, website satisfaction, and financing their education.

**Revisiting the Research Questions**

The results of the data analysis provide further insight into the research questions that guided this study. More specifically, two research questions were posed in Chapter One. The following few paragraphs revisit these questions and use the findings from this study to provide answers to each of the questions.
What are the factors or student characteristics that contribute to students successfully completing an online course?

The findings from this study identified three factors that exhibited direct effects on student persistence. Previous online experience had the greatest influence on student persistence. Students who have completed three or more online classes were much more likely to persist in future courses. This finding was not surprising given that Billings (1988) and Kember (1995) identified this as a key variable in both of their models.

A student’s desire to complete the course is the second strongest factor that is linked to student persistence. This is consistent with one of Tinto’s (1975) basic tenants in his retention model: goal commitment (desire to complete). Tinto contends that the stronger an individual’s desire to complete their degree the more likely he/she will in fact persist. This has been supported in other traditional studies of retention (e.g. Astin, 1984; Tinto, 1975; Berger & Milem, 1997). However, this is the first study to provide empirical support for the importance of this construct in online education.

Student assignment completion is the third and final factor that had a direct relationship on student persistence. If students completed reading and homework assignments on time, they were more likely to persist. This finding is consistent with Astin’s (1984) work, which also showed how student behavior in terms of time on task can be used as an indicator of the likelihood that student’s will be more likely to persist.

It appears that these three factors (previous online experience, desire to complete degree, assignment completion) accounted for so much of the explained variance that they may have suppressed other effects. Therefore, it is important to conduct further
studies to identify if other factors are related to persistence. Listed in the following section are the factors that were identified as being linked to student persistence.

Students perception of employer support proved to be a strongly linked to persistence. The more a student felt that they were receiving support from either their employer or fellow employees they were more likely to persist. This is also not surprising given the fact that Billings (1998) and Kember (1995) both cited employment support as an important factor in student persistence.

Classmate communication is another factor that may have been hidden because so much of the variance in the regression analysis was taken up by the three factors listed previously. The T-test showed a direct link between classmate communication and student persistence. The more interaction, whether via email or face-to-face, the more likely students were to persist. This reiterates Moore’s (1996) work on transactional distance and Holmberg’s (1988) research on guided didactic conversation.

*What are the factors or student characteristics that impede students from successfully completing an online course?*

Obviously, the factors that impede student persistence were the opposite of the factors that contributed to student success. Students who completed fewer than three courses were much less likely to persist than students with more online experience. Also, students who were less motivated to succeed in their online course were less likely to persist. Finally, if students did not complete their reading and homework assignments they were much less likely to persist. Once again, these findings can be linked to earlier
research; both Tinto (1975), as well as Berger and Milem (1997), demonstrated that student goal commitment is an important factor in student persistence.

**Additional Findings**

Given the evidence from existing literature, it was surprising that more variables did not have a significant effect on persistence. The fact that neither females nor students from underrepresented minority groups were identified as less likely to persist is surprising. This finding may indicate that these courses provide greater equity; or it may simply reflect that only females and non-white students who are already pre-disposed to succeed actually enroll in these online courses. In developing the conceptual model, I relied on many of the traditional persistence models, which all used race and gender as a key background characteristic in their studies. It would be interesting to see if this pattern continues to be true in other online student retention studies. Perhaps online learning takes away some of the barriers that have long affected students of color, as well as females? Or it may be that access is restricted only to those students who are more predisposed to succeed than their peers in traditional courses. These are empirical questions that clearly require further study.

**Recommendations for Policy and Practice**

One of the most important contributions that emerged from this study relate to how these results translate into policy and practice. This section analyzes some of the key findings and offers ideas about how faculty and administrators can use this information to improve online student persistence rates. I have outlined four action items: student entry
assessment, online course readiness assessment, online pedagogy training, early warning system that institutions can use to help ensure student success in their online programs.

