THE RELATIONSHIP OF STUDENT CHARACTERISTICS, HELP SEEKING BEHAVIOR, ACADEMIC AND ENVIRONMENTAL VARIABLES WITH STUDENT COURSE COMPLETION IN COMMUNITY COLLEGE ONLINE COURSES:

AN APPLICATION OF A CONCEPTUAL MODEL

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The purpose of this study was to examine differences and relationships in student definition and background characteristics, help seeking behaviors, academic and environmental variables between and among community college students at a single institution who successfully completed and those who did not complete online courses during a single term. An adapted version of Bean and Metzner’s conceptual model of nontraditional student attrition provided the theoretical framework for the study.

The results of data analysis revealed statistically significant differences between completers and noncompleters on the basis of definition, gender, ethnicity, experience and prior GPA. Statistically significant relationships were found between definition, ethnicity, gender, experience, prior GPA, orientation and completion and noncompletion. No statistically significant interactions were found between definition and experience and help seeking behaviors. No statistically significant differences, relationships or predictor variables were found by degree seeking, preassessment, or technical help seeking. Additional analyses by defining characteristics revealed statistically significant differences between completers and noncompleters on the basis of residency, age and enrollment status. Predictor variables found to be significant were definition, gender, experience, prior GPA and orientation. The odds of completion increased with nontraditional definition, female gender, higher prior GPA, and orientation participation. The odds of completion decreased with experience.
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>ACKNOWLEDGMENTS</th>
<th>iii</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF TABLES</td>
<td>vii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>ix</td>
</tr>
</tbody>
</table>

## Chapters

1. **INTRODUCTION** .................................................................1
   - Statement of Problem ...................................................7
   - Purpose of the Study .....................................................8
   - Research Questions ......................................................8
   - Significance of the Study ..............................................9
   - Definition of Terms .....................................................12
   - Limitations ......................................................................14
   - Delimitations ..................................................................14

2. **LITERATURE REVIEW** ..........................................................15
   - Introduction ....................................................................15
   - History of Distance Education .......................................15
   - Historical Approaches to Research on Student Outcomes in Distance Learning .............................................18
   - Conceptual Models of Student Departure/Dropout/Attrition .................................................................21
   - Research on Constructs of the Conceptual Model ..............35
   - Learner Characteristics – Defining and Background Variable Research ..................................................35
     - Learner Characteristics in Relation to Student Outcomes in Distance Learning ........................................36
     - Learner Characteristics in Relation to Nontraditional and Traditional Students .........................................50
     - Learner Characteristics in Relation to Student Outcomes in College, University, or Community Colleges ..........55
   - Academic Environment and Academic Integration Variables .................................................................59
     - Academic Environmental Variables in Relation to Student Outcomes in Distance Learning .......................60
3. METHODOLOGY ........................................................................................................92
   Introduction ........................................................................................................92
   Conceptual Framework .........................................................................................92
   Research Design ....................................................................................................96
   Hypotheses ............................................................................................................96
   Population .............................................................................................................97
   Participants ..........................................................................................................98
   Instrument ............................................................................................................100
   Measures ..............................................................................................................101
   Procedures for Data Collection ..........................................................................106
   Data Analysis .......................................................................................................107
   Summary ..............................................................................................................108

4. RESULTS ..................................................................................................................109
   Introduction ..........................................................................................................109
   Research Questions ..............................................................................................109
   Sample ..................................................................................................................111
   Participants ..........................................................................................................111
   Defining, Background Characteristics and Academic Integration
   Behaviors .............................................................................................................112
   Hypotheses ..........................................................................................................114
   Research Question 1, Hypotheses 1–6 .................................................................114
# LIST OF TABLES

<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Distance Learning Headcount and Demographic Historical Data Fall 2004-Spring 2008</td>
<td>97</td>
</tr>
<tr>
<td>2.</td>
<td>Distance Learning Headcount and Demographic Data Fall 2008-Spring 2009</td>
<td>98</td>
</tr>
<tr>
<td>3.</td>
<td>Description of Independent and Dependent Variables</td>
<td>103</td>
</tr>
<tr>
<td>4.</td>
<td>Group Membership as Completers, Noncompleters or Both Distance Learning Population Compared to Participant Sample</td>
<td>111</td>
</tr>
<tr>
<td>5.</td>
<td>Defining, Background Characteristics and Academic Integration of Participant Sample</td>
<td>112</td>
</tr>
<tr>
<td>6.</td>
<td>Completer and Noncompleter Group Statistics Differences by Prior GPA</td>
<td>119</td>
</tr>
<tr>
<td>7.</td>
<td>Completer and Noncompleter Differences by Prior GPA</td>
<td>119</td>
</tr>
<tr>
<td>8.</td>
<td>Chi-square Values of Defining and Background Independent Variables with Dichotomous Outcome Variable (Completion or Noncompletion)</td>
<td>121</td>
</tr>
<tr>
<td>9.</td>
<td>Cramer’s V Coefficients for Dichotomous or Categorical Defining, Background and Academic Integration Variables and Completion and Noncompletion</td>
<td>127</td>
</tr>
<tr>
<td>10.</td>
<td>Biserial Correlation Coefficient for Prior GPA and Completion and Noncompletion</td>
<td>127</td>
</tr>
<tr>
<td>11.</td>
<td>Independent Predictor Variables and Dependent Variable Coding in Binary Logistic Regression</td>
<td>130</td>
</tr>
<tr>
<td>12.</td>
<td>Primary Model Binary Logistic Regression Results</td>
<td>133</td>
</tr>
<tr>
<td>13.</td>
<td>Variables in the Equation for Intercept Only Model</td>
<td>137</td>
</tr>
<tr>
<td>14.</td>
<td>Hosmer-Lemeshow Test for Defining, Background and Academic Integration Variables and Course Completion and Noncompletion</td>
<td>137</td>
</tr>
<tr>
<td>15.</td>
<td>Omnibus Tests of Model Coefficients for Defining, Background and Academic Integration Variables and Course Completion and Noncompletion</td>
<td>138</td>
</tr>
<tr>
<td>16.</td>
<td>Defining Characteristic Predictor Variables Coding in Binary Logistic Regression (Revised Model)</td>
<td>141</td>
</tr>
<tr>
<td>17.</td>
<td>Revised Model Binary Logistic Regression Results including Defining Characteristics</td>
<td>142</td>
</tr>
<tr>
<td>18.</td>
<td>Hosmer-Lemeshow Test for Defining Characteristics, Background and Academic Integration Variables and Course Completion and Noncompletion</td>
<td>144</td>
</tr>
</tbody>
</table>
19. Omnibus Tests of Model Coefficients for Revised Model: Defining Characteristics, Background and Academic Integration Variables and Course Completion and Noncompletion .................................................. 144

20. Classification Table for Constant, Model and Revised Model ........................................... 145
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A conceptual model of nontraditional undergraduate student attrition (Bean and Metzner, 1985)</td>
<td>94</td>
</tr>
<tr>
<td>2.</td>
<td>Study framework adapted from Bean and Metzner’s conceptual model of nontraditional undergraduate student attrition (1985)</td>
<td>95</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

Introduction

Institutions are faced with the growing challenge of providing access to higher education for students whose needs cannot be met through traditional avenues. The majority of institutions seek to meet the needs of a diverse student population through distance learning. In a 2006-2007 study of distance education at degree-granting post secondary institutions, the most common factors affecting institutional decisions regarding distance learning were meeting the demand for flexible schedules, providing access to college for students who would otherwise not have access, making more courses available and seeking to increase student enrollment (Parsad & Lewis, 2008). At the community college, the presence of both traditional and nontraditional students with varied demographic backgrounds, educational preparedness, and demanding family and work obligations is even more apparent. Maeroff (2007) identified distance learning as a means by which to help solve two problems in higher education: time and place. Students enroll in distance learning to gain flexibility when conflict exists between two required courses offered at the same time; working adults, stay at home mothers, single parent families are all benefited by the availability of courses and access to education outside of the traditional time frame and modalities. The message is clear; incoming and returning students need flexible schedules as they struggle to meet the demands of life while trying to obtain a college degree.

Although several studies report that students enrolled in distance learning are three to five years older than students enrolled in traditional courses, distance learning is attracting students of traditional age as well. In a 2007 national survey of community colleges administered by the Instructional Technology Council (ITC), institutions reported 48% of students taking distance
learning classes at community colleges were between the ages of 18-25 years (traditional) and 52% were older than 26 years (nontraditional). Student demand for distance learning courses continues to exceed the availability of course offerings (ITC, 2008).

Allen and Seaman (2008) found that online enrollments are continuing to grow at a rate that far exceeds the rate of total higher education student population, with over 3.9 million students taking at least one online course during the fall 2007 term. The largest percentage of the growth is taking place at associate’s institutions. Associate degree granting institutions teach about 37% of the entire higher education population; however, they account for over one-half of all online students currently enrolled in higher education (Parsad & Lewis, 2008). Associate degree granting institutions came to the online market later than doctoral research institutions; however, it appears that associate’s institutions consider online offerings much more central to the mission of the institution and thereby have moved to increase both offerings and enrollment at a much faster pace (Allen & Seaman, 2008). The ability of an institution to respond to the needs of all students, traditional and nontraditional, is critical to fulfilling the mission of the community college.

Distance learning has made tremendous strides in recent years, but the ability of college students to succeed in the online environment remains in question. Nationally course retention rates for online courses have been reported to be lower than onsite. Student course completion in online courses is reported to range from 5 to 50% lower than comparable onsite courses (Carr, 2000; Dupin-Bryant, 2004; Frankola, 2001; O’Brien, 2002). The 2007 ITC (2008) survey of community college administrators from 154 institutions reported retention rates for distance learning courses to be 72%, with traditional courses averaging 78%. Students who, by choice or by necessity, desire to enroll in distance learning courses are not always prepared to successfully
complete online courses (Milligan & Buckenmeyer, 2008). Additionally, due to the community college open-door admission policy, underprepared students are encouraged to enroll, as are part-time students, working students, and first-generation students (Fike & Fike, 2008). In any combination, these factors may place first time community college students at risk with regard to retention and persistence; in combination with new technologies, the online environment that separates students in both time and distance from faculty and peers, a lack of understanding of the demands of distance learning and the prerequisite skills, the risks multiply.

Several conceptual models provided the theoretical frameworks for the current study, with a single model reformulated for use in the distance learning environment. Tinto’s longitudinal-process model of dropout (1975) and Kember’s model of drop-out of distance education (1989) and subsequent Distance Education Student Progress (DESP) Inventory (Kember, Lai, Murphy, Siaw, & Yuen, 1994), as well as, Bean and Metzner’s conceptual model of nontraditional undergraduate student attrition (1985) provided the theoretical and conceptual frameworks for studying distance learning dropout, particularly as it relates to the subpopulations of traditional and nontraditional students.

The conceptual models and related theoretical frameworks proposed relationships between pre-existing student definition and background variables and intervening variables of social and academic integration to outcome variables of completion and persistence. Those factors that appear to be influential in the establishment of collective affiliation in the distance learning academic environment and external factors affecting social integration are presented to provide additional background for the purpose and significance of the study.

Lower completion rates for distance learning courses suggest the need for self-assessment or preassessment of students prior to the start of the course. Without a preassessment mechanism,
the task of getting the student up to speed falls to faculty. Faculty have increasingly felt the pressure not only to teach a course online that meets the same rigor as a face to face course, to stay abreast of the current technologies and to design an effective, interactive course, but also to assist students with technical difficulties, guide them through the use of the various technical and communication tools within a course, and provide support often missing outside of the traditional institutional support window. Lynch (2001) found faculty spent an excessive amount of time troubleshooting problems student had with technology. More recently institutions have begun to recognize the importance of assessing both the level of technical knowledge and skill of the student prior to the start of the course. Given the importance of academic integration and affiliation, institutional support and training were included as variables to determine their relationship, if any, with course completion.

Higher education institutions routinely offer orientation programs that are designed and implemented to help students make a successful transition to higher education. In 2001, Scagnoli challenged institutions to respond to the unique needs of virtual learners, “considering the increase in the number of remote learners, universities offering distance learning programs must now design orientation programs suited for the students who will take courses at a distance” (p. 20). However, as recent as 2006, institutions reported that the greatest challenge administrators identified that they face with regard to students enrolled in distance education classes were orientation and preparation for taking distance learning classes (ITC, 2008). Miller, Rainer, and Corley (2003), identified reasons that students take an online course are that he or she perceives the computer as easy and useful to use. For students motivated to take online courses due to the flexibility of scheduling or preference for self-directed learning, they may overlook the need to
possess the necessary technical skills. The student that is under-prepared to use technology and uncomfortable with the computer, will spend less time engaged in online learning.

Foust (2008) found that students who had completed fewer credit hours thought that taking an online course could enhance their skills for the future and would be easier than a traditional class. The perception that the flexibility of online learning lessens the difficulty places students in a position to misinterpret the skills and time necessary to be successful in the online environment. Milligan and Buckenmeyer (2008) state “when students understand the requirements to reach their educational goals they may strive toward success by improving their self-study skills and their computer skills, or they may opt out of distance learning and try a more traditional program instead” (p. 451). Students can easily become frustrated if they lack the requisite skills and level of comfort necessary to deal with technical issues, delays in accessing course materials, and general navigation of the course and learning system. Several of the commonly cited challenges faced by faculty and students in satisfaction with distance learning includes technical skills, attitudes about working with technology and limitations and difficulty associated with the course management system (Egan & Akdere, 2005). Shelton and Saltsman (2005) indicated the need to screen potential distance learning students for both academic and technical aptitude as a necessary step to improving course completion rates. Additionally, they challenged institutions that are seeking to maximize student retention rates to evaluate or develop preassessment measures, including technical measures and provide online orientation courses.

Allen and Seaman (2008) asked institutions to respond to questions regarding the impact of the changes in the economy on overall enrollments and more specifically the demand for online courses. Institutional administrators reported that they believed the economic downturn, rising unemployment, and rising fuel costs would have positive impacts on both overall
enrollments and online enrollments, with associate degree granting institutions indicating that all factors would drive the growth of enrollments. The economic downturn, rising unemployment, and rising fuel costs were ranked as important or very important by over 85% of associate’s institutions.

The impact of the economy may result in adverse institutional change. At the same time as the demand for online increases, the availability of resources to support students’ online learning may be at risk. According to community college institutions’ response to the ITC (2008) survey, in 2004 and 2007, the number one challenge identified by administrators of distance education programs was the support staff needed for training and technical assistance; the number two challenge in both 2004 and again in 2007 was adequate student services for distance education students. Fueled by accreditation demands for equivalency, online student services and student support for distance learning students is a priority on most campuses. However, current budgetary constraints may limit either the creation or continuance of distance learning support services. The current online population will continue to change, as will the technology; the relationship between learner characteristics, course delivery, instructional design and emerging technologies will require continual evaluation. According to Tallent-Runnels et al. (2006), “Research is needed not only to better inform the design of instruction but also to better effect changes in the technology itself, so that both the teachers and the students are able to learn in supportive environments” (p. 112).

During a time in which institutions are facing tremendous scrutiny from within higher education as well as from external agencies, it is not enough to demonstrate student needs are being met by growing enrollment figures; it is critical to the mission of the community college that students complete courses, persist, and are successful in the distance learning environment.
Lau, 2003, “Student retention has become a challenging problem for the academic community; therefore, effective measures for student retention must be implemented in order to increase the retention of qualified students at institutions of higher learning” (p. 126).

Statement of Problem

Community colleges open admission policy potentially places already at risk students in an online environment that may contribute to student attrition. As accountability increases, institutions are challenged to determine the variables that most closely align with student completion and achievement in online learning. Further, there is a lack of knowledge regarding the characteristics and behaviors of students that are completers and noncompleters. With web-based learning now entering its second decade at many community colleges, it is important to gather fundamental knowledge about students, including enrollment patterns, academic and social integration factors and the behaviors and interactions that correlate with completion and noncompletion. Without gathering the information about characteristics of students and their experiences and outcomes it will be difficult for institutions to identify the type of student services and support that are needed for the various subpopulations of distance learning students. And lastly, the extent to which distance learning students utilize existing help support and its relationship to distance learning course completion is largely unknown.

The application of conceptual models to studying community college student outcomes in distance learning courses helps to identify critical defining and background variables, academic and environment factors, preterm and early term behaviors and interventions that influence student completion and achievement.
Purpose of the Study

The primary purpose of the study was to examine student definition and background variables, academic environment and integration variables, social and work variables between and among community college students enrolled in web-based courses who successfully complete and those who do not complete online courses to better understand the relationship of characteristic and integration variables on course completion. Secondarily, the purpose of this study was to gather information to improve the rate of course completion between and among subpopulations of community college (traditional and nontraditional, novice and experienced) students enrolled in distance learning courses. And lastly, the purpose of the study was to contribute to the body of knowledge that guides institutions to evaluate, implement and maintain learning support systems for distance learning students.

Research Questions

1) What differences, if any, exist between community college online course completers and noncompleters based on student definition (traditional or nontraditional [age, residence (commuter or online exclusive), enrollment status]) and background characteristics (gender, ethnicity, educational goals, previous online experience [novice or experienced] and prior GPA)?

2) Are there statistically significant interactions between and among traditional and nontraditional students, novice and experienced students, READI assessment participation, orientation participation, and 24/7 technical help seeking, as demonstrated by course grade(s)?

3) Are there statistically significant relationships between defining (traditional and nontraditional) and background (ethnicity, gender, degree seeking, distance learning
experience and prior GPA) variables, academic environment and academic integration variables (self-reported study habits, participation in READI assessment, participation in orientation and technical help seeking behaviors) and the environmental variable (number of hours committed to work and/or family responsibilities) and course completion or noncompletion?

4) Are defining and background variables, academic variables and the environmental variable statistically significant predictors of online course completion or noncompletion?

Significance of the Study

With 95.4% of two-year institutions admitting first-year undergraduates under an open admissions policy (Provasnik & Planty, 2008), it was important to determine the factors and practices that most closely align with student course completion and achievement so the results can be used in educational policy and institutional decision making. Research was needed that examined how the community college students enrolled in distance learning courses integrate with the academic learning environment that surrounds distance learning. Although often viewed as simply another mode of delivery, the distance learning environment is in actuality a campus, a virtual campus that requires a different and unique set of preparation, support and integration systems.

The findings of the study contribute to the body of knowledge that is needed for community college decision makers to understand the needs of distance learning students and the relationship between the characteristics of the student and the processes that exist (or do not exist) to integrate the student with the environment. By using a process model for evaluation, the results have a greater potential to impact institutional policies and procedures designed to
increase the likelihood of student success in the online environment. Additionally, the literature indicated the need to research areas that have been overlooked by previous studies. To strengthen this position, a few of the specific calls for research are outlined.

Throughout the literature, the results of single studies resulted in recommendations for future research. Bambara, Harbour, Davies, and Athey (2009) proposed the need for further research regarding how student learning support for online students affects retention and positive course completion. Motteram and Forrester (2005) targeted online orientation and early experience studies, “Although a growing body of literature has emerged focusing on students’ experiences in online learning, research that focuses on student orientation and introduction to the online learning environment and their initial experiences is relatively minimal” (p. 283). Tallent-Runnels et al. (2006), upon completion of an extensive review of literature on teaching online, recommended research on the impact of technical difficulties on students’ evaluation of courses to determine whether technical issues affect the student’s opinion of a course as a whole.

The study of the relationship of background variables in relationship to integration variables as proposed in Tinto’s (1975, 1993), Kember’s (1989, 1994), and Bean and Metzner’s (1985) models can be a complex process, however, the models provide a framework “against which predictions can be hazarded and judgments made about potential interventions” (Kember, 1989). The reality is the decision to drop out is generally not made on the basis of one or two factors or occurrences. The decision to drop out of a single course, a program of study, or an institution comes after multiple factors interact to contribute to the decision. And the decision comes at a cost. Along with the cost-benefit analysis of the single course, the cost to the student at the community college level comes at the risk of potentially exceeding the course repeat limit
and withdrawal limits, in addition to the often uncalculated loss to the student with the initial
time, efforts, and energy invested in the course, program or institution.

Community colleges attract the largest percentage of nontraditional learners. According
to the United States Department of Education, National Center for Educational Statistics, 2002
(Choy, 2002), students who were even minimally nontraditional were much more likely than
traditional students to attend a two-year institution. Among highly nontraditional students, 64%
attended a public two-year institution. Given the facets of Bean and Metzner’s (1985) model of
nontraditional student attrition, research examined the similarities and differences between and
among nontraditional and traditional students, in relation to student outcomes so that
interventions or support systems are designed to meet the challenges of the differing populations.

The Texas Higher Education Coordinating Board (THECB) recently released a report,
*Designing Texas Undergraduate Education in the 21st Century* (Texas Higher Education
Coordinating Board, 2009), following a study of national trends in undergraduate education in
the United States. The report challenged the institutions of Texas to find a means of increasing
retention and identified as a strategy to fund course completion as well as course enrollment. In
Recommendation 1-D, provide leadership to establish student success programs for new
students, the report cites Tinto to suggest that institutions “design programs that ensure, from the
very onset of student contact with the institution, that entering students are integrated into the
academic community of the college and acquire the skills and knowledge needed to become
successful learners in those communities (Tinto, 1986, as cited in Texas Higher Education
Coordinating Board, 2009). One of the strategies recommended is to offer academic orientations
that set a foundation for academic success by moving beyond the basics and including learning
outcomes for orientations that are as clearly defined as any academic course.
In discussing the significance of the study, it is important to include the current climate of the institution, the state and higher education. The report addressed undergraduate higher education in the state of Texas, not limited to community colleges. Each institution needs to craft a response and a strategy based on the stakeholders of their institution. For institutions that serve both onsite and online students, the challenge is to understand the unique needs of each population and to recognize that the one size fits all approach will not answer the charge. Hosting an onsite orientation for new students, targeting only onsite learners taking onsite classes and highlighting onsite resources leaves a distinct number of distance learners without an understanding of the institution and the resources that are available.

Given the number of students enrolled in distance learning, research regarding the relationship of the use or non-use of the support system, in relationship to student definition and background variables, was needed. The results of the study shed light on the factors and processes that contribute to online course completion and academic achievement, significant factors in the intent to persist.

**Definition of Terms**

- **Census date**: The official reporting date that public higher institutions must use to determine the enrollments that qualify to be reported to the Coordinating Board for formula funding.

- **Completer**: A student that received a grade in a course (A, B, C, D) other than F, I (Incomplete), or W. In the case of multiple online enrollments, students were identified as completers if they completed all online courses.

- **Course completion**: Finishing a course with a grade of A, B, C, or D.

- **Degree seeking**: Classification for students self-reporting enrollment for the purposes of achieving an associate’s degree or transfer.
• GPA: Grade point average

• Noncompleter: A student that received a grade of F, I, or W (voluntarily withdrew). In the case of multiple online enrollments, students were identified as noncompleters if they completed all online courses with a grade of F, I, or W.

• Noncompletion: Finishing a course with a grade of F, I, or W (voluntary withdrawal).

• Non-degree seeking: Default classification for students that apply for admission who do not self-report intent to complete an associate’s degree or transfer.

• Nontraditional student: A student that meets one or more of the following criteria:
  
  Bean and Metzner, 1985:
  
  • Age 25 or older
  • non-resident (commuter)
  • attending college part-time

  For the purposes of this study, residence will be sub-grouped according to commuter (enrollment in an online distance learning course(s) in addition to enrollment in a face to face course(s) - traditional) or noncommuter (enrollment in an online distance learning course(s) exclusively – nontraditional).

• Online courses: Courses that are delivered using a computer and the Internet, designated as web.

• Prior GPA: Refers to the student’s grade point average the most recent term of enrollment, at any institution of higher education (available in institutional records), prior to spring 2009.

• Traditional student: A student with an absence of any nontraditional characteristic.
Limitations

The findings of the single institution study may not be generalized to four-year institutions or private two-year colleges or proprietary schools. The study was limited to students that self-selected enrollment in distance learning courses. The use of existing data extracted from various institutional reporting systems, was limited by the accuracy of the input. The use of existing data extracted from the READI (2009) administrative database, the online student support participation records, and the 24/7 help desk support, was limited by the accuracy of the input. As some of the existing data was gathered from responses from a sample of distance learning students, the accuracy of the data may be limited by the input of the student response. The background variable classification as a novice or experienced distance learning student was limited to distance learning enrollment at the single institution. The research was limited to variables external to the course. No consideration was made regarding the instructional design of the course or the influence of interaction between student and content, student and instructor, and student to student. No consideration was made regarding the date of enrollment by the student.

Delimitations

The study was limited to a single, large, public, suburban multi-campus community college district in Texas. The study was limited to the students enrolled in online courses during spring semester 2009.

Students enrolled in blended courses (courses that include some face to face meeting with the instructor) were not included in the study due to the influence of the face to face interaction with the faculty. Technical support data was limited to the online student support center tracking logs and 24/7 help desk support monthly services utilization reports.
CHAPTER 2

LITERATURE REVIEW

Introduction

History of Distance Education

For the purposes of accreditation, distance education is defined as a formal education process in which the majority of the curriculum is delivered and instruction occurs when the instructor and the student are not in the same place (Southern Association of Colleges and Schools, 2009). Simonson, Smaldino, Albright, and Zvacek, 2006, define distance education as institution-based, formal education where the learning group is separated and interactive communications systems connect learners, resources and instructors (p. 7). The term asynchronous learning has been applied in a similar fashion, to learning that is self-paced, student centered with different place and time learning (Simonson et al., 2006). In contrast synchronous learning refers to same content, same time learning. This would apply to traditional face to face learning; however, given technological advances and the presence of web conferencing and two-way video interactive conferencing, synchronous learning can also be delivered at a distance. Distance education has been offered as correspondence, audio, video, computer-assisted learning and/or any combination via the Internet. Most recently, the Southern Association of Colleges and Schools has separated the definition of distance education from the definition of correspondence education (Southern Association of Colleges and Schools, Executive Council, SACS Commission on Colleges, June 2009). However, using the broad definitions of distance education and variety of distance learning modalities, the history of distance learning can be traced to the 1800s.
With its origins in Europe in the 1800s, correspondence instruction, print and post based learning is considered the first generation of distance education (Simonson et al., 2006). Several distance education organizations were formed including Hermod’s (Sweden), 1898, Skerry’s College (Edinburgh), 1878, and the University Correspondence College in London in 1887 (Simonson et al., 2006; Tracey & Richey, 2005). Eventually correspondence study crossed to the United States. In the late 1800s, Anna Eliot Ticknor founded a Boston-based correspondence program, the Ticknor Society, to provide women with a liberal education (Larreamendy-Joerns & Leinhardt, 2006; Tracey & Richey, 2005).

William Rainey Harper, President, University of Chicago, is credited with establishing the first correspondence study department in the United States in 1890 (Larreamendy-Joerns & Leinhardt, 2006). Students in the advanced program were permitted to complete up to 30% of coursework through the mail resulting in the instruction of 3,000 students via correspondence (Gayton, 2007). As is the case in present day distance learning, the idea behind correspondence study was to reach a large number of underserved or underrepresented populations. Democratization, either through access to higher education to populations that would otherwise be excluded, or increasing the range of people who might be served (Larreamendy-Joerns & Leinhardt, 2006), was and is at the heart of distance education. William Rainey Harper’s correspondence study “was designed to provide educational opportunities for those who were not among the economic elite and who could not afford full time residence at an educational institution” (Tracey & Richey, 2005, p. 18). Women, soldiers, international students, children and working professionals, were all served by correspondence study and continued to be reached by the next wave of technologies, television and radio.
Education television and radio began to emerge in the United States and abroad in the early 1920s. According to Simonson et al. (2006), television teaching programs were produced as early as the 1930s (University of Iowa, Purdue University, Kansas State College); however, it was not until the 1950s that college credit courses were offered via broadcast television. Additionally, early technologies included audio and video cassettes that could be mailed to students.

Throughout early history, distance programs met with resistance from the academic community. The academic community questioned the ability of a course to be delivered in the absence of interaction between and among faculty and students (Larreamendy-Joerns & Leinhardt, 2006). Although many of these questions still exist, the emergence of technology better able to facilitate synchronous and asynchronous instruction began to close the gaps between face to face and distance learning.

Since the mid-1980s and early 1990s, the development of fiber-optic communications provided for the development and expansion of two-way, audio and video systems for distance learning delivery (Simonson et al., 2006). Computer mediated instruction has been offered since the mid-1980s, however, in 1990, the U.S. Department of Labor reported that only 15% of U.S. households owned a computer (Shelton & Saltsman, 2005). With the World Wide Web made available to the general public in the early 1990s, the distance learning environment that exists today has a relatively short lifespan. With the continued emergence of today’s technologies, it is not surprising that the predominant form of distance learning today is online learning.

Early advocates of distance learning challenged institutional practice, used innovation as a means by which to reach more students and recognized that learning could take place in any number of forms. Their hard-work, knowledge, skill, and institutional leadership paved the way
for current online education to surpass all other modalities in terms of enrollment (Shelton & Saltsman, 2005). With 3.9 million students taking at least one online course during fall 2007 term, online learning is growing at a rate in excess of the total higher education student population (Allen & Seaman, 2008).

Over the past ten years, the acceptance of online learning has increased, demonstrated through major institutional initiatives by multiple institutions (Yale University, Columbia University, Stanford University, MIT and Carnegie Mellon University and others) and more recently, the abundance of scholarly articles and academic journals about Internet technology and its impact on teaching transformation (Larreamendy-Joerns & Leinhardt, 2006).

**Historical Approaches to Research in Student Outcomes in Distance Learning**

The concern over instructional quality in distance learning brought about research to gather empirical evidence about instructional quality, student dropout, student characteristics and student learning differences. One of the earliest examples was found in Bittner and Mallory’s “University Teaching by Mail” published in 1933 (as cited in Larreamendy-Joerns & Leinhardt, 2006). The results of survey research compared the performance of students in distance learning correspondence courses to resident students at American universities. The authors found that correspondence students met standards of academic achievement in the opinion of authorities, including instructors, examiners, and administrators (Larreamendy-Joerns & Leinhardt, 2006).

The interest in comparing distance learning outcomes to traditional outcomes has remained consistent over the past seventy years. As instruction shifted from correspondence, two-way video, and telecourse instruction to web-based learning, learners’ outcomes were studied to determine if online teaching produces as much learning as traditional instruction. In most cases, the researchers employed a comparison of academic performance online with
academic performance in traditional classes. In evaluating learning in the cognitive domain, research was conducted using causal comparative methods, quasi-experimental, or experimental studies (Tallent-Runnels et al., 2006). In the attempt to make comparisons, multiple populations, multiple methods and assessment measures were used; when the attempt was made to use experimental design to control for confounding variables, the results were generally the same with no significant differences in learning between the modalities of learning (Tallent-Runnels et al., 2006).

Tallent-Runnels et al. (2006) conducted an extensive review of literature on research related to online teaching and learning. Early research methodologies consisted of quantitative descriptive studies and qualitative evaluative case studies. Qualitative research design reflected case study approaches in which researchers used descriptive findings as a means by which variables and processes could be defined and new hypotheses developed. Mixed-method studies used surveys or questionnaires that included Likert-type items and open-ended questions to gather descriptive statistics (Tallent-Runnels et al.).

According to Tallent-Runnels et al. (2006) research on course environment consisted largely of descriptive research in which small number of participants limited generalization of findings. The research attempted to determine the similarities and differences that were necessary between online and face to face classrooms, the means by which to duplicate classroom discussions, faculty use of scaffolds to individualize learning, and the use of online interaction to enhance learning leading to or correlated with student success and satisfaction. Using quantitative and qualitative research methodology, McIssac, Blocher, Mahes, & Vrasidas (1999) examined archived messages including email, message posting and chat exchanges during a graduate course and subsequently interviewed the students. Students’ positive experiences were
influenced by instructors’ frequent feedback, encouragement, and use of collaborative strategies. Studies supported the creation of learning communities through small group discussion online (Knupfer, Gram, & Larsen, 1997), faculty development to promote instructor presence and participation during discussions (Blignaut & Trollip, 2003), and timely feedback from the instructor, discussions with classmates, and announcements to facilitate the learning process (Cooper, 1999).

Multiple studies investigated the motivations, characteristics, demographics, and learning styles of students enrolled in distance learning courses. Qualitative research included case studies to evaluate the interaction between design, delivery and user characteristics. As is the case in the present study, research looked to pre-existing traits, experiences or characteristics to better predict the type of student as well as the predisposition of a student to succeed in online learning. Early survey research by Richards and Ridley (1997) found that students were motivated to take online classes due to work or class schedule conflicts that limited other selections and wanted hands-on computer training and interventions to improve the online experience.

Research related to institutional policy and its impact on student outcomes was typically in the form of survey and interview data and case study (Feist, 2003; Phipps & Merisotis, 2000). Although limited research findings are available, the results indicated that faculty wanted additional support and training matched to their learning styles, and students wanted additional assistance and availability of online resources. In the late 1990s, Ridley, Bailey, Davies, Hash, and Varner conducted survey research to assess the impact of online learning on enrollment (as cited in Tallent-Runnels et al., 2006). Researchers found that online learning attracted those students who lived more than 50 miles from an institution but the flexibility of course scheduling attracted those who lived within 50 miles of the school. The present study evaluated the
differences between and among distance learning students that enrolled in online courses and face to face classes (to be classified as commuters) and those students that enrolled exclusively in online classes (to be classified as noncommuters).

Conceptual Models of Student Departure/Dropout/Attrition

Several conceptual frameworks provided insights regarding the issues related to student dropout that focus on, or can be applied to, distance learning. Tinto’s longitudinal-process model of dropout (1975) and Kember’s longitudinal model of drop-out from distance education (1989), as well as, Bean and Metzner’s conceptual model of nontraditional undergraduate student attrition (1985) provide the theoretical and conceptual frameworks for studying distance learning dropout, particularly as it relates to the subpopulations of traditional and nontraditional students. Additionally, Braxton and Hirschy’s framework for college departure (2004), Braxton, Sullivan and Johnson’s theoretical model (1997) and Liu, Gomez, Khan, and Yen’s learner-oriented community college online course dropout framework (2007), Cabrera, Nora, and Castaneda’s integration model of student retention (1993), and Astin’s input-environment-output model (1972) will be presented.

Tinto’s longitudinal-process model of dropout (1975) provided the basis for multiple models and theoretical frameworks. Tinto’s model seeks to explain drop out from institutions of higher education, not from the system of higher education. It was an institutional model rather than a systems model (Tinto, 1975). This provided support for the study of completion and persistence as a single institution study.

As is the case in the subsequent frameworks to be discussed, Tinto’s model (1975) is a longitudinal process that seeks to measure the direct and indirect effects of sets of variables on dropout that describes a process of moving toward dropout as opposed to a comparison of the
rates of dropout based simply on ability or social characteristics of the individual. Tinto’s model diagrams a longitudinal process of interactions between the individual and the various academic and social systems of the college. Along with background variables and student characteristics, goal commitment and past educational experience contribute significantly to college persistence. Interaction with the college environment including the individuals that make up the institution – peers, faculty, administration and staff, will lead to modifications of perceptions and commitment throughout the learning process. The social environment, more specifically social integration, implies some alignment with the social system of the college (Tinto, 1975).

Tinto (1975) proposed a model that described a relationship between academic and social integration, goal and institutional commitment. Tinto proposed a theory that integration into the academic system directly affected goal commitment and behaviors in the social system directly related to a student’s institutional commitment. Tinto’s model has some limitations to application for both distance learning and in consideration of nontraditional students. The model was prepared for full-time students in face to face learning situations and draws heavily on the social involvement with an institution. Tinto’s model has been tested empirically and the research results have supported the predictive validity of the model with regard to the precollege variables. Distance learning often separates students from the social context of the college environment, thus reducing the significance of the variable for distance learning dropout.

Additionally, a defining characteristic of the nontraditional student was the lack of social integration into the institution instead relying more heavily on social relationships with family, friends and colleagues external to the learning process (Bean & Metzner, 1985). Therefore, the social environment and social integration became a point of departure from Tinto’s model (1975).
and a point of entry for Kember’s model of drop-out from distance learning (1989) and Bean and Metzner’s model of nontraditional undergraduate student attrition.

Kember’s (1989) proposed longitudinal model had provisions for interpreting the effect of the student on the course and the effect of the institution on the student. The components of the model include student characteristics, goal commitment, academic aspects, social and work aspects and a cost/benefit analysis. The model begins with an examination of student characteristics; however, Kember recognized the impact of interventions by the institution and the student’s life and included those variables in his model rather than simply attributing dropout to a set of predestined variables. Demographic data, therefore, was included in the model, referenced in relationship to the interaction it has with other aspects of the model, rather than as a stand-alone predictor of, or barrier to, success (Kember, 1989).

The academic aspect of dropout includes all components of the offering of the distance education course of study by the institution including the manner in which the course of study is delivered to the students and interactions between the student and institution of either an academic or administrative nature (Kember, 1989). In Kember’s model, reference is made to the evaluation of the study package, where the student needs continuity. Many institutions now employ the use of a course management system where students are able to navigate and view course materials in similar environments. Depending on the level of functioning and use of the platform, course management systems may introduce a level of affiliation with a course and institution. However, if problems arise that cannot be resolved or a weak support system exists to deal with technical issues, hostility may develop toward the institution and those perceived to be responsible, including faculty and staff (Kember, 1989).
According to Kember (1989) affiliation with the institution can be also be influenced by administrative support or the lack of administrative support. The frequency and nature of contact, speed of response to student-initiated inquiries, availability of tutorials, and accuracy of information received can all contribute to the students’ feelings of support and positive affiliation with the institution and the course of study. Adversely, administrative incompetence, confusion over processes and requirements, and lack of academic and administrative resources can build a sense of isolation in the student and resentment toward the institution or course of study (Kember, 1989). To determine whether a student was successfully integrated in an academic sense requires examination of each of the components of the academic environment (Kember, 1989). Students help seeking behavior and institutional response patterns and learning support mechanisms may contribute to the feeling of, or lack thereof, collective affiliation with the institution and online learning, leading to persistence or dropout. Kember adapted Tinto’s social integration component of the longitudinal process and moved it from the socialization process within the institution to a measure of the student’s ability to successfully integrate the need to study with the external demands of family, work and social commitments (Kember, 1989).