First Step – Student Entry Assessment

Given the strong relationship between previous online experience and student persistence, one of the first checks at student intake would be to ascertain whether or not a student has previously completed other online courses. The findings from this study build on the work of Kember (1995) and Billings 1988), by empirically confirming that if students are successful in their first few courses they are more likely to persist in future courses. So, how can institutions help increase the chance of student success for new online students? My first recommendation would be to start students in blended courses. For some students the transition from face-to-face courses to solely online courses may be too much to overcome. As this study showed, technical self-efficacy is correlated to student persistence. As students get more experience with online courses their technical self-efficacy improves; which is likely to facilitate increased persistence. If a student is not comfortable using a computer for papers and research it is almost impossible to succeed in an online course. By having students start with blended courses they can become used to the technology and the change in pedagogy (Oblender, 2002).

This study also identified potentially negative relationships between student persistence and average time per day devoted to family responsibilities, as well as a negative correlation between persistence and care for number of children. It has been documented that there are a number of single parent and two-parent families where parents are working full-time and there simply is not enough time in the day to balance
school, work, and family (Kazmer & Haythornwaite, 2001). One of the main reasons individuals choose online learning is because they are too busy to attend college in a traditional format (Roblyer, 1999). One option for institutions would be to develop a network with area family services where they can refer their students for childcare help (Grubb & Lazerson, 2004). Another option would be to counsel students with childcare responsibilities to take the course in-person at their institution if that institution provides on-site childcare. Childcare on campus is becoming more of a standard practice at community colleges across the country (Grubb & Lazerson, 2004).

The issue of whether or not a student requires financial aid also needs to be addressed at the student entry stage. As this study indicates, there is a negative correlation between students who claimed to have difficulty understanding the financial aid process and household income. There is also a negative correlation between students who claimed to have difficulty understanding the financial aid process and those who stated they have trouble affording school. This finding reiterates the work of Olson and Rosenfeld (1984) and Mende (2003) who found that, students from less affluent families were less likely to understand the financial aid process and therefore less likely to apply for it. The key point here is that students who need financial aid the most have the most difficulty understanding the financial aid process. As noted in the literature review (Cabrera, Nora & Castenada, 1992), a student’s ability to pay can be a key indicator for predicting student persistence. From a policy perspective this finding poses an interesting dilemma. Students who attend institutions in a face-to-face format have the benefit of meeting with a financial aid counselor in-person to get through the myriad of steps and paperwork required to receive financial aid. In a completely online environment most, if
not all, of the financial aid processing is often done online. Going back to the point of functional navigation from the proposed conceptual model, institutions must develop better ways to deal with issues like financial aid in a completely online environment.

Second Step – Online Course Readiness Assessment

The next step in this assessment process is to have all students take an online readiness quiz. The online readiness quiz will be used to assess if students are indeed ready or capable of dealing with this type of learning format (Henne, 2008). As stated in Chapter Two, there are many tools including Guglielmino’s Self Directed Learning Readiness Scale (SDLRS) that institutions can use to assess student motivation. As this study showed, student desire to complete their degree is one of the key variables in student persistence. Once an assessment identifies who may be at risk, academic advisors can then specifically concentrate on those students and keep in close contact with, not only the students, but with their instructors to make sure that students are receiving the help necessary to succeed.

Online readiness from a student motivation perspective is important for student success. However, even if a student is highly motivated, but lacks basic computer skills, he/she will have a difficult time with an online course. Once again this study indicates that technical self-efficacy has an effect on student persistence. Technical self-efficacy is a factor consisting of the following two items: students’ comfort with basic computer applications and students’ comfort searching for information on the web. It is important for administrators to understand that they may lose students who lack the technical knowledge to succeed in online courses (White & Weight, 2000). Institutions should
conduct an assessment of all new students to identify who is proficient with the computer, as well as who is proficient in conducting research online. Once institutions identify who needs help, they can develop online self-paced tutorial programs that will help these students succeed. Another option for institutions is to create on-campus training and orientation programs. Although some institutions attract students from outside their geographic regions a majority of schools attract mostly local students so it is important to consider this fact when creating orientation programs.