Kember’s original model was later quantitatively measured using the Distance Education Student Progress (DESP) Inventory (Kember et al., 1994). Minor modifications were made to the original model and subsequently tested in a replication study. The modifications and the results of the second study resulted in a path model similar to the original design. The theoretical framework was designed to provide a basis from which institutional policy or decisions regarding distance learning could be made. The framework isolated demographic variables from measures of social and academic integration leading to outcome variables of GPA and a measure of course completion. Similar to both Kember’s original model (1989) and Tinto’s (1975)
longitudinal model, the model tested the degree to which social and academic integration influence students to progress within course and academic outcomes. After modifying Tinto’s social and academic integration variables for the distance education environment, four scales and fifteen sub-scales were presented in the DESP inventory. The scales, reflected in both the original model and the subsequent DESP inventory included emotional encouragement and external attribution as social integration variables, and academic accommodation and academic incompatibility as academic integration variables. Kember et al. (1994) viewed social and academic integration as intervening variables between pre-existing demographic characteristics and outcome measures (GPA and completion). Further discussion of the results of the research will be presented in a subsequent section.

Bean and Metzner’s (1985) conceptual model of nontraditional undergraduate student attrition includes many different characteristics and conditions that can define a student as nontraditional. For the purposes of Bean and Metzner’s model, the definition of a nontraditional student required a student to have at least one of three characteristics: part-time, commuter, and older than age 24. Bean and Metzner indicated that the decision to drop out was based on four sets of variables to include academic performance, intent to leave (influenced by both psychological outcomes and academic variables), background and defining variables, and environmental variables.

In Bean and Metzner’s model (1985), the decision to persist or to drop out is the result of the indirect and direct effects of the sets of variables. The model includes background and defining variables, academic variables, environmental variables, psychological outcomes, academic outcomes, and intent to leave. Academic variables include study habits, academic advising, and absence from class, major certainty and course availability. Environmental
variables include finances, hours of employment outside encouragement, family responsibilities, and opportunity to transfer. Environmental variables are of greater importance for the nontraditional student. One of Bean and Metzner’s (1985) theories was the relationship between environmental and academic variables. Identified as compensatory effects, for nontraditional students, environmental support compensated for weak academic support, however, academic support would not compensate for weak environmental support. Psychological outcomes included the usefulness of the course, satisfaction, goal commitment and stress. Findings of research using Bean and Metzner’s model will be presented in a subsequent section.

Rovai, 2003, proposed a model based on Tinto’s integration model (1975) and Bean and Metzner’s student attrition model (1985), specifically to address persistence in distance learning online degree programs. Rovai found Bean and Metzner’s model more relevant to distance learning due to the focus on nontraditional students and constructs that aligned to the distance environment; however, Rovai merged components of both Tinto’s model and Bean and Metzner’s model in the proposed model. Rovai’s model included several additional components, including skills required by students prior to admission, student needs, and pedagogy. A subset of internal factors, student needs, identified five specialized needs based on Workman and Stenard (as cited in Rovai, 2003). The needs include program clarity, student self-esteem, identity with the institution, social integration, and ready access to support services, such as bookstore, library, and advising.

Cabrera, Nora, and Castaneda (1993), building on the research of Cabrera, Castaneda, Nora and Hengstler (1992) proposed a theoretical framework that is essentially a merger of Tinto’s student integration model and Bean and Metzner’s attrition model. Cabrera et al. (1993) noted the commonalities between the two models in which persistence is explained as a result of
complex interactions over time. Additionally, both models supported the role of precollege characteristics that affect how well the student adjusts to the institution over time. The integrated model incorporated both Tinto’s and Bean and Metzner’s theoretical frameworks; however, modification of the model occurred by excluding specific paths and their corresponding variables. The hypothesized model included encouragement from friends and family, academic integration, financial attitudes, GPA, social integration, and goal commitment with paths identified indicating their direct and indirect effects on institutional commitment, subsequent intent to persist and resulting persistence. In testing the hypothesized model, data was gathered from students at two points during a single academic year using a survey questionnaire and accessing college transcripts (Cabrera et al., 1993).

The results of Cabrera, Nora, and Castaneda’s (1993) study indicated significant effects (paths) for academic and social integration factors and commitment factors, consistent with Tinto’s (1975, 1987) and Bean’s (1980, 1985) theoretical frameworks. Support was also found for the role of external factors facilitating the transition of the student into the institution, including encouragement from friends and family on commitments to the institution. However, the direct effect of finance attitudes on persistence behavior, academic experiences on institutional commitment and the effect of social integration on goal commitment was not found to be statistically significant (Cabrera et al., 1993). Based on the findings of initial testing, several modifications were made to the model and statistical applications resulting in a final structural model that included the addition of several new direct and indirect paths. Cabrera et al. proposed that a greater understanding of the persistence process could be found by combining the major theories of Tinto (1975, 1987) and Bean (1980, 1982, 1983) and Bean and Metzner (1985) of college persistence. The major findings indicated that the effect of environmental
factors was far more complex than was proposed by Tinto. The results of the study also supported the view that encouragement and support from significant others as well as other environmental factors should be considered when examining student persistence (Cabrera et al., 1993).

The merged theoretical model developed by Cabrera et al. (1993) supported the need for college administrators to focus on variables that are highly predictive of students’ intent to reenroll as the target variables to address intervention strategies. The researchers recommended subsequent intervention strategies that target variables that can be manipulated and those that have been found to be the strongest predictors of predispositions to leave. In this context, Cabrera et al. (1993) research offered support for the present study to evaluate intervention strategies. Additionally, the research suggested the need to “constantly monitor whether an institution’s intervention plan is having an effect on the persistence process” (Cabrera et al., 1993, p. 136).

Braxton, Sullivan and Johnson (1997) and Braxton and Hirschy (2004) proposed a revision of Tinto’s theoretical model for student departure in residential colleges and universities. The revision included the students’ ability to pay. According to Braxton and Hirschy (2004), the student entry characteristics influence the choice of institution and the initial commitment to the institution. The initial level of commitment shaped the five constructs of the revised model (a) students’ perception of the institution’s commitment to the welfare of its students, (b) the potential for community, (c) the integrity of the institution, (d) proactive social adjustment and (e) psychosocial engagement. The higher the level of initial commitment by the student, the more likely the student will use proactive adjustment strategies and the greater the psychosocial engagement. The interplay of the entry characteristics and the student’s incoming
perceptions of the institution would result in students taking a proactive versus reactive approach to social integration and had the potential to build a strong sense of personal self-efficacy. The student’s confidence in the ability to pay positively influenced the actions that the student took to integrate with peers and campus community. Students’ interaction with administrators, faculty and staff and actions taken by institutional representatives shaped the students perceptions of the institution’s commitment to the welfare of the student and the academic integrity of the institution (Braxton and Hirschy, 2004).

According to Braxton and Hirschy (2004), confidence in the institution resulted in an increase in the student’s self-efficacy of his or her ability to survive the institution, leading to social integration. It was proposed that the five new constructs (variables) directly influenced the student’s social integration, subsequently reaffirming the student’s institutional commitment and resulting persistence. Although the model was proposed as a revision of Tinto’s (1987) model for residential colleges and universities, the model has some relevance to the current study of students enrolled in distance learning courses at the community college. First, the ability to pay is typically one of the motivations identified by students as a reason for selecting a community college. The tuition and fees costs can be significantly lower at the community college than at a four-year institution.

Students’ belief that they can afford to attend a community college will contribute to self-efficacy. However, community college administrators and faculty have expressed the belief that the low cost of community college attendance may adversely affect persistence. For students that have the ability to pay, the process of dropping a course or dropping out may be made with the sense of minimal financial impact. The cost of getting a poor grade may be a much greater threat to a student’s self-efficacy than the cost of taking the course again. Accordingly, the ability to
pay will not be evaluated in the present study. Additionally, Braxton and Hirschy’s (2004) model addressed the influence of the institution’s concern about the welfare of a student. The presence of distance learning orientations, a distance learning support center, 24/7 technical support, and workshops and resources available specifically for students enrolled in distance learning courses may indicate to the student that the institution is committed to their welfare and success in the distance learning environment. This construct was included in the present study.

Donaldson and Graham (1999) proposed a model of college outcomes for adults. The model was designed to take into account the unique nature and complexity of adults’ lives and to explain the differences between adults’ undergraduate experiences and those of traditional-age students. Student integration has been identified as an essential construct in most models of student outcomes, with student involvement defined on the basis of campus social activities and faculty and student interactions outside of the classroom. However, adult students are often motivated by reasons that are different from traditional-age students and lack the level of traditional-age students’ social engagement with the institution.

According to Donaldson and Graham, the work of Kasworm and Kuh (as cited in Donaldson and Graham, 1999) contributed significantly to the development of the model, which is an open model that considers the impact of factors outside of the collegiate environment. The model consists of six components (a) prior experience and personal biographies, (b) psychosocial and value orientations, (c) adult cognition, (d) the connecting classroom as the central avenue for social engagement on campus, (e) life-world environment, and (f) college outcomes.

Although Donaldson and Graham’s model is presented in a linear format, it is similar to the other models presented in that a high level of interaction occurs between and among the various components. Prior experience and personal biographies influence motivations, self-
estee, self-confidence, and intent and influence the manner in which adults will experience, evaluate and use surroundings or life-world experiences to make meaning of college. Adults face competing roles of being students, family members, and employees. The absence of conflict, possessing strong study skills, and presence of a supportive network contributes to adult participation behaviors and retention. Adults often rely on the classroom experience and the interactions with faculty and students during class as a replacement for the lack of interaction outside of class on campus. Donaldson and Graham (1999) provided supporting evidence that the classroom is the focal point for learning for adults (Bean & Metzner, 1985; Dill & Henley, 1998).

In Donaldson and Graham’s model (1999), the connecting classroom is placed at the middle of the framework, signifying its relative importance to the remaining constructs. The adult cognition component of the model includes the knowledge structures, the self-regulatory processes, and the cognitive operations through which learning occurs. The life-world environment refers to the social settings outside of the collegiate environment that provide a support system for the adult student and college learning activities. The avenues provide the out-of-classroom context for learning and serve as alternatives to conventional campus involvement. Results from survey research of 28,000 undergraduate students indicated that adults reported higher levels of growth than did younger students on most academic and intellectual items (Donaldson & Graham, 1999).

Donaldson and Graham (1999) provided a framework to explain how and why adults often do as well as traditional-age students given the absence of critical elements in aforementioned models of student outcomes. The final component, learning outcomes for adults, was measured in terms of types and levels of learning, applications of learning, and significance
of learning. As the models discussed up to this point have focused on the outcomes in terms of student persistence, completion, success or satisfaction, the model of college outcomes for adults was a significant departure.

The present study sought to measure the differences between and among traditional and nontraditional students. Given that one defining characteristic of nontraditional students is age, it is important to include in the literature review models that can expand ones understanding of the adult nontraditional student. However, with the primary component of Donaldson and Graham’s (1999) model found in the connecting classroom, it would not be appropriate to use the model as a foundation for research related to distance learning. Although interaction is a component of distance learning, the asynchronous nature of most online learning would limit the application of the Donaldson and Graham’s model to the current study.

Liu et al. (2007) proposed a learner-oriented community college online course dropout framework constructed on the basis of the results of a review of literature and a survey of 30 community colleges on online self-assessment practices. Following higher education institutions’ primary strategy for reducing attrition, the early identification of students likely to drop out and the development and implementation of interventions for those deemed at risk (Summers, 2003), the researchers administered a survey to review existing self report measures assessing students’ potential for success in an online course. The study limited the questions to learner controllable factors. The results contributed to the construction of a model based on three learner controllable factors (a) psychological factors, (b) technological factors, and (c) social factors.

Liu et al. (2007) defined course dropout as maintaining enrollment in a credit course after the course census date and failing to complete the course with an A-C grade at the end of the term (p. 531). Psychological factors included student self-efficacy, motivation, resourcefulness,
persistence, time management and learning style. Technological factors include technology
efficacy, email management, Internet search, file management, word processing, and trouble
shooting. Social factors include association, peer and instructor interaction, partnership team
work, learning community, help seeking and online participation. The framework provides some
similarities to other models of distance learning and institutional completion and persistence.
However, the majority of studies of community college dropout evaluated enrollment over a
period of several terms. Limiting a model to course dropout enabled researchers to address the
diversity of educational goals of students enrolled in community college. Viewed from this
perspective, the learner-oriented community college online course dropout framework (Liu et al.,
2007) provided support for the study, by studying student dropout within a single course. The
findings of the research resulted in support of Seidman’s retention formula (as cited in Liu et al.)
which stated that retention is equal to early identification plus early, intensive, and continuous
intervention. Although the model corresponds with other frameworks in that it offers inter-
related variables; the simplicity of the model, absent the inclusion of pre-entry characteristics
limits its application to the current study. The model is included because there are few
frameworks offered exclusively for community college distance learning. However, due to its
limitations, it was not selected as the framework for the current study.

The final model to be discussed is Astin’s input-environmental-output model (1972). As
a model for student development, Astin identified three distinct components (a) student inputs,
(b) the college environment, and (c) student outputs. Student inputs consist of the talents, skills
and aspiration and other potentials for growth and learning that the student brings with him to
college (Astin, 1972). Some of the inputs are static input or predictor variables which include
demographic variables such as gender, age, race, and ethnicity and others are background
variables. In addition, pretests on output measures are often included as student input variables (Astin, 1972).

In Astin’s model (1972), environmental variables included between college measures (type of institution, type of control, race, geographic region, selectivity, enrollment size) and within college measures (method of financing college, residency, marital status). Output variables included completion of college course work, GPA, affective behaviors, career choice, educational plans, self ratings, impressions of the college, satisfaction of the college, satisfaction with specific aspects of the college, ratings of sufficiency of specific aspects of the college. The model was designed as a measure of the effects of higher education (Astin, 1972). Astin expressed that, to have meaningful results, research on college impact must be multi-institutional and longitudinal in design (1972, p. 1). Although similarities exist to other interactional models, the differences of purpose, application and intended outcomes described make the use of Astin’s input-environmental-output model inappropriate for the current study.

The models provided a conceptual framework for this study. The purpose of focusing on models that presented a process toward dropout or completion versus single categories of variables was to provide a broader perspective that may be more useful in institutional decision making. Models that only point to factors or characteristics that exist before enrollment cannot help to shape policy. By evaluating factors and relationships as a process, institutions can begin to determine policy and practices for distance learning that provide opportunities for remediation and intervention. Although only Kember’s (1989) model, Rovai’s (2003) model and the Liu et al. (2007) model specifically addressed dropout in the distance learning environment, all of the models have been used as a framework for research regarding distance learning attrition. For the purposes of this study, an adaptation of Bean’s and Metzner’s (1985) model of nontraditional
Research on Constructs of the Conceptual Model

Learner Characteristics – Defining and Background Variable Research

The problem of college student attrition has been a focus of research for the past thirty years. The problem is viewed from multiple perspectives. At the institution level retention and persistence are viewed as measures of effectiveness, financial necessity, and enrollment management. Accrediting agencies, state legislatures and federal government have increased the call for accountability regarding the ability of a student not only to enroll (access) but also to successfully complete courses, degrees, and programs. The problem appears to be even a greater challenge for the community college. Students enter and exit with differing goals and intended outcomes. As has been presented, the problem of student success and persistence in higher education is highly complex with multiple dimensions in an interrelated framework. When the environment is shifted to the distance learning virtual campus, the problems accelerate and the challenges increase exponentially. According to Summers, (2003), “Many institutions’ primary strategy for reducing attrition is the early identification of students likely to drop out and the development and implementation of intervention services for those students” (p. 64). As Bean and Metzner’s (1985) conceptual model of nontraditional student attrition was used as the theoretical framework for the present study, prior research studies and findings related to defining and background variables of community college, distance learning, and traditional and nontraditional students are presented.
Learner characteristics in relation to student outcomes in distance learning.

Early research by Powell, Conway, and Ross (1990) offered a multivariate framework for analyzing success and persistence in distance learning. Three categories, predisposing characteristics, institutional factors, and life changes, were identified that interrelate to impact student success and persistence. Although the framework presents a model for analyzing persistence, the time length of the study did not permit evaluation of second course or subsequent course enrollment and completion. Therefore the study limited the measurement to the outcome of success, defined as whether newly enrolled students passed their first course at Athabasca University. Three hundred one newly enrolled students were interviewed face to face prior to beginning course work at Athabasca University. Dichotomous, categorical and continuous data resulted.

In the study by Powell et al. (1990), discriminate analysis was used to analyze data in order to analyze the interactions among the number of predictor variables. The variables were used to construct a profile of potentially successful and at-risk students. Nine major criteria differentiated between successful and unsuccessful students at AU. The criteria found to correlate with success included student self-rating of not passing as a serious consequence, higher rating of chances of succeeding, married students, student literacy, a combined measure of household income and perceived financial security, identifying a place for study and generous estimation of study time needed to successfully complete the course, high student rating of prior formal and informal learning preparation for university, and female gender. With regard to gender, based on previous analysis, the researchers indicated the differences in gender success appeared to be partly explained by course choice. In contrast, students that tended to have a lower chance of succeeding, students that indicated that support from others was needed to
complete tasks, lower literacy, lower subjective rating of prior education and male gender, were found to correlate with withdraw or fail outcomes. The discriminant model classified 69% of the respondents correctly in terms of success as compared to an expected 50% average that would have been achieved by random allocation (Powell et al., 1990).

Analysis of findings indicated that a substantial amount of variance of completion behavior is explained by predisposing characteristics, however, it did not account for all of the variance in completion behavior; therefore, predisposition should not be considered predestination (Powell et al., 1990). The results of the study provided some rationale for the current research, however, given that the predisposing factors were for the most part based on self-reported attitudes and perceptions versus defining or background variables, application to the study was limited.

Using data mining methods from a dataset at a large southwest institution, Yu, Digangi, Jannasch-Pannell, and Kaprolet (2008), sought to determine factors that would distinguish students who tend to take online courses from those who do not. In the study, the researchers attempted to identify crucial factors to profile online students with the hope that the findings can provide administrators and educational researchers information to prioritize course development, to determine the appropriateness of courses for delivery and to develop strategies to help students succeed. The dataset was compiled from 9,944 senior students in a given semester and tracking their online enrollment for the previous four years. The dependent variable was whether the student had taken online classes or not. Online classes were defined as classes where all learning was conducted through the Internet; hybrid or blended courses were excluded. Once initial data was collected the term online students was changed to students who took online courses, due to the low number of courses in which a student could have enrolled (1). According to Yu et al., the
term group defined as online students did not seem appropriate for a student that had only taken one course over the course of four years. Therefore, the two classifications were changed to students who had taken online courses and those who had not taken online courses.