Third Step – Online Pedagogy Training

Institutions need to offer specific workshops for faculty members who teach online courses to new students. These workshops can address not only best practices for teaching online but, also make faculty aware of warning signs of early student academic troubles (Wilson & Stacey, 2003).

As this study indicates, there is a strong link between student persistence and assignment completion. It makes sense that students who complete their reading and homework assignments are going to do better. But how can this affect policy and/or practice? It would be helpful if faculty were to give students manageable assignments spread throughout the semester rather than only a mid-term and final. This also ties into the idea of giving prompt feedback, which is one of the Seven Principles of Good Practice in Undergraduate Education (Chickering & Gamson, 1987). By having frequent assignments it allows the faculty member to provide feedback on a regular basis so that students know how they are doing.

Another important finding from this study is the relationship between classmate
interaction and student persistence. Classmate interaction was a factor that measured how often students sent emails to classmates, as well as how often they received email from classmates. Once again, from a pedagogical standpoint as addressed in Chapter Two, Moore and Kearsley (1996), as well as Holmberg (1988), show that student-to-student interaction is a key to success in online education. If students feel connected to one another, they are more likely to persist. Once again, this idea is connected to the Seven Principles of Good Practice. The second principle states, “Learning is enhanced when it is more like a team effort than a solo race. Good learning, like good work, is collaborative and social, not competitive and isolated. Working with others often increases involvement in learning. Sharing one's own ideas and responding to others' reactions improves thinking and deepens understanding” (Chickering & Gamson, 1987).

Instructors need to create an online environment that fosters and supports group work and online collaboration.

There are new tools available such as Kaltura, Google Docs, PBWiki that are designed specifically for increasing collaboration in online settings (Piezon & Donaldson, 2008). For example, PBWiki is a wiki, which is essentially a web site that multiple users can have access to and create online documents without any knowledge of HTML. This tool can be used by instructors to form groups and allow students to collaborate on highly media rich content, which can include anything from simple text to links to other websites to embedding video streams. One of the major benefits to many of these tools is that they have no direct costs to the institutions. The only cost for institutions is to provide the necessary training for their instructors on how to effectively incorporate these tools into their courses. Another benefit to many of these tools is that many come with
built-in monitoring programs so instructors can assess who is participating and to what extent. For example, PBWiki has a feature where the instructor can be notified anytime someone makes a change to the website. With Google Docs the instructor can log in to the web at any time and identify who has collaborated on writing assignments.

This idea of time on task is also one of the “Seven Principles of Good Teaching” proposed by Chickering and Gamson (1987) and it is a core feature of Astin’s (1984) Theory of Involvement. An example that Chickering and Gamson propose to encourage time on task is to use computer assisted instruction that requires students to spend adequate amounts of time on a specific task. Many of the new textbooks come with course cartridges, which offer rich media applications that can be used to supplement the textbook. Instructors should, whenever possible, attempt to find textbooks that have the available course cartridges, which will then in turn give students more activities to work on which will increase time on task.

From an administrative perspective, it is important to provide the necessary tutoring services that will aid students in making sure assignments are completed. A recent trend in the last year has been the development of a service known as E-Tutor (CTDLC, 2007). This service allows students to email assignments to a tutor and work with the tutor online to help resolve any issues with assignments. This finding supports Astin’s (1984) work that showed that if students are engaged and participating in activities they are more likely to persist.
Fourth Step - Early Warning System

Once students begin their online courses it will be important to identify students who are struggling as soon as possible. Institutions should develop an “early warning” system that makes it easy for instructors to notify academic counselors about new students who are falling behind. An early intervention will be the key to success (Tinto, 2000). Institutions should make sure new students are given all of the tutor and counseling support necessary during their first few semesters. Wild and Ebbers (2002) also address this issue of an early warning system in their research. They discuss the idea of setting up an email system where faculty can notify a student’s counselor, tutor, and advisor; and, I would add financial aid counselor with one email to let them know that a student is beginning to have academic difficulties. As this study showed, there are factors (family responsibilities, ability to pay, workplace support, etc.) that have nothing to do with academic ability but can certainly deter student success. By notifying various individuals on campus hopefully they can identify the root of the problem.