Yu et al. (2008) used classification trees and multivariate adaptive regression splines (MARS) to generate student profiles. Based on the classification tree, the findings indicated that the most important factor contributing to the decisive split between students who took online courses and those who did not, was age. The second most important factor was choice of college (i.e. College of Education; College of Fine Arts). GPA was only a factor in application to a single academic school (engineering). Using MARS statistical analysis, only age was a factor found to profile online students. In contrast to prior research and existing survey data that indicated that online students tend to be nontraditional students or older than age 26 (Instructional Technology Council, 2008), the results of the data mining method with the existing data set resulted in findings that indicated that students under the age of 21 have a higher tendency to take online classes. Additionally, using the classification tree by exhaustive CHAID (exhaustive chi-squared automatic interaction detection, SPSS, 2007), it was determined that tendency to enroll online decreases with age and with regard to both the youngest and oldest online students, gender results as the determining factor when enrolling in online classes. Females were more likely to take part in online classes in both age groups (Yu et al., 2008).

The results of the study were important to the current research. First, it indicated the importance of obtaining profiles of online students from an institution’s population versus relying on aggregate data gathered regionally and nationally. The present study gathered demographic data with respect to age, and age was one contributing factor for defining a student as either a traditional or nontraditional student. Additionally, the findings supported previous
research that indicated that females tend to seek online enrollment at a higher rate than do males. Although Yu et al. (2008) study does not address student outcomes, the demographic data and the analysis of student enrollment patterns contributed significantly to the current study.

Dupin-Bryant (2004) studied pre-entry variables related to course completion and noncompletion in university online distance education courses. Although grounded on the work of Tinto’s (1975) predictive model of higher education retention and Kember’s (1989) adapted model, Dupin-Bryant elected to focus her study on the most manageable area of the framework, the pre-entry variables. The stated purpose of the study was to identify pre-entry variables related to course completion by developing a predictive model of student retention in online courses and to provide an awareness of the variables to help instructors and administrators provide assistance to at-risk students. A random sample of students was drawn from a population of students taking online distance learning courses at Utah State University during the spring of 2003. The participants were sent a research questionnaire developed, tested and reviewed by distance learning professionals. At the end of the term, course completion data was collected from the university’s continuing education registration office for each student who agreed to participate in the study. Four hundred sixty four students participated in the study. Descriptive statistics were generated from the data to appropriately identify the group from which inferences would be made. Discriminant analysis was used to determine the best predictors of retention in online courses as defined by course completion and noncompletion. The product-moment correlation coefficients indicated the relative ability of each of the seven variables to discriminate between completing and noncompleting students (Dupin-Bryant, 2004).

The results of Dupin-Bryant’s (2004) study indicated that the seven variables accounted for 9% of the variability in course completion. Six of the seven variables were responsible for
discriminating between completing and non-completing students at either the $p < .05$ or $p < .001$ level. The six variables included (a) cumulative grade point average, (b) class rank, (c) searching the Internet training; (d) number of previous courses completed online, (e) operating systems and file management training, and (f) Internet applications training. Years of computer training, the seventh variable, was not found to be significant. The results supported previous research with the exception of years of computer experience. Given the other forms of computer training included in the variables, it appeared that the number of years of computer training was not as important to student retention as the type of computer experience. The percent of cases correctly classified was 79.5% (Dupin-Bryant, 2004).

The results of Dupin-Bryant’s (2004) study supported the idea that pre-entry assessment should not be used to include or discourage potential students. The results indicated the need to assess students and identify those students that are at risk and provide them with appropriate training and guidance in the use of specific distance learning technologies. Dupin-Bryant’s study suggested research methodology that was used in the present study as well as providing rationale and support for the study. Dupin-Bryant (2004) recommended future research with a wider sample of institutions and to look at different variables perceived to be related to course completion, including institutional and instructional factors. The current study sampled community college students and included academic integration, institutional support and student behavior as means by which research can advance the body of knowledge that is needed to identify the variables that may facilitate or impede course completion and persistence in online learning. Dupin-Bryant’s study contributed significantly to the current research.

Morris, Wu and Finnegan (2005) developed a study with the intent to identify student characteristics related to completion and noncompletion in online learning at the undergraduate
level offered by the University System of Georgia. Three research questions were examined (a) how accurately can a student’s persistence be predicted in online courses, (b) which predictors are the most important with respect to predictive accuracy of a student’s group membership, and (c) can a prediction/classification rule be developed that may be used with a different analysis unit? The participants were students enrolled over five semesters in distance learning courses across six affiliate university systems institutions. All courses were developed collectively by faculty and instructional design teams and all were offered using the WebCT learning management system. Predictive discriminant analysis (PDA) was used to describe group differences and multivariate analysis of variance (MANOVA) was used to assess the effects of grouping variables on outcomes variables. The grouping variable was labeled as completers and noncompleters resulting in classifications of students according to those who successfully completed a specific course during the semester and students who withdrew from a specific course during the semester (Morris et al., 2005).

On the basis of previous research that found that locus of control, as measured by Rotter’s Internal-External Locus of Control Scale (Parker, as cited by Morris et al., 2005), was significantly related to persistence in online learning, Rotter’s Internal-External Locus of Control Scale was used for Morris, Wu and Finnegan’s (2005) study. The original data included 389 subjects; 146 cases were deleted due to multiple enrollments. When the grouping variable was applied, an additional thirty-two cases were eliminated due to classification as both completers and noncompleters. The remaining 211 students were assigned to two well-defined groups. Two subsets of predictors were used. Subset A included gender, age, verbal ability (SAT verbal score), math ability (SAT math score), current credit hours, HS GPA, and College GPA. Subset
B included financial aid and locus of control (Rotter’s I-E score). Information in Subset A was collected from existing student records.

According to Morris et al. (2005), the data were found to be univariately and multivariately normally distributed and a linear classification rule was applied. The purpose of the study was to determine how accurately a student can be correctly classified into dropout and completion on the basis of his or her scores on seven predictors. The PDA results of subset A indicated that the actual classification results were better than chance at the $p < .05$ level, predicting students’ completion and withdrawal with an accuracy of 62.8%. The findings indicated that high school GPA and SAT math score were considered to be the most important predictors in the study of subset A. Based on the results of subset B, the prediction rule was able to predict students’ group membership with 74.5% accuracy. The two measures included the availability of financial aid and Rotter’s scores.

In order to test the application of PDA study, Morris et al. (2005) applied the classification rule to five new students, predicting students 1, 2, 3, and 5 into a completion group and student 4 into the noncompletion group. The study was limited by sample size; replication of the study was recommended with larger sample size. The study contributed to both the research methodology employed for the present study and the selection of predictor variables, particularly as it related to the use of demographic and academic information variables. Selection of defining and background variables was a critical component of research design and methodology for the current study. Based on the results of Morris, Wu and Finnegan’s (2005) study, gender, age, enrollment status, and college GPA were included. No measure of verbal or math ability was included. High school GPA was considered as a variable but was not included due to the
diversity of enrollment time windows (variability in time since high school enrollment) for community college students.

Parker (1999) conducted a study of students enrolled in distance learning courses offered on audiocassette, through correspondence by mail, or through electronic mail (computer conferencing). Data from the locus of control scale and student information sheet were used to determine which variables could be considered as predictors from distance education. Correlation analysis, regression analysis, and discriminant analysis were used. Parker found that locus of control and source of financial assistance, could predict close to 85% of dropout of distance learning.

DeTure (2004) conducted a study to identify those learner attributes that may be used to predict student success in terms of grade point average in web-based distance learning. DeTure, aimed to identify student characteristics that correlate with student success in distance learning in an effort to understand the retention problem in distance learning. DeTure selected six general education courses offered online at a southeastern community college. All six courses were taught through WebCT or Blackboard learning management systems. All content, tests and discussions were provided online. One hundred sixty one participants enrolled in the selected courses and a total of 73 students were participated in the study. Of the 73 participants in the study 79.5% were female and 20.5% were male (DeTure, 2004).

Students self-selected enrollment in the courses and were aware of the optional on-campus visit in the first week of the course for research related test administration (DeTure, 2004). Participants were given the Group Embedded Figures Test (GEFT) and the Online Technologies Self-Efficacy Scale (OTSES) as paper and pencil tests. Research hypotheses stated that cognitive styles scores can predict student success in web-based courses; online technologies
self-efficacy can predict student success in web-based courses. Descriptive statistics were gathered from the results. An analysis of variance (ANOVA) was done on the GEFT scores by CourseID. An ANOVA was done on the OTSES scores by course identification. Post hoc analysis of the correlation between GEFT and OTSES scores was done. A significant positive correlation was found at $p < .01$ between scores on the GEFT and scores on the OTSES suggesting that field-dependent students tend to have higher online technology self-efficacy.

Based on the results of multiple regression analysis and the lack of correlation between GEFT scores and final grade and the results of multiple regression analysis and the lack of correlation between OTSES scores and final grades, both hypotheses were rejected. According to DeTure, 2004, cognitive style scores and online technologies self-efficacy scores were poor predictors of student success in online courses.

The results of the study produced evidence that, although field independents have higher confidence with online technologies, they are not necessarily more likely to be successful in online courses. DeTure’s (2004) study provided support for the current study; in making final recommendations, DeTure recommended continued exploration and research of student characteristics and instructional design variables that correlate with student success. The research methodologies outlined in DeTure’s study were evaluated as a framework for research design.

Aragon and Johnson (2008) evaluated factors influencing completion and noncompletion of community college online courses. In addition to evaluating factors, the research was offered as a means by which institutions can analyze enrollment patterns as a guide in developing and maintaining adequate and appropriate student support services. The purpose of Aragon and Johnson’s research was to investigate the differences in demographic, enrollment, academic, and self-directed learning characteristics between students who complete and those who do not
complete online courses. The second research question queried the self-reported reasons for student noncompletion of online courses. Demographic characteristics were defined as age, gender, ethnicity, and financial aid eligibility. Academic readiness characteristics were defined by reading, writing, and mathematics placement as measured by the Compass and Asset tests and grade point average. Self-directed learning variables were student measurement scores obtained from the Bartlett-Kotrlik Inventory of Self-Learning (BISL). Course completion was defined by the grade of A, B, C, or D. Course noncompletion was defined by a grade of F, Dr, W or I (Aragon & Johnson, 2008).

Aragon and Johnson’s (2008) study used comparative design and survey design to answer two research questions. The sample for the study included community college students from a rural community college that enrolled and completed a survey within the first day of registration through the tenth day. Three hundred five students, 189 completers and 116 noncompleters participated in the study. Seventy-one percent of the participants were female and 29% male. Student grade point average was calculated for all postsecondary semesters prior to spring 2002.

The student demographic, enrollment, academic readiness, and course completion data were obtained from the college’s database, exported to excel and imported into SPSS for further analysis (Aragon & Johnson, 2008). The assessment of the BISL instrument was conducted online in WebCT as part of the tutorial program that each online student completed prior to starting an online course. Attempts were made to contact noncompleters by phone. Each student reached was asked an open ended question regarding why they chose not to complete their online course. Chi-square analysis was used to analyze question one, t test was conducted to compare the means of completers and noncompleters, correlation coefficients were used to determine the
degree of covariation when a significant difference was found as a result of chi-square and \( t \) tests (Aragon & Johnson, 2008).

Regarding demographics, the findings of Aragon and Johnson’s (2008) study indicated no significant difference for age, a significant but small difference on the basis of gender, no significant difference for ethnicity, and no significant difference on the basis of application eligibility or ineligibility for financial aid. Completers enrolled in more online courses than noncompleters and no significant difference was found on the basis of developmental class enrollment. Completers of online courses had a higher GPA than noncompleters; however, the difference was small. No significant difference was found on the basis of self-directed learning readiness. Research Question 2 was answered by 56% of online student noncompleters. The responses were aligned with five themes: personal or time issues, course design and communication issues, technology or WebCT issues, institutional issues and learning preference.

The research findings were conducted at a single institution but were offered to other community colleges that were trying to find strategies to improve retention rates in online programs. The findings of the study indicated that 18% of the students were not completing courses because of technical and WebCT tutorial problems. Implications of the study included the recommendation of the creation of help desk and student support for online community college students (Aragon & Johnson, 2008).

Recommendations for future research included replication with multiple community colleges, longitudinal study, expansion of the qualitative component and further assessment to determine the reasons more women than men are enrolling in online courses at community colleges. The study by Aragon and Johnson (2008) provided the impetus for the proposed study. Although limited to entry characteristics, the design and findings of the study prompted
evaluation of student support needs and implementation of help services. The current study
provided the opportunity to evaluate entry variables and the impact of the interventions designed
to reduce student attrition.

Hall (2008) combined two web-based surveys commonly used by institutions to assess
student readiness for online learning. The first survey - Is Online Learning Right for Me, was
developed by the Northern Virginia Community College Extended Learning Institute (as cited by
Hall, 2008), and - What Technical Skills Do I Need, was developed by Palm Beach Community
College (as cited by Hall, 2008). The purpose of the study was to determine if the surveys are
accurate predictors of student performance in web-based distance education courses. The single
survey instrument was collected from 228 on-campus students and 83 distance students enrolled
in four different classes on three different regional campuses of a mid-west community college.
A paper version was administered to on-campus students and a web-based version was
administered to students enrolled in distance courses.

Hall (2008) distributed surveys to 629 community college students; surveys were
returned by 261 on-campus students and 90 web-based students. During the course of the
semester, 40 students dropped the course, leaving 311 students who received final grades at the
end of the term. Hall used multiple regression to assess the predictive validity of the two survey
instruments. The independent variables were scores from the two survey instruments and the
type of course taken by the student and the dependent variable was the final grade. In the case of
the on-campus students, all of the variance was accounted for by the categorical variable (the
course). Only 8% of the observed variance in the final grade percentage of distance education
students was explained by the two survey instruments. Eleven percent of the variance was
explained by the categorical variables. A one-way analysis of variance (ANOVA) was conducted
on each instrument to determine if there were differences between the students who withdrew from a class and those that received a final grade. The scores were not significantly different. The results indicated that neither of the surveys was effective in predicting student performance in distance education courses.

Based on the results, Hall (2008) made four recommendations for future research. One recommendation was to use different statistical methods and to use logistic regression or discriminate functional analysis to predict a passing score as one of two dichotomous groups instead of predicting a final grade percentage. The second recommendation was to test other existing assessments. The third recommendation was to improve the predictive validity of the existing surveys and the fourth recommendation was to develop a completely new survey instrument.

Several important points from this study contributed to the current study. First, the research methodology in the current study employed the use of statistical analysis that predicted group membership; second, although the results of assessment were not included in analysis, the assessment instrument that was included in the present study has been tested for reliability and validity and includes an actual measure of knowledge and skills in the place of simply asking the students to self-report. This weakness was noted by Hall (2008) in stating that “several researchers have noted the tendency for individuals to inflate their skills in both social and intellectual domains,” (p. 8) and his belief that the self-inflation of skills may have served as a contributor to the low predictive ability of the two surveys studied. Hall recommended the addition of orientation specifically designed to meet the needs of community college distance learning students. The present study permitted evaluation of distance learning orientations and their contribution to student course completion.
In a study of the students enrolled in distance education courses, Thompson (1997) sought to determine the extent to which a wide range of demographic, academic and administrative variables were related to attrition and persistence. Data were extracted from the student record systems and two self-administered surveys. The independent variables included age; gender; number of years teaching experience (study included upper level students currently teaching, enrolled in Bachelor of Education courses outside of the United States); number of years since completing pre-service training; stage in the course; current occupation; geographical location; method of communication; administrative issues; personal circumstances; work related issues; perceived benefit of completing course; and relevance of unit content to career needs.

Five hundred four students were invited to participate, 258 students submitted follow-up surveys (Thompson, 1997). Descriptive statistics and discriminant analysis were used to correctly classify 69.35% of students according to whether they continued or withdrew from their studies. Discriminant analysis was used to determine the variables known at beginning of the course that were associated with withdrawal and the variables known at the end of the course that are associated with withdrawal. The students who withdrew from class had less teaching experience, completed fewer units and semester of study, and had lower course averages than continuing students. The main reasons for withdrawal were work, family and study commitments (Thompson, 1997). Students who withdrew were less satisfied with levels of communication with instructors. The value of this study was in the application of Kember’s (1989) model in evaluating direct and indirect variables that influence subsequent components.

Survey research methods were used by Yukselturk and Inan (2006) to assess the factors that affected student dropout in an information technologies online certificate program. The Online Course Dropout Survey was developed and distributed to 98 students who had dropped
the program. Twenty-six participants responded. Yukselturk and Inan referenced Morgan and Tam’s 1999 study as identifying three approaches to examining student attrition: (a) predicting dropout by looking at student characteristics, (b) examine features and format of courses which possibly affect student dropout, and (c) soliciting student perspectives. The study consisted of two parts; the first part, included Likert-type scale questions, the second, open ended questions. Data was analyzed using descriptive statistical techniques.

Yukselturk and Inan’s (2006) findings indicated that time limitations and personal problems, expenses, and motivation had higher scores than scores relating to the program. Participants’ responses confirmed that the lowest reason for drop out was the instructors. Subsequent open ended responses confirmed the findings of the quantitative findings. Some of the open ended responses included motivation that decreased as they progressed through the program, being unfamiliar with distance learning, difficulty adapting to distance problems, lack of communication or feedback, and difficulty experienced in chat and discussion (Yukselturk & Inan, 2006).

Given the small number of participants and focus population of the study, generalizability was limited. However, the factors of preparation for distance learning, availability of hours to study, social and work limitations, and response to help seeking were included as variables in the present study.

Learner characteristics in relation to nontraditional and traditional students.

Adult students were surveyed in a correlational design study administered by Kemp (2002) to determine the relationship between persistence and resilience, life events, and external commitments in undergraduate distance education. Self-reported measures were gathered using two psychometric tests, the Resiliency Attitudes Scale (RAS) and the Life Events Inventory
(LEI) and a questionnaire distributed to students by mail. These measures formed the independent variables. The dependent variable, persistence, was obtained from student records regarding course completion and noncompletion. Although the term persistence is applied in multiple ways throughout the literature and in institutional contexts, for the purposes of Kemp’s study, persistence was defined as successful course completion of the first undergraduate course at Athabasca University (AU). Students were considered first-time distance learning students if they were registered in at least one undergraduate distance course and if this was the first undergraduate distance course in which they had enrolled at AU. To control for the intrinsic variable of age, only students between the ages of 30 and 45 were included in the study. Given the focus of the current study on student groups classified as nontraditional and traditional on the basis of age, Kemp’s findings were important.

Kemp (2002) gathered descriptive data and conducted an ANOVA to determine if significant differences existed between the completion and noncompletion groups. Data were analyzed using discriminate analysis to determine the interactions among a number of predictor variables. Stepwise discriminant analysis was performed using Wilks’s lambda. The findings indicate that no significant difference existed based on prior distance learning experience, gender, external commitments related to family, personal, home, community, or financial commitments, or life events.

Significant differences were found between the two groups for resiliency skills and subskills. Kemp’s final analysis determined that the primary variables that discriminated between students who completed courses and those who did not were insight, attaching, persistence, work commitments, general resilience, valuing, commitments, initiative, recruiting, and generating. Kemp’s (2002) findings demonstrated that students with high levels on nine measures of
resilience were more likely to succeed in undergraduate studies. The limitations identified included correlational study, voluntary participation, self-reported data, and single institution study. Although the research design of the study had application to the present study, the age limit of the participants (30-45) and measures of resiliency as a construct limits the application of the findings in support of the proposed research. Prior distance learning experience and work commitment were included as independent variables in the current study.

Jacobsen and Harris (2008) studied self-regulated learning of traditional and nontraditional students’ enrollment at traditional and nontraditional campuses using the Motivated Strategies for Learning Questionnaire (MSLQ). An analysis of variance was used to investigate the differences within and between traditional and nontraditional students attending two different types of institutions. Significant differences were found between traditional and nontraditional students on 10 of the 15 MSLQ scales. Significant differences were found between students attending a traditional or nontraditional college on 9 of the 15 MSLQ scales. Results were not directly applicable to the current study; however, the findings are included in support of the need to study nontraditional and traditional students in relationship to the campus of enrollment. In the current study, the nontraditional campus was the distance learning campus.

Boden, Smartt, Franklin-Guy, and Scudder (2005/2006) examined the relationship of demographic variables, epistemological beliefs, and the readiness of learners to be self-directed in three populations. The students in the sample were selected from traditional undergraduate students (18-25 year olds), adult undergraduate students (25 years old or older), and adult graduate students. The students were undergraduate students studying foreign language, older students in an associate’s degree or bachelor of science program and graduate students enrolled in a communication sciences and disorders program. The first two groups were enrolled in a
small, liberal arts’ college and the third group from a mid-size state university. The students were administered the Schommer Epistemological Questionnaire (SEQ), the Self Directed Learning Readiness Scale (SDLRS) and a demographic questionnaire. The findings from the study indicated that demographic variables and epistemological beliefs can be used to predict self-directedness. The findings showed that students become more self-directed as they progress in class ranking and age and as their belief about fixed ability, simple knowledge, and certain knowledge become more sophisticated (Boden et al., 2005/2006).

The findings of Boden et al. (2005/2006) provided background evidence for evaluation of traditional and nontraditional students in the distance learning environment. Research has shown that self-directedness is a criterion for success in online learning. If age and class standing appeared to be a predictor of self-directedness, one might hypothesize that age would be a predictor of success in distance learning courses. These findings, although not directly applicable, offer a perspective for hypotheses regarding outcomes of nontraditional and traditional learners enrolled in distance learning courses. However, as has been identified in previous research, age has not generally been found to be a predictor of distance learning course completion or persistence.

In a study of nontraditional students in community college using Donaldson and Graham’s model of college outcomes for adults (1999), Philibert, Allen and Elleven (2008) applied three components of the model to research students enrolled in technical and nontechnical courses. Three hundred eleven students were asked to respond to survey questions based on three key constructs of the model in the areas of prior experiences and personal biographies, the connecting classroom, and the life-world environment. The purpose of the study
was to assess the relationship between nontraditional students and higher education in the community college (Philibert et al., 2008).

Data were analyzed using the multivariate analysis of variance (MANOVA) to determine whether the groups differed on more than one dependent variable. Descriptive discriminant analysis was used to find the dimensions of group difference and the classifications that predict group membership. Philibert et al. (2008) found that nontraditional students vary from traditional students with regards to the three model constructs. Findings indicated the life-world experiences contributed the most to describing group differences between and among traditional, minimally nontraditional, moderately nontraditional, and highly nontraditional. Philibert et al. (2008) found that technical students are not different from nontechnical students in relationship to the three model constructs and the study found no difference between traditional and nontraditional students when compared to technical and nontechnical students in regards to the three model constructs.

The findings offer evidence that student populations differ in their approach to the classroom and day to day responsibilities and activities. However, using four levels of classification, only eleven students remained classified as traditional. The study offered some evidence of the differences between traditional and nontraditional students and the resources needed to meet the needs of all students. Philibert et al. (2008) recommended additional research to determine who an institution’s students are and what they need from the educational institution. Additionally, the study brought to light the low number of traditional students that may be enrolled at an institution.
Learner characteristics in relation to student outcomes in college, university or community colleges.

House (1999) used Astin’s input-environmental-output model to extend the research findings of others by assessing the effects of both academic and cognitive-motivational input variables and by examining the effects of two types of environmental variables. The sample population of 594 students was drawn from students who had started college approximately five years prior to being surveyed. The data from the survey was merged with information about the students’ initial characteristics when they began the college. The sample consisted of 180 male students and 414 female students. Three types of input variables were related to achievement consisting of high school grade point average, self-ratings of overall academic ability, and expectations of graduating with honors. The environmental variables were six measures of students’ instructional experiences and other factors perceived to be related to achievement in college to include hours per week spent on studying, the presence of group work, presence or absence of a major change, satisfaction with quality of instruction, work hours during college, and number of hours per week spent commuting (House, 1999).

House assessed two outcome measures; whether or not the student was satisfied with their college experience and whether or not they earned a degree (House, 1999). Several methods were used to analyze the data including correlation coefficients to analyze the relationships between each of the input and environmental variables and to evaluate the predictive relationships between all input and environmental variables and the outcome measures. Lastly, causal analytical modeling via blocked regression analysis (CAMBRA) was used to evaluate Astin’s I-E-O model. House’s study resulted in several significant findings which have relevance for the proposed study. First, the three input variables significantly correlated with the outcome
variables of earning a bachelor’s degree and satisfaction with the college experience. Students who showed a greater degree of satisfaction with their college experience and completed a bachelor’s degree spent more hours per week studying, worked on group projects in class, were more satisfied with the overall quality of instruction and spent fewer hours commuting. The students who completed a bachelor’s degree had also changed their major.

House (1999) found one of the input variables, high school GPA, was a significant predictor of students’ satisfaction with college. Two limitations of the study were identified. One, only traditional age students were included in the analysis and two, only students from a single institution were included. House indicated the need to repeat the study including adults (of nontraditional age) because of the results of previous research that indicated that adults have different educational strategies and benefit from different instructional strategies than younger learners. This model was not replicated in the present research; however, a similar approach was taken. In order to reduce the age related limitation of House’s study, students of traditional and nontraditional age were included in the research.

Although House’s (1999) study was not designed to be applied to distance learning students, the I-E-O model has been used in research related to distance and online learning. The primary significance of the study in relation to the present research was in the example that it provided for the use of an assessment model that considers the effects of student characteristics (inputs) and instructional activities (environmental variables) on student achievement (outcomes).

Craig and Ward (2008) used existing data of 1,729 first-time full-time students who entered a public community college in New England in fall 1998 to study retention of community college students on the basis of student and institutional characteristics. The
institution’s database provided information on student demographic, academic characteristics and initial program major. Data analysis was conducted using analysis of variance (ANOVA) and logistic regression analysis. The only student demographic found to be significant relative to student retention was the length of interval between high school graduation and college enrollment (Craig & Ward, 2008). Age was not related to GPA, nor was it a predictor of success or failure to remain in college. Gender was related to cumulative GPA; however, it was not a predictor of having greater or lesser odds of success, nor was race/ethnicity. Cumulative GPA was found to be the student academic factor most strongly related to student success. Second semester GPA and attempted credits were also found to be significant. Completion of fewer credits was an indicator of risk for retention. Of the population studied, dropouts on average had earned only 16.8 credits with an average GPA of 1.68 (Craig & Ward, 2008).

Craig and Ward’s (2008) findings indicated that the factors that most closely corresponded to student retention at the community college, academic performance, credits earned, and the time interval between high school and college, were all factors that can be addressed with institutional strategic planning and institutional policy. The results also indicated the importance of early identification and intervention. Community colleges are not in a position to improve retention by raising the academic standards of those they are seeking to admit. They must simply continue to assess the needs of their existing populations and craft the appropriate response. The findings of Craig and Ward’s study offered insights in to the areas that require further research within other community college institutions or districts. In addition to other variables identified, the demographic and academic variables found to be significant in this study were considered for the study, specifically GPA and credit hours attempted and attained.
In an application of Tinto’s 1975 model of attrition, Freer-Weiss (2004-2005) studied the role of late applicants with regard to pre-entry characteristics, academic performance and subsequent reenrollment in the following term. Institutional data was gathered from the admission files of 785 first-time, matriculated college freshman at a two-year regional campus of a large state university in a metropolitan area. For the purposes of the study, a sample of 2,706 files was drawn from 6,766 files of students who were no longer enrolled.

Freer-Weiss (2004-2005) referenced Tinto’s position that intention and commitment most affected attrition and the critical time periods during which an institution can have an impact are prior to entry, during the time of application and orientation, and in the first term of enrollment (Freer-Weiss, 2004-2005, p. 139). Using a framework similar to Tinto’s model, the study examined demographic data of age, sex, race and academic ability based on HS rank, English and math placement scores. Students’ goals were measured by full-time or part-time enrollment and degree objective. Descriptive analysis, parametric and not parametric statistical methods were applied to the data. The research design was a longitudinal post hoc study of closed admission files.

Freer-Weiss (2004-2005) found age, sex, and whether a student earned a GED or high school diploma to be significant variables in relation to the number of days that a student applied before the beginning of term. Race was not a contributing factor. Males, students with a GED, and students not entering college directly after high school were more likely to apply within the last three weeks of the term or after classes began. Students who applied within the last two weeks indicated that they were seeking an associate’s degree. The third week before the semester began more students indicated that they were seeking a bachelor’s degree. The second hypothesis, students who apply late do not perform as well academically as students who apply
early, was not found to be significant. Although not at a significant level, the results indicate that late applicants were more likely to have a lower GPA and complete fewer hours than students who applied early. The third hypothesis, students who apply late are less likely to reenroll the following term than students who apply early, was supported by the data. The number of days applied before term was found to be significantly related to reenrollment the subsequent term (Freer-Weiss, 2004-2005).

In summary, Freer-Weiss (2004-2005) indicated that the association between high-risk profile, late application and attrition was affirmed. In relationship to the current study, the findings were significant. The pre-entry defining and background variables, preterm and early term behaviors of novice and experienced, traditional and nontraditional students were examined. In analysis of the data, it was important to keep in mind, if not affirm, the participation in preterm or early term interventions in relation to the point in time that the student makes application to the institution. Although time of enrollment was not included as a variable in the current study, it was included in limitations.

**Academic Environment and Academic Integration Variables**

Limited research was found related to the institutional factors that impact online and onsite learning. Much of the research comes from the academic environment and academic integration that occurs within courses; information regarding the influence of institutional factors within the academic environment but external to courses is limited. According to Tallent-Runnels et al. (2006), “There is little formal research on various institutional factors for online courses. Most of the research on this aspect of online courses is organized around distance education” (p. 113). In proposing a study on predictors of student success at two-year and four-year institutions, Strauss and Volkwein (2004) stated, “there is a dearth of empirical studies
analyzing multicampus data and the important influence of structural/organizational influences on student outcomes” (p. 204). The following sections present studies related to the academic environment and integration variables within course and external to the course, in relation to student outcomes, with respect to online and distance learning, at two-year and four-year institutions. Subsequent sections will reference the social and environmental construct variables. As there is often an interrelationship between the academic environment and the social environment in research, studies will be grouped according to the most significant implications of the findings of each study.

**Academic environment variables in relation to student outcomes in distance learning.**

Morris, Finnegan and Wu (2005) examined student engagement in asynchronous online courses through empirical analysis of student behavior online and its relationship to persistence and achievement. According to Morris et al., the study was designed to further the research on the influence of student online behaviors on academic achievement and performance. Due to the nature of the research, it is being included as a component of academic integration, integration with the course and curriculum, versus social integration, which is discussed in a subsequent section. Morris et al. examined (a) what is the relationship of student participation to student persistence and achievement online, (b) what are the differences and similarities between completers and withdrawers in various measures of student behavior online, and (c) how accurately can measures of student participation predict achievement in online courses?

The population included students enrolled in undergraduate courses offered through eCore, the electronic core curriculum of the University System of Georgia. Data were collected over three terms for three courses. Student data tracking logs were accessed from archived courses. The data was extracted and exported to excel and SPSS for analysis. $T$ tests were used to
determine whether completers and withrawers differed with regard to frequency and duration of participation. Multiple regression was used to assess the relationship between students’ achievement and participation (Morris et al., 2005).

Morris et al. (2005) examined three hundred fifty-four student records; 70 students were withrawers and 284 were completers. Results indicated a statistically significant difference in all variables that measured frequency of course participation between completers and withrawers. Across all three courses, completers had a greater number of original posts, follow-up posts, discussions viewed, and content pages viewed. Withdrawers had significantly lower participation than completers in all four measures.

The descriptive data gathered by Morris et al. (2005) also revealed significant differences between successful completers and nonsuccessful completers. Successful completers completed the course with a grade of A, B, or C. Nonsuccessful completers received a grade of D, F, or I. A multiple regression analysis was completed to evaluate how well student participation measures predicted achievement. Achievement was measured by the end of course grade assigned by the instructor. The multiple squared correlation coefficient was .31, indicating that 31% of the variability in achievement was accounted for by student participation measures. Three of the eight variables were statistically significant at \( p < .01 \) and served as good predictors of final grades; number of discussion posts viewed, number of content pages viewed, and seconds viewing discussions (Morris et al., 2005).

The findings of this study follow earlier research by Morris, Wu, et al. (2005) that suggested that one significant factor in persistence is student motivation. Morris et al. suggested that the unsuccessful students and the withdrawers had the same opportunity to view discussion posts and engage in discussion as the successful completers; however, the data indicates that
unsuccessful students were far less active in participation than successful students. Creating and replying to discussion posts was not found to be significant. Morris et al. recognized the limitations to the study, in that the quality of discussion was not addressed nor was the role of discussions in making content meaningful.

The study by Morris et al. (2005) provided both design and direction for the current study. Tracking student behavior patterns in relation to course outcomes may provide insights into the types of behaviors necessary for successful student outcomes in online learning. Although Morris et al. studied behaviors within the course and the current study examined student behaviors external to the course, the findings may shed additional light on the student practices and procedures most closely associated with success. Although not adopted, this study offered definitions that were evaluated for use as the dependent variables in the proposed study: successful completers (A, B, or C), nonsuccessful completers (D, F, or I) and withdrawers.

Using a design and statistical analysis replication of the previous study, Finnegan, Morris and Lee (2008) examined behavior in online courses and its relationship to persistence and achievement across fields. Twenty-two courses were grouped in to three broad fields to include English and Communication (EC); Social Sciences (SS); and the (STEM) fields of Science, Technology and Math. The study population included students enrolled in 118 sections of 22 undergraduate courses offered through eCore by the University of Georgia System. Over the course of three semesters, 2,681 students enrolled with a total of 757 withdrawers, 595 non-successful completers and 1,329 successful completers. To evaluate persistence, students were classified as completers or withdrawers; to examine achievement, completers were classified as successful completers (A–C) or non-successful completers (D, F, or I). Tracking logs found in archived courses were used to extract data. As was the case in the previous Morris et al. (2005),
and Morris, Wu, et al. (2005) studies, Finnegan et al. (2008) found that students that had withdrawn participated less frequently and spent less time on online activities than completing students. Student participation data were divided into the three academic fields. On average students enrolled in social science courses demonstrated greater frequency and more time in the four behaviors of discussion posts read, original posts created, follow-up posts replied, and content pages viewed (Finnegan et al., 2008).

Finnegan et al. (2008) analyzed data using t tests and multiple regression analysis. Results showed statistically significant differences between completers and withdrawers on all variable measures. Among completers there were statistical differences across fields on all four measures. Students in STEM courses participated less in reading discussions, following up and creating new discussion postings. However, STEM students viewed content pages more frequently than English and Communication students. Students in social science courses spent more time online than students enrolled in EC or STEM courses (Finnegan et al., 2008).

Multiple regression analysis was conducted to evaluate how well student participation measures predicted achievement. End of course grades were treated as a continuous dependent variable. Data from 1,862 students were used in the analysis. The results by Finnegan et al. (2008) indicated that student activity for all courses was significantly related to achievement. The multiple squared correlation coefficient was .27, indicating that approximately 27% of the variability for achievement was accounted for by student participation measures. For each course category, linear combination of students’ activities was significantly related to achievement (Finnegan et al., 2008).

Learning management systems such as WebCT or Blackboard provide the opportunity for faculty and administrators to study student behavior in online courses and develop early
warning systems for students who may be at risk for withdrawal or failure. Although analysis of within course activity was not part of the current study, the Finnegan et al. (2008) research design and statistical analyses were examined. In addition, the study provided a foundation for future research of existing data to determine if differences in student behavior through assessment, preparation, and help seeking exist across varying subjects and disciplines.

Kumrow (2007) examined the predictive value of five self-regulatory resource management strategies including time management, study environment, effort regulation, help seeking and peer learning to determine whether or not a student would be successful in a hybrid learning environment. The sample consisted of 38 students enrolled in a graduate health care economics course in either a hybrid or face to face section. Kumrow’s (2007) research design was quasi-experimental comparative. The non-random sample included students enrolled in either a face to face or hybrid course. At the end of the term, the number of participants had decreased to 33, with 18 in the hybrid section and 15 in the lecture section. Three separate research instruments were administered to the participants, as pretest only, posttest only or both pre and posttest. Kumrow administered a demographic survey at the beginning of the course. The affective measures survey was administered at course completion and consisted of Likert-style questions about the method of instruction, and the Resource Management Strategies Survey was administered at the beginning and end of the course. The Resource Management Strategies Survey was constructed with items from the Motivated Strategies for Learning Questionnaire. Ninety-seven percent of the participants were female and ranged in age from 24 to 61 (Kumrow, 2007).

Data analysis revealed that the hybrid section had significantly higher grades. Pearson’s product-moment correlations using pretest and posttest scores were calculated for both sections
to determine if there was a significant relationship between each of the five resource management strategies and end-of-course grades. Only help seeking demonstrated a significant correlation with end-of-course grades in both sections. Help seeking in the hybrid section was positively correlated with pretest and posttest scores. Help seeking in the face to face lecture section was not correlated with pretest scores but was negatively correlated with posttest scores. The affective measures survey indicated that students in the hybrid section had significantly more favorable feelings toward their method of instruction (Kumrow, 2007).

Given the findings of the study and the significance of help seeking in relation to academic achievement in the hybrid section, Kumrow (2007) recommended that those using hybrids build sufficient help seeking paths so that students do not develop a sense of isolation from peers and the instructor. Additionally, Kumrow recommended that instructors determine whether adequate help-seeking mechanisms are in place for hybrid learning. This study was included due to the findings of the significance of help seeking. This study supported the need to evaluate help-seeking mechanisms that are available to students.

Bambara et al. (2009) studied the experiences of community college students enrolled in high-risk online courses. A qualitative phenomenology approach was taken for the research directed at those courses that were considered high-risk, courses in which 30% or more of the students withdrew or earned final courses grades of D or F. From the institutions list of 13 online courses classified as high-risk courses (HRCs), four courses were selected. All students enrolled in the courses were sent an email invitation, thirteen students volunteered. Each participant met with the researcher for a face to face interview for a period of 60 to 90 minutes. The participants’ experience included both completion and withdrawal or failure in accounting, statistics, and
basic computer skills. The interviews resulted in Bambura identifying four structured themes that defined the participants lived experience in HRCs.

The first theme was isolation. The participants found the HRCs to be static. They lacked student-instructor interaction; they felt a void in student-to-student connections (Bambara et al., 2009).

The second theme was academic challenge. The participants’ unreal expectations with both the content and navigation of the online environment led to frustration and “disdain for the course” (Bambara et al., 2009, p. 225). Lack of clarity in course organization and misinformation added to the academic challenge. Technology frustrations were also noted. Participants expressed that simply navigating the course management system was difficult and they felt especially vulnerable when issues occurred at the beginning of the term.