These four action items (student entry assessment, online course readiness assessment, online pedagogy training, early warning system) give institutions a starting point for identifying the necessary services that need to be put in place to help ensure individuals will succeed online. Workplace support was another item that was identified in the findings. Institutions need to examine their relationships with area businesses and discover ways to develop or strengthen these relationships so that all parties can benefit (students, employers, institutions).

Given that workplace support also proved significant in terms of student persistence, students who receive support from their employers are more likely to succeed (Billings,
There should be a symbiotic relationship between employers and employees attending school. Employers are gaining a presumably happier and more skilled worker, and employees are gaining necessary skills to advance in their companies (Cappelli, 2003). In the community college setting, this reinforces a new trend between community colleges and area businesses often referred to as “workforce development”. Jacobs (2002) defines workforce development as “the coordination of school, company, and governmental policies and programs such that as a collective they enable individuals the opportunity to realize a sustainable livelihood and organizations to achieve exemplary goals, consistent with the history, culture, and goals of the societal context” (p. 13).

Legislation was recently passed in Oregon (2005) and California (2002) to refocus the mission of community colleges to directly address the needs of workforce development. According to the California Education Code Section 66010.1 and 66010.4(3), “A primary mission of the California Community Colleges is to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement”. Both of these states have created funding available to area community colleges to establish programs of study that will benefit area businesses in terms of new workers with new knowledge bases. Community colleges are the ideal type of institutions to partner with industries. Most community colleges are small organizations, which allow them to be more nimble to react to the changing needs of the marketplace.

Businesses also play an important role in workforce development initiative. An interesting example of how businesses can support employees is United Technologies Corporation (UTC) based in Connecticut. UTC developed a program called the
Employee Scholar Program (Gorelick, 2004). This program features the following benefits: free tuition for part-time and full-time employees; three hours time-off per week for every three-credit course; $10,000 worth of company stock with each degree earned.

A stronger relationship needs to develop between local businesses and area companies. In Connecticut, for example, there is a strong link between the manufacturing industry and the state community colleges. A “virtual” college was developed called the College of Technology, which has no buildings or faculty. Instead, its mission is to work with the twelve community colleges to train students in technology with the short-term goal of earning an associates degree, and the long-term goal of eventually earning a four-year degree at one of six public or private institutions in the state. Students are allowed to take courses in-person or online at any of the community colleges in the state without having to worry about transfer agreements. The funding and logistics for this project is an example of a variety of groups and agencies working together to solve a problem. The federal government (National Science Foundation funding); state government (legislation and funding to create a program); local corporations supporting employees in the program, as well providing internships and jobs); public and private colleges and universities (developing articulation agreements that allow students to seamlessly transition from associates degree programs into bachelor degree programs) combined to develop this highly successful program.

**Suggestions for Future Research and Limitations**

All of the indications from this study are that success breeds success. While there is rich knowledge in the traditional student retention-literature regarding what helps students succeed, we still do not have enough information about what helps students
succeed in an online environment. We need to conduct specific studies that show what makes students succeed in the online classroom setting.

This study provides a broad picture of some of the major factors that affect adult student persistence in online education. This is strictly a quantitative study, which is an effective first step in trying to understand this complicated process. We need to follow this study up with a qualitative study to develop grounded theories and next steps. For instance, one issue that needs to be further examined is that of workplace support. One-on-one interviews with both employees and employers will bring to life this dynamic relationship and try and target how employer support affects student persistence in online education.