The third theme was ownership. Participants described how their motivation, commitment, independence, self-direction and resourcefulness helped them survey the course. They said that they took a positive stance toward the HRC. They invested extra-time once they realized how challenging it was going to be; however, the admitted that the HRCs required more time and effort than they had planned to invest (Bambara et al. 2009).

The fourth theme was acquiescence. Although not all students’ acquiescence resulted in failure or withdrawal, it was usually the case. Students silently submitted to the experience and admitted they lost motivation; they compromised and worked to complete the course even thought it was not a positive experience. As they realized they were in trouble they expressed that they felt shame and humiliation (Bambara et al., 2009).

Based on the results of the study, Bambara et al. (2009) made recommendations for institutions to identify HRCs; to examine institutional policies and practices to ensure student
services and academic support programs are prepared for the wide-range of students enrolled; and to provide prospective students with orientation sessions that alert them to the course expectations and the personal investment involved.

Motteram and Forrester (2005) used qualitative research to gather insights in relation to students’ expectations of distance learning and students’ needs. Students enrolled in Master of Education distance learning programs and face to face programs were surveyed to gather comparative data. Follow-up telephone interviews were conducted with four students. The data was entered in using QSR NVivo. Students’ responses indicated that both opportunities and limitations were anticipated by the participants. The opportunities included communicating with students from other parts of the world and extensive use of e-resources. The constraints correlated with issues related to inadequate preparation and technology issues. Students indicated the need for knowledge of contact or support personnel, who to contact about specific questions and where to get feedback. Students also expressed the importance of communication with peers and instructors (Motteram & Forrester, 2005).

Based on the results of the research, Motteram and Forrester (2005) indicated the need to understand the needs of the students and their initial experiences with online distance education. The research identified the students’ concerns and anxieties, which provided a greater understanding of the students’ engagement with online learning. Motteram and Forrester’s (2005) study reinforced the need to conduct institutional research relative to the specific needs of the online student population and to assess early and often how they perceive their initial experiences with online distance learning. The current research study examined the assessment, preparation and help seeking behaviors of distance learning students at a single institution preterm and early term and its relationship to student outcomes. The study by Motteram and
Forrester (2005) offered insights in support of the significance of the current study with regard to the academic environment and the support needs of distance learning students.

Lynch (2001) interviewed faculty and students, reviewed student evaluations of online courses and online teachers, and analyzed registration records and dropout rates for online courses. Lynch found that student dropout rates online were as high as 35-50% compared to 14% for traditional classes. On the basis of the findings, Lynch hypothesized the creation and implementation of a student orientation course would provide significant impacts. The one credit course was piloted with 50 students. After a successful pilot the course was required of all students entering an online bachelor degree program. The implementation study spanned six months and enrolled 392 students with 376 students completing the course. Using general statistics, the results indicated an improvement in technology skills, an increase in independent self-directed learning, an increase in learning style knowledge and effective communication skills using web-based tools (Lynch, 2001).

An attrition and reenrollment comparison was made on an individual student basis. Ninety-two percent of the students in the orientation courses registered for at least one online course in the following term. However, the attrition rate of those that reenrolled varied significantly according to the number of courses they took at one time. For students taking one course, attrition was as low as 7.5%; for students taking three or more courses, online attrition was as high as 34% (Lynch, 2001).

The lack of research design limited the value of Lynch’s (2001) study to the proposed research.
Academic environment variables in relation to outcomes in community college or freshman year.

Strauss and Volkwein (2004) examined the predictors of institutional commitment of first-year students at 28 two-year and 23 four-year public institutions. Institutional commitment had been found (Cabrera, Nora, & Castaneda, 1993; Tinto, 1993) to be a strong predictor of college students’ intent to persist and persistence. Strauss and Volkwein defined student institutional commitment as a student’s satisfaction, sense of belonging, impression of educational quality, and willingness to reenroll. Cross-sectional research design was employed to analyze data from the 1997 Integrated Post-Secondary Education Database System (IPEDS) database from 51 public institutions. Student-level data were gathered from outcomes surveys with a total of 8,217 responses from first-year students with 2,499 at four-year institutions and 5,718 at two-year institutions. Twenty-two independent variables from seven broad categories including (a) organizational characteristics, (b) pre-college characteristics, (c) encouragement from significant others, (d) financial aid and attitudes, (e) social integration and growth, (f) academic integration and academic growth, and (g) grade point average, were measured on the dependent variable, institutional commitment.

Data analysis was conducted with multivariate analysis using hierarchical linear modeling. The results of the study supported the hypothesis that two-year and four-year institutions have different patterns of student institutional commitment, but the differences were not as great as anticipated. Strauss and Volkwein’s (2004) findings indicated that first-year students at two-year institutions have slightly higher institutional commitment scores than those at four-year institutions. Findings also indicated that the classroom experience was more critical to institutional commitment to two-year students with social integration a stronger relationship.
for students at four-year institutions. With regard to retention, the study found the strongest influences on institutional commitment coming from student level variables not organizational characteristics. The student level variables were not in the form of student entry characteristics, but instead were found in subsequent campus experiences (Strauss & Volkwein, 2004).

The findings of Strauss and Volkwein (2004) did not support previous research that found campus size differences, wealth, complexity, and productivity as important variables on student commitment. Strauss and Volkwein (2004) suggested that institutional administrators should focus their attention, efforts, and policies on improving student experiences that build student integration and commitment, particularly classroom experiences, faculty and student interaction and intellectual growth experiences. Social involvement, student friendships and growth were also found to be strongly connected to commitment and therefore persistence. Additional influences, although not as strong, were age, ethnicity, marital status, and financial aid (Strauss & Volkwein, 2004).

Fike and Fike (2008) examined predictors of first-year student retention in the community college by conducting a quantitative, retrospective study after gathering data over a four-year period at a Texas public urban community college. Two dependent variable responses were included in analysis, (a) first-year fall semester to first-year spring semester retention, and (b) first-year fall semester to second-year fall semester retention. Independent variables were selected based on existing theories of retention to include student gender, age, and ethnicity; student completion status for developmental mathematics, reading and writing courses; participation in student support services; receiving financial aid; enrollment in Internet courses; semester hours enrolled in the first semester; semester hours dropped in the first semester; and the education level of parents. Descriptive statistics, bivariate correlation coefficients, point-
biserial correlation coefficients, phi correlation coefficients and multivariate logistic regression models were used to assess relations and to predict odds of retention. For all analysis, $p < .05$ level of significance was used (Fike & Fike, 2008).

The Fike and Fike (2008) study revealed that the strongest positive correlate with retention was successful completion of a developmental reading course. Other positive correlates included successful completion of a developmental math course, receiving financial aid, taking an Internet course, semester hours enrolled in the first semester, and participation in student support services. Negative correlates included student age and semester hours dropped during the first semester. Multivariate analysis demonstrated positive predictors of fall to spring retention as (from strongest to weakest) passing a developmental reading course, taking an Internet course, participating in student support services program, not taking a developmental reading courses, passing a developmental mathematics course, receiving financial aid, father having some college education, semester hours enrolled in the first fall semester, and student age. Positive predictors of first fall to second fall semester retention included (strongest to weakest), passing a developmental reading course, taking an Internet course, not taking a developmental reading course, participating in student support services program, passing a developmental writing course, passing a developmental mathematics course, receiving financial aid, father having some college, mother having some college and the number of hours enrolled first term.

Successful completion of a developmental reading course was a significant predictor of retention and persistence. College level reading comprehension and reading strategies are essential to student success. Developmental course enrollment and success will not be a variable in the proposed model; however, it may be included in future research. An additional finding of Fike and Fike’s (2008) study was the importance of enrollment in an Internet course. Given the
growth of nontraditional students at community colleges it is not surprising that the availability of Internet course is critical to retention and persistence. However, they did not assess the reasons why taking an Internet course was a predictor of student success. Further research was recommended.

O’Gara, Karp, and Hughes (2009) used qualitative research methods to examine the role of student success courses in influencing behaviors associated with persistence. The original intent of the research was to assess institutional and personal factors that contributed to or provided barriers to students’ persistence in the community college. However, the importance of the student success course emerged during the process and the focus shifted. O’Gara et al. conducted interviews with students during their second semester of enrollment and they were re-interviewed six months later during the fall term, whether they remained enrolled or not. Students were enrolled at two urban community colleges in the northeast. Students were randomly selected from all first-time enrollees. Forty-four students participated in the study. The study sample consisted of more female participants than male. Data was uploaded to NVivo.

During the interviews, O’Gara et al. (2009) focused on role of a student success course offered at both institutions. At one institution (pseudonym Northern), the course was offered as a one semester, one credit course aimed to teach students about college services, study techniques, time management and how to develop a sense of community within the college. The course was intended to serve traditional age students who attended college on a full-time basis and, although not technically required, advisors routinely added students to the course. Part-time students were not typically enrolled unless they encountered difficulty in courses and then they were encouraged to enroll.
At the other institution (pseudonym Eastern), the goals of the student success course were similar to Northern. However, at Eastern, the student success course was targeted at all students regardless of full or part-time status and it was required for graduation (O’Gara et al., 2009).

The findings of O’Gara et al. (2009) indicated that students found the courses to be beneficial in multiple ways, including finding information about the college, skills and techniques essential to their academic endeavors and created important relationships. Students who did not take the course reported that they often found out information about the college by accident, through flyers or missed it all together. Often this left students without an understanding of the resources offered by the college (O’Gara et al., 2009).

Specifically related to the area of academic integration, those students enrolled in the student success courses met with faculty advisors, were presented resources regarding study skills and time management, and forged relationships with those in the academic community. The question was raised by O’Gara et al. (2009) as to whether the same information could be provided to students through another avenue. Findings indicated that having knowledge was not enough, the students needed to know how to use the services. In providing an example, O’Gara et al. identified the differences between use of tutoring services by students who had taken the student success courses (58%) and use by students who did not take the course (23%).

The findings of O’Gara et al. (2009) research study resulted in suggested changes in policy and procedure at the two institutions studied. Additionally, the research offered other institutions a perspective of student success courses and the possible relation with academic and environmental integration, as well as social integration. Although qualitative in nature, this study supported the inclusion of distance learning orientation and online student success workshops as variables in the research design.
Social and Environmental Variables

Social and environmental variables in relation to student outcomes in distance learning.

Brown (2001) conducted a study to develop a theory about the process through which community formed in adult computer mediated asynchronous distance learning classes. Brown defined community as support from people who shared joy and trials; community-building as creating a sense of belonging, connectedness; and a distance learner as anyone who is not actually in the presence of the teacher while learning. The study used a combination of qualitative methods and grounded theory. The subjects of the study were selected from graduate level educational administration courses delivered asynchronously from a midwestern university through the Internet. Theoretical sampling was used to select participants. Twelve students in the fall term and six students from the spring term participated. The first round of study was done by phone; the second round via email. Grounded theory methods set procedures for the analysis of the data (Brown, 2001).

Brown’s (2001) findings resulted in the development of a community building paradigm. The conditions that caused community building included instructor modeling of expected behavior; sufficient time for discussion; similarities among students that allowed for communication; personal need, academic need, and desire to be a part of community (Brown, 2001). Brown identified strategies as a result; create an class atmosphere to promote openness, demonstrate interest, share relevant experiences, reach out for help when needed, provide timely feedback, grapple with issues to solve problems together and encourage threaded discussions. Three levels of community were identified; the first included on-line acquaintances, the second a community member, and the third, a camaraderie which was achieved after long term association.
Brown (2001) found that five of the study participants felt no sense of community. The factors contributing to this result were lack of interest or thought about the community, did not want to be part of the community, being out of sync with the community, need for face-to-face interaction to feel a sense of community and lack of time to participate in the community. Brown (2001) proposed another portion of the theory in a concept known as Time Triangles (p. 26). New students spent much of their time familiarizing themselves with technology, teaching methods, and course content with little left for community building (upright triangle), whereas veteran students spent less time with technology and teaching method familiarity and invested their time in course content and community building (inverted pyramid). The findings of this study support the need for social integration, even in the absence of face-to-face interaction. Social interaction within an online course was not included as a variable in the current study due to the absence of this construct in Bean and Metzner’s model (1985). However, the understanding of how community is built online and the implications of the time triangles for new and returning online students was considered in examination of preterm and early term behaviors of online students.

Jung, Choi, Lim, and Leem (2002) investigated three types of interaction, academic, collaborative and social interaction, on learning, satisfaction, participation and attitude towards online learning in a web-based instruction environment. Jung et al. identified four research questions: (a) does the level of learner satisfaction differ according to the type of asynchronous interaction, (b) do students who are engaged in collaborative or social interaction achieve more that those who are just engaged in academic interaction, (c) do students participate more actively in online discussion within collaborative or social interaction environments than within academic
only interaction environments, and (d) do students change their attitude toward online learning according to the types of interaction they engage?

One hundred twenty-four graduate students from three courses in Seoul, Korea participated (Jung et al., 2002). The students were assigned to one of three interaction groups and a pre-test was conducted to ensure that the groups were similar. No significant differences were found. The independent variables were identified as the academic interaction group, the social interaction group and the collaborative interaction group. The dependent variables included learner achievement on five assignments, learner satisfaction after the course concludes, participation in interactive activity, and attitude change after taking the course. After completion of the courses, a post-test was given to all three groups of participants that measured attitude and a questionnaire was administered that measured satisfaction. A one-way ANOVA revealed that no significant differences existed between the groups’ general satisfaction with the web-based instruction (WBI) or their perceived learning outcomes. There were significant differences among the groups regarding satisfaction with the learning experience. Learners’ satisfaction with the WBI experience was most strongly related to the amount of interaction time with other students than with the instructor (Jung et al., 2002).

To answer the question about learning achievement, Jung et al. (2002) conducted a one-way ANOVA and post hoc scheffe analysis. Findings indicated social interaction between learners and the instructor contributed to increased learning achievement, collaborative interaction among students did not. Results also revealed that there was no significant difference among groups in terms of attitude toward online learning; however, there were changes in the students’ attitude after receiving WBI. The results revealed that taking a web-based course caused learners to view online learning more positively regardless of the type of interaction.
Satisfaction with online learning was not measured in the current study. Bean and Metzner’s model (1985) includes a psychological component with satisfaction as a variable; therefore, it is included here for reference. The design of the proposed study did not include types of class interaction as a variable in assessing successful completion, nonsuccessful completion or withdrawal from an online course.

Social and environmental variables in relation to student outcomes in higher education.

Tinto’s model (1975) had been tested through multiple studies, results supporting the importance of person-environment fit. However, according to Pascarella, Terenzini, and Wolfe (1986), less attention had been paid to identifying areas within the conceptual framework where institutional interventions might influence student persistence and withdrawal behavior. Pascarella et al. examined the influence of an institutional intervention on student persistence and withdrawal behavior within the framework of Tinto’s model. Specifically, they measured the influence of pre-college orientation designed to increase student’s knowledge of the institution and to promote his or her integration into the institutions social and academic system.

Pascarella et al. (1986) used a longitudinal study design, with data collection prior to, during and subsequent to the 1976-1977 academic years. A random sample of 1,906 students was drawn from the incoming freshman class at a single, medium-sized residential university. Sample members were sent a questionnaire requesting responses on detailed background information, initial commitments and goals for graduation. During their freshman year, a follow-up survey was sent, gathering information on the freshman year experience. Chi-square goodness-of-fit tests indicated that the 773 freshman were representative of the freshman population. The following fall, institutional records indicated that 90 of the 773 freshman had withdrawn voluntarily and 673 had reenrolled. Ten students were forced to withdraw. These ten students
were dropped from the analysis based on the researchers’ premise that forced withdrawals are substantially different from voluntary withdrawals. The study by Pascarella et al. focused on the effects of orientation experiences on persistence versus voluntary withdrawal.

Although Bean and Metzner’s conceptual model of nontraditional undergraduate student attrition (1985) was used for the current study (primarily on the basis of defining and background variables and lack of a social integration variable given the nature of the virtual campus and lack of social integration), the framework resembles Tinto’s model (1975). This is an important consideration in the discussion of Pascarella et al. (1986) study. In the framework, Pascarella et al. placed student orientation experiences between background characteristics and initial commitments, which were judged to be precursor influences, to social and academic integration. It was proposed by Pascarella et al. that exposure to orientation was influenced by student background characteristics and if background characteristics and initial commitments were controlled statistically, participation or exposure to orientation would influence causally the subsequent variables in the model (Pascarella et al., 1986). A similar analysis and application will be made in the proposed study using the constructs of Bean and Metzner’s model. Thus, the importance of including Pascarella et al. study in the review of literature, even though the study is over twenty years old.

Pascarella et al. (1986) used multiple regression to complete statistical analysis for the general causal model. Background characteristics and initial commitments were treated as exogenous and all other variables were treated as endogenous variables. Six structural equations were used to complete the analysis, the purpose being to measure both the direct and indirect effects to obtain an explanation of the process by which a variable impacts the outcome (Pascarella et al., 1986).
The findings of the Pascarella et al. (1986) study indicated that only three variables had significant direct effects on persistence when controlling for all other variables in the model; social integration, goal commitment and institutional commitment. However, results indicated attending the orientation had significant direct effects on social integration and institutional commitment. Social integration and subsequent institutional commitment had the largest effect on persistence; therefore, the indirect effect of orientation was deemed important to freshman year persistence. According to the findings of Pascarella et al. (1986) “of all the variables in the model, exposure to orientation had the largest positive, indirect effect on freshman year persistence (.094)” (p. 169). The use of a causal model enabled the researchers to assess influence on persistence through direct and indirect effects. Had only direct effects been measured, the importance of the orientation would have been overlooked. However, it is noted in the limitations of the study, that the single institution findings of the freshman orientation impact on persistence was not generalizable to other institutional settings, although replication was recommended.

In a previous study conducted with the same sample data, Pascarella and Terenzini (1980) sought to examine whether a multidimensional measure of social and academic integration would significantly discriminate between freshman yearpersisters and voluntary dropouts. In this case, the study was designed to test a specific measure of Tinto’s (1975) concepts of academic and social integration. It was proposed by the researchers that the results of the study might have implications for educational decision makers when trying to reduce potentially wasteful resources associated with attrition at their institutions. Additionally, Pascarella et al. proposed that the results of the study could lead to planned interventions targeted at students most at-risk for drop out.
Using data gathered from incoming freshman at Syracuse University, Pascarella et al. (1980) tested the predictive validity of Tinto’s model. To assess social and academic integration, and goal and institutional commitment, a series of five Likert items were developed, with a total of fifty-five items. The list was reduced to thirty-four items which were judged to be the most adequate representations of Tinto’s model. The instrument included measures of peer-group interactions, interactions with faculty, faculty concern for student development and teaching, academic and intellectual development and institutional and goal commitments. Pascarella et al. controlled for pre-college characteristics, freshman year cumulative GPA and involvement in extracurricular activities. Data on all variables were gathered from the follow-up instrument or university records. Multivariate analysis of covariance and discriminant analysis were used to determine predictive validity of the integration scales from the thirty-four items (Pascarella et al., 1980).