Background characteristics proved to be a large piece of the puzzle. Thus, it would be interesting to gather not only quantitative figures, but also the stories behind those numbers and recommend subsequent steps. For example, students with previous college experience were much more likely to persist. It would be interesting to use interviews to identify those factors that have allowed them to succeed in college. Institutions can then possibly put together a predictive model that would show which students are most likely to succeed based on background characteristics.

Another limitation of this study deals with geography and institutional type. This study looked at only public two-year institutions in Connecticut at the undergraduate level. More detailed studies need to take place around different areas of the country, as well as different institutional types to improve the generalizability of this study. For example, this study should be replicated in rural settings, as well as urban settings to see
how the model holds up. Also, it will be important to conduct this study at a variety of institutional types including four-year private institutions, as well as research universities.

Yet, another limitation to this study is that the survey used to gather the data for this study was developed specifically for this study. The actual measures and factors should be replicated to test with other populations and other settings to make sure they hold up across contexts. For example, previous online experience was an important factor in this study, but what if we were using this same survey with online graduate students. Would it hold up?

Another limitation is that this study investigated persistence in just one course. Looking at persistence over an entire certificate or degree program may provide even more insight as to what factors affect student persistence.

The response group was yet another limitation in this study. Students voluntarily agreed to complete this survey, so there is a possibility there could be response bias between responders and non-responders; but the strong return rate (over 50%) should make this acceptable.

A final limitation to this study is that all of the courses examined were asynchronous courses that used discussion boards as the primary form of interaction. As we move to a Web 2.0 society the ability to conduct distance learning courses in a synchronous, highly interactive format is becoming a real and affordable possibility. There are tools such as Skype and Wimba that allow individual and multiple users to connect in real time. Based on the research in this study as well as information from the literature review, the greater the interactions between student-to-student and student-to-instructor the greater the probability the students will succeed.
**Cost Benefit Analysis**

As this literature review has demonstrated student persistence in online course is typically higher than in face-to-face courses this leads to some interesting questions: Does it make sense for institutions from a financial perspective to try and save all of their online students? Are the extra support services worth the cost of trying to keep each student? Or would institutions be better off simply save money on additional support services and use that cost savings to recruit more students? These are issues that need to be addressed from campus to campus, while keeping the ethical obligations to provide necessary resources and support for all enrolled students to succeed.

**Summary**

As online learning continues to grow and mature, considerable work needs to be done in terms of both qualitative and quantitative research on best practices. By examining the previous literature and developing this model researchers now have a starting point to conduct future studies.

To conclude this study, I want to show three models and explain the significance of each one, as well as discuss how they may be used in future research. The first model shown below (Figure 5.1) is the model that was discussed in detail in chapter three. An exploratory model, it contained 26 variables in all. The contribution to the field with this model is that it is based on an extensive review of the literature taking into account factors such as employer support and technical self-efficacy. Future researchers can examine this model and identify the itemized factors and their individual effects on student persistence so that they can decide whether to include those items in their models.
Figure 5.1: Conceptual Model for Predicting Adult Student Persistence in an Online Course Based on Previous Literature

The second model (Figure 5.2) is based on the results of the regression analysis. This is a much more refined model with a total of three variables. The contribution to the field with this model is that researchers can quickly identify the three main variables that affect student persistence in online courses. It is the most rigorous because it only
identifies those sources of influence for which there is robust empirical support, which would also protect against a Type I error. Although this model is rigorously empirical it is limited by the data/sample and may not describe the other factors that influence student persistence.

Figure 5.2: Model Based on Results of Regression Analysis

As stated earlier, previous online experience accounted for so much of the total variance, it appears other items were hidden or masked. I felt it was important to provide future researchers with a more robust model, which not only incorporated the three items identified in the regression analysis but also included items that were identified as having an impact on persistence via the paired t-tests as well as the correlation analysis.

To create this model (Figure 5.3), I began with the model based on the regression analysis (solid boxes/solid lines). I then overlaid the factors identified in the t-tests and correlation analysis (dotted boxes/dotted lines). This proposed model is a combination of both behavioral and perceptual items. This is a more nuanced model and less likely to be
The principal purpose of this study was to develop a model that could be used to help predict adult student persistence in an online course. As stated in the beginning of this study, there is a major gap in persistence literature as it pertains to online learning. According to Alan Seidman, Editor, *Journal of College Student Retention*, “There is still no model that examines the multiple factors that affect online student persistence” (Seidman, 2006). Although there have been studies that examined a variety of factors (i.e., previous college experience, ability to pay, etc;) there were previously no holistic...
models that looked at how behavioral and perceptual factors affect students in online distance learning courses. Hopefully, the model developed in this study will be an ideal starting point in finding answers to this troubling situation of lack of student persistence in online education. Ideally, other researchers and institutions can replicate this model and improve upon it to find the solutions to increase adult student persistence in online education.
APPENDICES

Survey Instrument

SCREEN 1

My name is R.J. McGivney and I am a doctoral student at the University of Massachusetts. As part of my research I am interested in studying what factors affect student success in online education. Consequently, I am asking all online students at your institution to complete this survey.

Your responses to these questions are COMPLETELY CONFIDENTIAL. This survey is not "anonymous" because we need to be able to follow-up with non-respondents in order to achieve a high response rate.

The survey should take you approximately 15 minutes to complete.

If you are ready to begin, click "Continue."

NOTE: If you are interrupted while filling out the survey, and need to terminate your browser session, you can click on the link again and resume where you left off.
SCREEN 2

The first set of items pertains to how your family and friends view your pursuit of your education. Please indicate the extent to which you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>My friends encourage me to enroll in college courses</td>
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<tr>
<td>My friends distract me from my studies</td>
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<tr>
<td>It is easy to balance my social life with my schoolwork</td>
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<tr>
<td>My family is supportive of me taking college courses</td>
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<tr>
<td>I am often distracted by family members when I attempt to study</td>
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<tr>
<td>My family does not believe I will benefit from taking college courses</td>
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</tr>
</tbody>
</table>
The next set of items pertains to how your employer and coworkers view your pursuit of your education. Please indicate the extent to which you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>My supervisor is supportive of me taking college classes</td>
<td></td>
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<tr>
<td>My work schedule makes it difficult to spend enough time on my coursework</td>
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<tr>
<td>Most of my coworkers have college degrees (associates or higher)</td>
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<tr>
<td>In order for me to advance at work I need to have a college degree</td>
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<tr>
<td>My coworkers are supportive of me taking college courses</td>
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</tbody>
</table>
SCREEN 4

The next set of items asks you about how your time is spent each week. Please give your best estimate to the following questions.

How many hours do you typically spend working for pay each week? 

On a typical day, how many minutes do you spend community to and from work?

On a typical day, how many hours do you spend on family obligations (cooking, cleaning, childcare, eldercare, etc)?

During a typical week, approximately how many hours do you spend socializing with friends?

During a typical week, approximately how many hours do you spend on social obligations (church, civic or social organization, exercise, etc)?
SCREEN 5

The next set of items asks pertains to your instructor for this online course. Please indicate the extent to which you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
</tr>
</thead>
</table>

Overall, my instructor presents information clearly
Overall, my instructor presents information in an engaging way
If I needed to contact my instructor it was easy to do so
Overall, my instructor is well prepared for class
The next set of items pertains to the evaluation of your instructor and the course. Please indicate the extent to which you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generally my instructor gives me thoughtful feedback on my assignments</td>
<td></td>
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<tr>
<td>Overall, my instructor presents information in an engaging way</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>If I needed to contact my instructor it was easy to do so</td>
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<tr>
<td>I would recommend this course to a friend</td>
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<tr>
<td>The workload for this course was heavier than most of the traditional, in-person courses I have taken</td>
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<tr>
<td>I find this course to be interesting</td>
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<tr>
<td>Given the opportunity I would have preferred to take this course in a traditional classroom setting</td>
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</tbody>
</table>
The next set of items asks you to evaluate your peers as well as tutoring services. Please indicate the extent to which you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most of the students in my class are actively involved in online discussions.</td>
<td></td>
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</tr>
<tr>
<td>Classmates are readily accessible to discuss assignments with me.</td>
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<tr>
<td>There are opportunities to get together in person with other classmates to discuss assignments.</td>
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<tr>
<td>If I had a problem with an assignment help was easily available from a tutor.</td>
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<tr>
<td>The tutors were knowledgeable about the subject matter.</td>
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</tbody>
</table>
SCREEN 8