Pascarelli et al. (1980) identified the purposes of the study to develop a multidimensional instrument that assessed the major dimensions of the Tinto model (1975) and to determine the validity of the instrument and the model which could then be used to accurately identify freshman at-risk for drop out or likely to persist. When the results of the instrument were added to a discriminant analysis based on the pre-college characteristics, freshman year academic performance, and extracurricular involvement, the scales increased correction identification for persisters from 58.2 to 81.4% and for dropouts from 34.5 to 75.8%. Scores on the five scales alone correctly identified 78.9% of the persisters and 75.8% of dropouts. One finding of importance was the strong contribution of student-faculty relationships as measured by interaction and faculty concern of student development. A limitation of the study was presented by Pascarella et al. in that students’ responses may be biased to the instrument if they had already
decided to drop out before completing the instrument. The purpose of including this study in the literature review was to gather further insights from research designed to evaluate student outcomes on the basis of a theoretical model.

Lundberg (2003) examined degree-seeking adult students enrolled full-time or part-time in degree granting institutions. Two research questions guided the study: (a) how do background characteristics, time-limiting characteristics, social and academic integration, and quality of effort contribute to student learning, and (b) is there a difference in this pattern based on the age of students (20-23, 24-29, 30 and older)? Lundberg used the fourth edition of the College Student Experiences Questionnaire (CSEQ) (Kuh & Pace as cited by Lundberg, 2003). Lundberg proposed a path (causal model) in which background characteristics influenced time limiting variables, social and academic integration variables, which influenced efforts in reading, writing, and homework, ultimately impacting learning. The sample of 4644 students was drawn from a larger set of 20,000 students from 20 institutions. Because the focus of the research was adult students, students over 23 years old were oversampled, which represented 49% of the sample. Commuting, part-time, and working students were also oversampled.

Lundberg (2003) used descriptive statistics and a multiple linear path model to identify both the direct and indirect effects of the variables. All independent variables were dummy coded. The ultimate endogenous variable was learning, measured by a 22-item composite variable. The second endogenous variable was effort in reading and writing which was measured with six individual items about quantity of reading and writing completed (Lundberg, 2003).

In an effort to focus on the issues relevant to the current study, only the findings that are most applicable are included for discussion. Lundberg (2003) found that commuting and working had a negative effect on learning for students 29 and younger, but the time limitations
did not affect learning for students 30 and older. Quality of relationships with administrators was a strong predictor of learning for all students in the study but strongest for students 30 years and older. Lundberg noted that the strength of this variable should provide empirical support for the call that higher education environments must restructure their services, hours and perceptions about adult learners. The current study examined traditional and nontraditional student attrition with regard to academic integration and social environment variables (including work and family responsibilities). Additionally, the current study tracked patterns of assessment, preparation and help seeking behavior as it related to course completion. Lundberg’s study provided support for the inclusion of the variables identified and the need to assess the differences between and among students using age, enrollment status and time limitations as variables.

Psychological Variables

*Psychological variables in relation to student outcomes in distance learning.*

Bean and Metzner’s (1985) conceptual model of nontraditional student attrition was used as a framework for the current study. However, the psychological outcomes component of the model including the variables of satisfaction, utility, goal commitment and stress were not included in the present research study. The studies discussed in this section have an interrelationship with other variables and components of interest or are included as an example of an integral aspect of Bean and Metzner’s model.

Arbaugh and Rau (2007) examined the effects of subject matter, course structure, and participant behaviors on students’ perceived learning and satisfaction with web-based courses. The two-year study was conducted of participants in an MBA program in the midwestern United States. Several hypotheses proposed by Arbaugh and Rau were relevant to the current study including (a) online learning experience of students will be positively associated with students’
perceived learning and satisfaction (those students who had taken web-courses before were more likely to be satisfied with the experience), (b) age of students will be positively associated with students’ perceived learning and satisfaction, (c) women will report higher perceived learning and satisfaction outcomes, (d) participant characteristics (student computing experience, gender, age, and online experience of course instructors) will explain a portion of the differences between students’ perceived learning and satisfaction outcomes by course discipline.

In Arbaugh and Rau’s (2007) study, data collection consisted of a two-step process. Students completed a survey either in class for those with a final physical meeting or via email for those without a meeting. The nonresponding students were mailed a copy of the survey. Statistical analysis showed no significant difference on the basis of age or gender between respondents and nonrespondents, demonstrating that the sample was not subject to nonresponse bias (Arbaugh & Rau, 2007). Each item was measured using a seven-point Likert–type scale. The two dependent variables were perceived student learning and satisfaction. The hypotheses for student learning on the basis of online learning experience, gender and age were not supported and only age had a positive effect on satisfaction with medium delivery.

According to Arbaugh and Rau (2007), although there was a significant difference in perceived learning and satisfaction by course discipline, only some, not all of the mean differences in disciplines could be explained by participant characteristics. The results of this study and others already referenced have implications for future research, if not the current study. In light of findings by discipline, it would be important to look at student outcomes in distance learning according to course discipline. Examination of course outcomes by discipline has also been suggested by the findings of Finnegan et al. (2008).
Arbaugh et al. (2007) found that behavioral effects were most significantly associated with perceived learning. Disciplinary and course structural effects were most significantly associated with satisfaction with the Internet as an educational delivery medium. Based on the findings of Arbaugh et al., continued evaluation of the influence of technology on student outcomes, particularly student satisfaction is needed.

Herbert (2006) proposed a study for the purpose of determining the variables that were significant for retention in online courses as asked by questions on an online course survey. Using Noel-Levitz Priorities Survey for Online Learners (PSOL), (Noel-Levitz, 2006, as cited by Herbert), the survey was sent to every student who enrolled in an online course. The target population was undergraduate students but Herbert noted that a few graduate students completed the survey as well. The first round of survey distribution was sent via the Internet and the second survey by mail to those students who had not responded to the first survey distribution. One hundred twenty-two surveys were returned, which represented 25% of the students who took an online course fall 2005. Seventy-four percent of the respondents reported that they had successfully completed the online course the semester they enrolled, 25% of the respondents reported they did not successfully complete the course during the same semester of enrollment. The survey questions related to importance and satisfaction levels of the following variables: faculty responsiveness, timely faculty feedback, institutional response to questions in a timely manner, frequency of student instructor interaction, availability of financial aid, and importance of student to student collaboration (Herbert, 2006).

Herbert’s (2006) findings indicated that the most important variable of importance was faculty responsive to student needs; the least important was student to student collaboration. The rankings of satisfaction levels with this particular institution indicate that students who
successfully completed their online course had expectations consistent with their experience. Although neither completers nor noncompleters ranked their experience as high, the successful completers were more satisfied with all aspects of the online course experience than the noncompleters. Students that did not complete the course were asked to select a response identifying the reason for noncompletion. The most frequent response was time commitments. Significant differences were found in terms of mean satisfaction between the two groups; however, discriminant analysis did not result in a model that could predict retention (Herbert, 2006).

Using survey research, Raphael (2006) examined what online degree seekers identified as their perceived need for student services that exist for students attending on-campus classes. It also sought to determine what student support needs were being met. Raphael sought participants from 13 institutions offering online degree programs; six institutions participated, all four-year institutions, five public institutions and one private institution. The convenience sample included 272 participants, 72 undergraduates and 199 graduate level students. Raphael developed an inventory listing of the potential out-of-class needs for online degree seekers. Forty-nine items were identified and each was paired with a Likert-type response. Each question had two areas for response, one indicated the level of need and the other indicated the level at which they perceived the need was being met. Data was gathered for a period of seven weeks. Findings indicated that students’ top needs were related to academic advising and bookstore services. The bottom needs reported were a required for credit orientation course, opportunity to participate in online student government and website links related to counseling, health and wellness, and counseling services.
With regard to the level needs were met, Raphael (2006) found the largest gap between the perceived need of learning assistance, tutoring, and other academic support services and the level at which needs were met. The other top categories were related to career services. Although Raphael’s study offered some descriptive statistics in evaluating the services that are needed for fully-online students, it has limited value to the current study.

Application of Conceptual Models to Analysis of Student Completion and Persistence

Application of Tinto’s Model (1975) by Halpin, 1990

Halpin (1990) applied Tinto’s model of college student persistence to an analysis of first semester freshman at an open-door nonresidential comprehensive community college. The population was all first-time full-time freshmen a non residential community college in rural New York state. Three hundred eighty-one were in the original group, 289 persisted to the second semester, 56 were academically dismissed and 36 withdrew voluntarily. A questionnaire was developed modeled after the Pascarella and Terenzini (1980) instrument (as cited by Halpin, 1990). The survey was administered three weeks before the end of the first semester. Two hundred twenty-seven usable questionnaires were collected via direct administration and additional 64 were obtained through the mail for a total of 291. Background variables included sex, highest degree expected, father’s educational background, and mother’s educational background. Environmental variables included commuting distance, work, college organization, informal conversations with faculty, academic conversations with faculty, and perceived cost burden of college. Halpin (1990) used the Pascarella et al. instrument, social and academic integration and commitment variables were set. The dependent variables were persister (enrolled for second semester), dismissal (academically dismissed), or withdrawer (allowed to enroll but did not elect to do so) (Halpin, 1990).
Results of Halpin’s (1990) study indicated that the integration variables significantly discriminated among the three groups, even after the effects of the background and environmental variables held constant. Following discriminant analysis, the use of the background variable set alone resulted in correct classification of 54.1% of all cases. Addition of the environmental set increased the proportion of correct classification to 63.1% and the addition of the integration variables increased the proportion of correct classifications to 78.9%. The results indicated that Tinto’s model was effective in the analysis of persistence or withdrawal at a community college. Additionally, the results found a greater influence of academic integration as compared to social integration. Faculty and academic themes was found to be of greatest significance, accounting for 74.5% of the variance. The peer group relations scale was not entered in the discriminant function. These findings were consistent with other findings at commuter colleges in general (Halpin, 1990). The results of this study offered support for the current study of distance learning students at the community college which eliminates social integration from consideration. Bean and Metzner’s model (1985) does not include social integration as a variable (although it does offer it as a possible effect).

Application of Tinto’s (1975) Student Integration Model and Bean’s (1985) Student Attrition Model by Cabrera, Nora and Castaneda, 1993

Cabrera et al. (1993) used a longitudinal research design to test the integrated models. The population was drawn from the 1988 entering freshman class at a large southern urban institution. In an effort to remain consistent to the theoretical models, only traditional students, first time freshman under 24 years of age, not married were selected. The number of students meeting the criteria was 2,459. An initial survey (attitudinal data) and a follow-up survey yielded 466 usable surveys. Transcripts were used to determine GPA and academic status at two
different points in time. The integrated model accounted for 45% of the variance observed in persistence and 42% of the variance observed in intent to persist. After researchers made modifications to the statistical analysis, the largest total effect on persistence was accounted by intent to persist, followed by GPA and institutional commitment. The largest total effect on intent to persist was accounted for by institutional commitment, followed by encouragement from friends and family (Cabrera et al., 1993).

The findings of Cabrera et al. (1993) supported the propositions in the hypothesized integrated model. The results were consistent with both Tinto’s (1975) and Bean’s (1985) theoretical frameworks. However, the results indicated that the effect of environmental factors was far more complex than offered by Tinto’s student integration model. Cabrera et al. found support for the presumed role of external factors facilitating the transition of the student into the academic component of the institution as well as the effect of encouragement from friends and family and Bean’s (1985) propositions that environmental factors should be taken into account in explaining persistence. The findings of the study contributed to a greater understanding and perspective regarding the interplay among individual, institutional, and environmental variables in the college persistence process.

Application of Kember’s Model (1989) by Kember, Lai, Murphy, Siam and Yuen, 1994

Based on Kember’s original model of dropout from distance learning (1989), with origins in Tinto’s model (1975), the 1994 study aimed to determine if a similar path model for student progress could be found for three distance education programs, replicating the findings of the original study. The sample for the study was all students enrolled in student guidance and bachelor of education courses and a random sample of students from the Open Learning Institute of Hong Kong. A questionnaire, including demographic questions was administered by mail to
all participants with a follow-up letter to nonrespondents. Usable responses were received from 555 students. The questionnaire, known as the DESP, included demographic questions and statements to which the students were to respond to a five-point Likert scale. The scales and subscales in the DESP include emotional encouragement, external attribution, academic accommodation, and academic incompatibility. The reliabilities for the scale and subscale were found to have acceptable values. Statistical analysis included path analysis and multiple regression analysis with a causal theory. Findings of Kember et al. (1994) supported the findings of Kember’s 1989 study. Path analysis confirmed that social and academic integration (reformulated for the distance learning context) act as indirect, intervening variables. The initial student characteristics had significant relationships to the integration variables which linked to the outcomes, GPA and resulting persistence. Although Kember’s model was designed to address part-time adult students (Kember et al., 1994), the model could be used as a means by which institutions can evaluate the processes of student achievement and address policy issues.

Summary

Tinto’s theory of student departure (1975) has been tested extensively in single institution studies with some findings supporting the influence of academic integration on persistence (Cabrera, Castaneda, Nora, & Hengstler, 1992; Halpin, 1990; Pascarella & Terenzini, 1980) and others nonsupporting (Braxton, 2000; Cabrera, Nora, & Castaneda, 1993). Building on Tinto’s model, Kember (1989) proposed a model for dropout from distance learning, shifting the social environment from internal to external, meeting the demands of family, work and social commitments. Findings supported that social and academic integration act as intervening variables (Kember et al., 1994; Thompson, 1997), and yet, Braxton, Hirschy, and McLendon, 2004, failed to support academic integration links with student departure.
Bean and Metzner’s model of nontraditional student attrition (1985) included environmental factors that examine family support and encouragement. The significance of environmental variables in relation to student persistence was supported by Cabrera, Nora, and Castaneda, 1993; Herbert, 2006; Lundberg, 2003; and Yukselturk and Inan, 2006.

Students’ GPAs were found to be related to persistence in online courses and programs (Aragon & Johnson, 2008; Craig & Ward, 2008; Diaz, 2002; Dupin-Bryant, 2004; Kember et al., 1994; Finnegan et al., 2008). Research findings regarding students’ pre-entry characteristics related to persistence in distance learning supported the inclusion of variables of gender, age, and ethnicity (Arbaugh & Rau, 2007; Carr, 2000; Craig & Ward, 2008; Kemp, 2002; Powell et al., 1990; Yu et al., 2008); however, the significance of predictors varied among studies.

Prior online learning experience was measured but not found to be significant in a study by Kemp, 2002; number of online courses was found to be significant (Aragon & Johnson, 2008). Internal locus of control and availability of financial assistance was found to predict dropout rate in the online environment (Morris et al., 2005; Parker, 1999); but, Aragon and Johnson, 2008, found no significant difference in completion and noncompletion on the basis of application eligibility or ineligibility for financial aid. Self-report instruments for online readiness were not effective in predicting online course completion (Hall, 2008), nor were cognitive style scores or online technology self-efficacy scales (DeTure, 2004).

Research studies conducted regarding academic environment measures directly related to distance learning found student behavior with regard to course interaction and discussion to be positively related to course achievement (Finnegan et al., 2008; Morris et al., 2005), whereas student satisfaction online was found to be related to faculty response to students (Herbert,
In contrast, Jung et al., 2002, found that satisfaction with learning was strongly related to students’ interaction with other students online.

Limited research was found with regard to administrative, student services, or technical support of distance learning students and the relationship of support to persistence. In a traditional college environment, Pascarella et al., 1986, found student orientations to be indirectly related to persistence but strongly related to social integration and institutional commitment.

No research was found that examined differences between and among students enrolled exclusively online (classified for this study as noncommuters/nontraditional) and students enrolled in online courses in combination with face to face classes (classified as commuters/traditional) and subsequent course completion or noncompletion. No research was found related to assessment, preparation, and help seeking behaviors of novice (first time enrollment in distance learning) versus experienced distance learning students and subsequent course completion or noncompletion.
CHAPTER 3

METHODOLOGY

Introduction

The examination of course completion and student persistence is a significant institutional issue. Tinto (1993) stressed the importance of understanding how events within an institution can influence student departure and asked how institutions can alter activities or modify policies to retain more students. This quantitative study used existing data in a non-experimental correlational design to investigate the differences in defining and background characteristics between community college students who complete and those who do not complete online courses; the interactions between and among student groups (traditional and nontraditional and novice and experienced) and help seeking behaviors; the relationships of background and defining characteristics, help seeking behaviors, academic and environmental variables on student assignment to groups as course completers (completion of all online courses) or noncompleters (noncompletion of all online courses); and application of an adapted conceptual model using independent variables to predict the likelihood of group membership as a completer or noncompleter. Independent variables (predictors) for the model were identified from Bean and Metzner’s (1985) conceptual model of nontraditional student attrition, critical interests to higher education decision makers, and those of a particular institutional interest.

Conceptual Framework

The study applied an adapted version of Bean and Metzner’s (1985) conceptual model of nontraditional undergraduate attrition to examine factors in relation to community college online course completion. For the purposes of the study, research focused on variables in three component areas of the conceptual model: the defining and background variables, the academic
variables, and the environmental variables. Psychological outcomes, intent to leave and dropout were not included in the research study but will be discussed in chapter 5, recommendations for future research. The variables and components of Bean and Metzner’s model are provided in Figure 1.

Bean and Metzner’s (1985) model identified defining and background variables and academic and environmental variables presumed to have direct effects on academic outcomes, psychological outcomes, intent to leave and dropout. For the purposes of the present research, the dependent variable was academic outcomes in a single term. This approach was supported in Bean and Metzner, “Finally, researchers may wish to concentrate their efforts on part of the model. It can be used as a guide to the study of GPA, satisfaction, stress, goal commitment or other intervening variables, each of which can be treated as the dependent variable” (p. 530).

The model was adapted to include help seeking behaviors by students that include preassessment (READI assessment), voluntary participation in distance learning orientations and contacting technical help support for assistance. The adapted model is provided in Figure 2. This is consistent with Bean and Metzner’s (1985) recommendation:

If there is a particular factor, such as an extended orientation program, that was not included in the model due to insufficient empirical study, but that is assumed to be of importance at a particular institution, such a factor can be added to the model in its appropriate place (in this case, as an academic variable). (p. 530)
Figure 1. A conceptual model of nontraditional undergraduate student attrition (Bean & Metzner, 1985, p. 491).
Figure 2. Study framework adapted from Bean and Metzner’s conceptual model of nontraditional undergraduate student attrition. (Bean & Metzner, 1985, p. 491).
Research Design

The study used a non-experimental correlational research design. The principal strengths of using correlational design, according to Gall, Gall, and Borg (2007) are (a) they enable researchers to analyze the relationships among a large number of variables in a single study; (b) they allow researchers to analyze how variables, either singly or in combination, affect patterns of behavior; and (c) they provide information concerning the degree of the relationship between the variables being studied. The identification of a complex set of variables based on a conceptual model and the opportunity to use existing institution data for in-depth analysis of student outcomes in the online learning environment supported a single institution non-experimental correlational research design.

Hypotheses

$H_1$. There will be a statistically significant difference between traditional and nontraditional students on online course completion and noncompletion.

$H_2$. There will be statistically significant differences among ethnicities on online course completion and noncompletion.

$H_3$. There will be a statistically significant difference between males and females (gender) on online course completion and noncompletion.

$H_4$. There will be a statistically significant difference between degree seeking and non-degree seeking students on online course completion and noncompletion.