The next set of items asks you about interactions you have had with your instructor. Please give your best estimate to the following questions.

Since the beginning of the semester, how often do you email your instructor with a question?
   a) about once a day
   b) 3-4 times per week
   c) 1-2 times per week
   d) less than once per week
   e) never

When you have emailed your instructor with a question, when do you typically receive a reply?
   a) the same day
   b) the next day
   c) within 2-3 days
   d) after 3 or more days
   e) never

So far this semester approximately how many times have you met your instructor in-person? _____________
SCREEN 9

The next set of items asks you about interactions you have had with your classmates. Please give your best estimate to the following questions.

<table>
<thead>
<tr>
<th>Never</th>
<th>Once Per Week</th>
<th>Twice Per Week</th>
<th>Three Times Per Week</th>
<th>Four Times Per Week</th>
<th>Not Applicable</th>
</tr>
</thead>
</table>

How often do you email classmates with questions about assignments or readings?
How many times per week do you receive email from any of your classmates per week?
How many times per week do you typically post to course discussion boards?
How many times per week do you typically respond to course discussion boards?

During the semester, approximately how many times did you meet with a classmate or classmates face-to-face? ________
The next set of items asks you about your assignments for this course. Please give your best estimate to the following questions.

How many times per week do you log on to the class web site?

How many times per week do you log on to the Internet for class research?

How often do you complete your reading assignments on time?

How often do you complete your homework assignments on time?

The next set of items asks you about your assignments for this course. Please give your best estimate to the following questions.

How many posts per week do you place on your class discussion board?
The next set of items asks you about your assignments for this course. Please give your best estimate to the following questions.

<table>
<thead>
<tr>
<th>None</th>
<th>1-3 hours</th>
<th>4-6 hours</th>
<th>7-10 hours</th>
<th>11-15 hours</th>
<th>More than 15 hours</th>
</tr>
</thead>
</table>

How many hours do you spend online for this course in a typical week?

How many hours do you spend off-line for this course in a typical week?

<table>
<thead>
<tr>
<th>Never</th>
<th>Once per week</th>
<th>Twice per week</th>
<th>Three times per week</th>
<th>Four times per week</th>
<th>Five times or more per week</th>
</tr>
</thead>
</table>

How many times do you log on to the class web site in a typical week?

How many times do you log on to the Internet for class research in a typical week?

How many posts do you place on your class discussion board in a typical week?

On average, how many minutes do you spend writing your posts when you post to the class discussion board?
SCREEN 12

The next set of items asks you about your overall satisfaction with online materials for this course. Please indicate the extent to which you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall, I found using the website for this course to be easy</td>
<td></td>
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</tr>
<tr>
<td>The website for the college in general was easy to find information on</td>
<td></td>
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</tr>
<tr>
<td>The college’s online library had the study materials I needed for this</td>
<td></td>
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<tr>
<td>course</td>
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<tr>
<td>When I sought online student services (e.g. ability to register online,</td>
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<tr>
<td>find out about financial aid online, ability to pay online)</td>
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</tr>
<tr>
<td>it was easy to find</td>
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</tr>
</tbody>
</table>
SCREEN 13

The next set of items asks you about finances and your education. Please indicate the extent to which you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
</tr>
</thead>
</table>

I have no difficulty affording school
my online college courses
I found the financial aid process difficult to understand
This class was worth the money it cost

Which of the following best describes how this course is being paid for? (Check all that apply)

a) My employer is paying for it
b) I am using personal funds
c) I am using financial aid
d) I am using Veteran’s Administration Benefits
The next set of items asks you about technical literacy. Please indicate the extent to which you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
</tr>
</thead>
</table>

I generally feel comfortable with basic computer applications (e.g. word processing, spreadsheets, Web browsers, EMAIL)
I generally feel comfortable searching for information on the web
There was adequate technical help for this course
SCREEN 15

The next set of items asks you about your access to computers and your computer experience. Please give your best estimate to the following questions.

How old is the computer you most use when you are at home _______________?

a) less than a year old
b) between 1-3 years old
c) 4 years or older
d) I do not have a computer at home

Which of the following best describes how you connect to the Internet when you are at home ___________?

a) Dial-up Access
b) DSL or Cable
c) Don’t know
d) No Internet Access

How much of your time do you spend for your job/s working at a computer_______?

a) none of the time
b) some of the time
c) most of the time
d) all of the time

How much of your “free” time do you spend on a computer_________?

a) none of the time
b) some of the time
c) most of the time
d) all of the time
The next set of items asks you about your motivational level towards your education. Please indicate the extent to which you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
</tr>
</thead>
</table>

I am very determined to finish this course
Completing a college degree is very important to me

This course is a degree requirement for my major? Yes_________ No___________
SCREEN 17

The last set of items asks you for background information?

Which of the following best describes your race/ethnicity? (Check all that apply)
   a) White or Caucasian
   b) African American or Black
   c) American Indian, Native American or Alaskan
   d) Asian American or Asian
   e) Hispanic or Latino (a) or Chicano (a)
   f) Multiracial
   g) Other

What is your gender?

Male_______   Female__________

What is your approximate household income before taxes?
   a) under $10,000
   b) $10,000 to less than $20,000
   c) $20,000 to less than $35,000
   d) $35,000 to less than $50,000
   e) $50,000 to less than $75,000
   f) $75,000 to less than $100,000
   g) $100,000 or more

What is your current relationship status?
   a) Married
   b) Living with partner in marriage-like relationship
   c) Single, never married
   d) Single, divorced
   e) Widowed

How many children and/or adults do you spend time taking care of in your household? By taking care of, we mean cooking, cleaning, providing transportation for.

   Number of children younger than 18 ___________

   Number of adults ________________

How many years of full-time work experience (35 or more or hours working in one or more jobs per week) do you have?
How many years have you worked a full-time schedule?
   a) zero
   b) less than 5 years
   c) between 5 and 10 years
   d) between 11 and 20 years
   e) more than 20 years

Approximately how many college courses have you completed in your lifetime?
   a) zero
   b) 1 to 3 courses
   c) 4 to 10 courses
   d) 11 to 15 courses
   e) 16 or more courses

Approximately how many online college courses have you taken and earned credit for?
   List Total__________.

Is English the first language you learned to speak?
   Yes_______   No__________

What is the highest educational attainment of your father?
   a) grammar school or less
   b) some high school
   c) high school degree or GED
   d) some college
   e) associates degree
   f) bachelors degree
   g) graduate degree
   h) don’t know

What is the highest educational attainment of your mother?
   a) grammar school or less
   b) some high school
   c) high school degree or GED
   d) some college
   e) associates degree
   f) bachelors degree
   g) graduate degree
h) don’t know

What is your personal highest educational attainment?

a) grammar school or less
b) some high school
c) high school degree or GED
d) some college
e) associates degree
f) bachelors degree
g) graduate degree

What is the highest degree you intend to earn?

a) associates degree
b) bachelors degree
c) masters degree
d) doctoral degree

What was your average grade in high school?

a) A
b) B
c) C
d) D
e) F
f) Do not wish to respond
BIBLIOGRAPHY