$H_5$. There will be a statistically significant difference between novice and experienced distance learning students on online course completion and noncompletion.

$H_6$. There will be a statistically significant difference between community college online course completers and noncompleters based on prior GPA.
H₇. There will be statistically significant interactions between traditional and nontraditional students, novice and experienced students, READI assessment participation, orientation participation, and 24/7 technical help seeking, as demonstrated by course grade(s).

H₈. There will be statistically significant relationships between defining and background variables, academic environment and academic integration variables, and the environmental variable and course completion or noncompletion.

H₉. Defining and background variables, academic variables and the environmental variable (included in the model) will be statistically significant predictors of group membership of completers and noncompleters in online courses.

Population

The population for this study is all students enrolled in distance learning courses at a single large, public, suburban multi-campus community college district in Texas.

From fall 2004 to spring 2008, 20,666 students enrolled in distance learning courses during the fall and spring terms, for an average headcount of 2,583 students per term. Headcount and demographic data for the historical period are provided in Table 1.

Table 1

Distance Learning Headcount and Demographic Historical Data Fall 2004 – Spring 2008

<table>
<thead>
<tr>
<th></th>
<th>Fall 2004 – Spring 2008 (per long semester)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average headcount</td>
<td>2583</td>
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<tr>
<td>Gender</td>
<td>Male            Female</td>
</tr>
<tr>
<td>Percent headcount</td>
<td>32.54%          67.43%</td>
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(table continues)
Table 1 (continued)

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<tr>
<th>Age</th>
<th>≤ 22</th>
<th>23-29</th>
<th>30-35</th>
<th>36-40</th>
<th>41-54</th>
<th>≥ 55</th>
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</thead>
<tbody>
<tr>
<td>Percent headcount</td>
<td>38.75%</td>
<td>27.93%</td>
<td>14.76%</td>
<td>7.97%</td>
<td>9.82%</td>
<td>2%</td>
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<tr>
<th>Ethnicity</th>
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<th>Black</th>
<th>Hispanic</th>
<th>Other</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent headcount</td>
<td>&lt; 1%</td>
<td>8.02%</td>
<td>9.57%</td>
<td>9.07%</td>
<td>&lt; 1%</td>
<td>71.93%</td>
</tr>
</tbody>
</table>

*Note. Institutional Credit Program Snapshot accessed May 2009*

The total headcount for the district fall 2008 and spring 2009 was 21,000 and 21,304 respectively. Distance learning accounted for 11% (fall 2008) and 13.9% (spring 2009) of total headcount. Fall 2008 and spring 2009 distance learning data are presented in Table 2.

Table 2

*Distance Learning Headcount and Demographic Data Fall 2008 – Spring 2009*

<table>
<thead>
<tr>
<th>Fall 2008 - Spring 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average headcount</td>
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<table>
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<tr>
<th>Gender</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent headcount</td>
<td>32.5%</td>
<td>67.50%</td>
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<table>
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<tr>
<th>Age (Average 28.2)</th>
<th>≤ 22</th>
<th>23 - 29</th>
<th>30 - 35</th>
<th>36 - 40</th>
<th>41-54</th>
<th>≥ 55</th>
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<tbody>
<tr>
<td>Percent headcount</td>
<td>37.91%</td>
<td>28.41%</td>
<td>14.52%</td>
<td>7.86%</td>
<td>10.09%</td>
<td>1%</td>
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<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Am Indian</th>
<th>Asian</th>
<th>Black</th>
<th>Hispanic</th>
<th>Other</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent headcount</td>
<td>1%</td>
<td>9.69%</td>
<td>11.31%</td>
<td>9.50%</td>
<td>2.2%</td>
<td>66.48%</td>
</tr>
</tbody>
</table>

*Note. Institutional Research Office Headcount Statistics Reports FY2009 accessed May 2009*

Participants

A sample of convenience was used for the study. During spring 2009, as of census date, 3,615 students were enrolled in distance learning courses. Of the 3615 students enrolled in
distance learning courses, 498 students enrolled exclusively in blended courses. The study is limited to those students enrolled in online courses; therefore, the 498 students enrolled exclusively in blended courses were removed from the sample. Course outcomes were extracted for the remaining 3117 participants. Of the remaining 3117, 287 students with multiple online enrollments were determined to be both completers and noncompleters. For the purposes of the study, students were classified as completers if they completed all online courses with a grade of A, B, C, or D. Students were classified as noncompleters if they completed all online courses with a grade of F, I, or W. Because the study is limited to group membership as online course completers or noncompleters, the 287 students that were both completers and noncompleters were removed from the sample, reducing the sample to 2830. At this point, the sample included all students enrolled in online distance learning courses as of census that were either completers or noncompleters at the end of term. The final reduction of the sample occurred when prior GPA data was extracted; 381 completers or noncompleters were missing prior GPA. Those students were removed from the sample, leaving a final sample of 2449 participants.

Hypothesis 7 was tested using data from those participants who received a grade for one or more online classes. Students classified as noncompleters on the basis of W only were not included in the data set for testing Hypothesis 7. Therefore, \( n = 2017 \), was used to test Hypothesis 7.

In spring 2009, 287 online sections representative of 137 different courses were offered by the district. A variety of courses including core curriculum courses, non-core courses, and workforce courses were offered online. The majority of participants had declared a major in one of three areas: General Studies Associate of Arts, 44%; General Studies Associate of Science, 22%; and Business Field of Study, 7%. The remaining 27% of participants had declared majors
distributed between 70 other degree or certificate programs. Participant defining and background variable data were extracted from existing data held in institutional databases.

Participation in distance learning online support activities is voluntary and available to all students. All students received communication via college website announcements and the distance learning website. Information was distributed regarding opportunities for READI self-assessment, orientations, resources and 24/7 technical support available as a prospective or currently enrolled student. Information was distributed to students during the semester prior to the term of enrollment, between semesters, prior to the start of the semester (during the registration period) and early in the term.

Instrument

The study includes the Readiness for Education at a Distance Indicator (READI) assessment (2009), offered by Decade Consulting, which measures a student’s readiness for distance learning on five component areas (a) individual attributes, (b) learning styles, (c) technical competency, (d) on-screen reading rate and recall, and (e) typing speed and accuracy. The READI instrument is not designed to be a predictor of academic success; instead it is an indicator of the goodness of fit of online learning for the student and informs the student of strengths and opportunities for growth related to taking online courses. In addition to the standard components of the READI tool, institutions are able to add additional questions to the personal attribute section of the READI assessment. The institutional questions are optional, but offer the institution an additional opportunity to gather information about prospective and current students.

Participation in the READI assessment was not required of new or returning distance learning students at the single institution where the sample was drawn. Students were offered the
opportunity to participate in the READI assessment and were encouraged to take the READI assessment through communication from online student support center staff, distributed through collateral materials and website promotional messages and academic advisors. For the purposes of this study, the results of the standardized sections of the READI assessment were not used; however, tracking the student’s behavior with regard to voluntary participation in the READI assessment was examined. Additionally, two institutional questions included in the READI assessment provided data for two variables; specifically (a) how many hours a week do you have for your online course work (study habits) and (b) how many hours a week do you have for work and/or take care of family obligations (social and work integration)? The READI assessment was not administered as part of this study; data was extracted from existing READI data available in the institutional READI administrative dashboard.

In addition to the READI archives, data was gathered from the institutional student database, student reporting, online student support center registration and attendance archives, student tracking logs, and 24/7 help desk support monthly services utilization reports. No personally identifiable information was included in the findings of the study.

Measures

The variables included in the study originated from Bean and Metzner’s (1985) conceptual model of nontraditional student attrition or as an additional variable of interest to the institution or educational policy and decision makers. The independent variables were grouped as defining or background variables, academic variables and environmental variables and the dependent variable was course completion as defined by A, B, C, or D and noncompletion by F, I, or W, with student group membership as a completer or noncompleter. The defining variable classification was on the basis of the student characteristics of age, enrollment status (full-time or
part-time), and residence (commuter or noncommuter). The defining characteristic was used to classify the participant as either a traditional student or nontraditional student. One defining characteristic (25 or older, enrolling part-time, or noncommuter/exclusively online) in the nontraditional category resulted in student classification as a nontraditional student.

The background variables included ethnicity, gender, educational goals, experience, and prior GPA. Prior GPA referred to the student’s grade point average the most recent term of enrollment, at any institution of higher education (available in institutional records), prior to spring 2009. Students without a prior GPA on record were removed from the sample. Classification as a novice distance learning student was determined by the student’s enrollment history, with spring 2009 identified from institutional records as the first term for distance learning enrollment. Experienced distance learner classification was the result of a student having previously enrolled in a distance learning course. The academic variables were study habits (included in Bean and Metzner’s model, 1985) and three institutional academic integration variables related to the online environment, as indicated from the review of literature. Study habits (as measured by student’s response to a question regarding the number of hours available for online course work) were classified with \(\leq 10\) hours and \(> 10\) hours as the dividing point. The institutional variables identified were help seeking behaviors of (a) voluntary participation in self-assessment (READI) preterm or early term, (b) voluntary participation in an online or face to face distance learning orientation preterm or early term, and (c) technical help seeking demonstrated by contacting the online student support center or 24/7 help desk support within the first ten days of the term. The environmental component was measured by one variable addressing a student’s work and family responsibilities (as measured by student’s response to a question regarding the number of hours for work and family obligations). As 20 hours or less is
considered a part-time student worker, 20 hour or less and greater than 20 hours was the dividing point, without differentiation between work and family responsibility. The question of study habits and work and family relationships was included as institutional questions within the READI assessment. Only those students who completed the READI assessment provided data regarding study skills (Variable 7) and work and family responsibility (Variable 11). Therefore, Variable 7 and 11 were removed when testing the full model and data analysis for the subsample, $n = 128$, was conducted separately.

The dependent variable is dichotomous, assignment to group membership as a course completer or noncompleter based on grades or withdrawal. To examine course completion, students who were enrolled as of census were classified at the end of term as either completers or noncompleters. Students assigned grades of A, B, C, or D in all online courses were grouped as completers. Students who completed the process for withdrawal (W) or received a grade of F, or I in all online courses were grouped as noncompleters. It was determined that no student in the sample received an I. Table 3 provides a description of all variables in the model.

Table 3

<table>
<thead>
<tr>
<th>Defining variables</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification (1) (IV)</td>
<td>Traditional: absence of any nontraditional characteristics; Nontraditional: one or more of the following characteristics: $\geq 25$ years of age; noncommuter (exclusively online); part-time enrollment</td>
</tr>
</tbody>
</table>

*(table continues)*
### Background variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity (2) (IV)</td>
<td>Am Indian; Asian; Black; Hispanic; White; Undisclosed or Unknown</td>
</tr>
<tr>
<td>Gender (3) (IV)</td>
<td>Male; Female</td>
</tr>
<tr>
<td>Educational goals (4) (IV)</td>
<td>Degree seeking; Non-degree seeking</td>
</tr>
<tr>
<td>Distance learning experience (5) (IV)</td>
<td>Novice; Experienced</td>
</tr>
<tr>
<td>Prior GPA (6) (IV)</td>
<td>Cumulative GPA at the end of the most recent term prior to spring 2009 (within institutional records)</td>
</tr>
</tbody>
</table>

### Academic variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study habits (7) (IV)</td>
<td>Hours for online course work (self-reported within READI) ≤ 10 hours; &gt; 10 hours</td>
</tr>
<tr>
<td>READI assessment participation (8) (IV)</td>
<td>READI participation preterm or early term; No participation during the established time window. Preterm – before the first day of the term; early term – within the first ten days of the term.</td>
</tr>
</tbody>
</table>
Table 3 (continued)

<table>
<thead>
<tr>
<th>Environmental variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance learning orientation participation (9) (IV)</td>
<td>Orientation participation preterm or early term; No participation Preterm – before the first day of the term; early term – within the first ten days of the term. Participation classified on the basis of attendance at face to face orientations or the date of access to self-paced online orientation</td>
</tr>
<tr>
<td>Technical help seeking (10) (IV)</td>
<td>24/7 Contacted help support within the first ten days support; No contact.</td>
</tr>
<tr>
<td>Work and family responsibility (11) (IV)</td>
<td>Hours a week for work and/or family obligations (self-reported within READI) ≤ 20 hours; &gt; 20 hours</td>
</tr>
<tr>
<td>Dependent variable(s) (1 DV)</td>
<td>Course completion (Completers): Completing all online courses with a final grade of A, B, C, or D. Noncompletion (Noncompleters): Completing all online courses with a final grade of F, I, or W.</td>
</tr>
</tbody>
</table>
Procedures for Data Collection

Support for the study and permission to use the selected institution as a site for research and data collection was obtained from community college administrative leadership. Approval for research was obtained from both the University of North Texas Institutional Review Board and the Institutional Review Board of the site institution.

Student (participant) information was extracted from institutional databases. In order to examine the relationship of community college student definition and background variables, academic variables (including behaviors) and environmental variables on course completion or noncompletion in online courses, student outcomes were recorded. The college identification number was used to extract completion or noncompletion data (as demonstrated by course grade or W) from institutional databases. Outcomes were coded according to group membership based on completion (completers) or noncompletion (noncompleters) and grade(s). All corresponding academic, environmental and help seeking data were extracted from READI archives, online student support center orientation archives, online student support center student tracking logs, and 24/7 help desk monthly services utilization reports. Each individual was assigned a participant number. Personally identifiable information was separated from participant data. For record keeping purposes, the college identification number and corresponding participant number is maintained in a separate file. No personally identifiable information was maintained in the data file. The study utilized existing data; no changes were made to processes or data for the purposes of research. No personally identifiable student information was included in the study results; data is reported in aggregate form. Participant data was entered in SPSS (PAWS Version 17.0) for analysis.
Data Analysis

Descriptive statistics include demographic data, frequencies, and means (as appropriate for continuous data). All data were reported in aggregate form to protect the privacy of the students. Data analysis procedures for testing the hypotheses are presented. For each comparison, an alpha level of < .05 was established as the level of statistical significance.

Chi-square test of homogeneity (test of independence) was used to test Hypotheses 1-5 (H₁-H₅), to determine if there were statistically significant differences between traditional and nontraditional students (definition), ethnicity, gender, educational goals, and previous online experience (novice or experienced) of completers and noncompleters in online courses. Chi-square was used to determine significance; Cramer’s $V$ was used to determine strength of association. Chi-square analysis was used due to categorical variables and the dichotomous dependent variable. To test Hypotheses 6 (H₆), a $t$ test was conducted to compare the mean prior GPA between completers and noncompleters.

Six two-way between-subjects analysis of variance (ANOVA) were used to test Hypothesis 7 (H₇), to determine if there were statistically significant interactions between definition (traditional and nontraditional), novice and experienced, READI participation, orientation participation, and 24/7 technical help seeking, as measured by course grade(s).

Correlation coefficient, specifically Cramer’s $V$, was used to test Hypotheses 8 (H₈) and logistic regression was used to test Hypothesis 9 (H₉). The use of chi-square, Cramer’s $V$ and logistic regression was based on the categorical independent variable and the dichotomous dependent variable. Cramer’s $V$ was used for correlation, measure of association, due to contingency tables greater than 2 x 2.
Logistic regression was used to examine the relationship of independent predictor variables on the dichotomous dependent variable. Logistic regression was chosen due to the predictor variables mix of continuous and categorical variables with a dichotomous course completion dependent variable (Wuensch, 2008).

Summary

The study used existing data to address four research questions. Nine hypotheses regarding the differences, interactions, and relationships between student characteristics, help seeking behaviors, academic and environmental variables on student course completion or noncompletion were tested. Independent variables were identified from Bean and Metzner’s conceptual model of nontraditional student attrition (1985), critical interests to higher education decision makers, and those of a particular institutional interest. The dichotomous dependent variable, completion or noncompletion, was determined by end-of-term grades or withdrawal. Data analysis included descriptive statistics, chi-square, $t$ test, analysis of variance, correlation coefficient and logistic regression. The study used a sample of convenience of 2449 students enrolled in online courses in a single term, spring 2009, at a single large, multi-campus community college district in Texas.
CHAPTER 4

RESULTS

Introduction

The purpose of the study was to investigate the differences in defining and background characteristics between students who complete and those who do not complete online courses; the interactions between student groups (traditional and nontraditional and novice and experienced) and help seeking behaviors; the relationships of background and defining characteristics, help seeking behaviors, academic and environmental variables, on student assignment to groups as course completers (completion of all online courses) or noncompleters (noncompletion of all online courses); and examination of variables as predictors of group membership as completers or noncompleters. The following research questions provided the focus for the study:

Research Questions

1) What differences, if any, exist between community college online course completers and noncompleters based on student definition and background characteristics?

2) Are there statistically significant interactions between and among traditional and nontraditional students, novice and experienced students, READI assessment participation, orientation participation, and 24/7 technical help seeking, as demonstrated by course grade(s)?

3) Are there statistically significant relationships between defining and background variables, academic environment and academic integration variables and the environmental variable and course completion or noncompletion?
4) Are defining and background variables, academic variables and the environmental variable statistically significant predictors of online course completion or noncompletion?

Independent variables for the model were identified from Bean and Metzner’s conceptual model of nontraditional student attrition (1985), critical interests to higher education decision makers, and those of a particular institutional interest. The dichotomous dependent variable, was group membership as a completer or noncompleter, based on course grade or course withdrawal, with those participants receiving an A, B, C, and/or D in all online courses grouped as completers, and those receiving F and/or W in all online courses grouped as noncompleters. It was determined that no student in the sample received an Incomplete (I).

Hypotheses for the study were (a) there will be statistically significant differences between completion and noncompletion on the basis of defining and background variables (traditional and nontraditional, ethnicity, gender, degree seeking, experience, and prior GPA), (b) there will be statistically significant interactions between definition and experience and READI participation, orientation participation and technical help seeking, (c) there will be statistically significant relationships between defining and background variables, academic environment and academic integration variables and the environmental variable and course completion or noncompletion, and (d) defining and background characteristics, academic environment, academic integration and environmental variables will be statistically significant predictors of online course completion.
Sample

The sample for the study consisted of 2449 students who were either completers or noncompleters in online courses in a single term, spring 2009, at a single large, multi-campus community college district in Texas. According to institutional research data, total headcount for the district for spring 2009 was 21,304, with 57% female and 43% male; average age 25.4; 63% part-time enrollment, 37% full-time; and ethnic distribution 34% minority and 63% nonminority (3% undisclosed or unknown). Distance learning headcount represented 17% of total headcount, with 15% enrolled in online courses. Distance learning headcount was 3615, with 68% female and 32% male; average age 27.8; 61% part-time enrollment, 39% full-time; and ethnic distribution 32% minority and 66% nonminority (2% undisclosed or unknown).

Participants

Data was obtained from 2449 participants, of which 1712, or 69.91% were completers of all online courses, and 737, or 30.09% were noncompleters of all online courses. Table 4 presents a comparison between the distance learning population and sample participant group.

Table 4

*Group Membership as Completers, Noncompleters or Both Distance Learning Population Compared to Participant Sample*

<table>
<thead>
<tr>
<th>Group membership</th>
<th>Distance learning all</th>
<th>Sample all</th>
<th>Distance learning with both removed</th>
<th>Sample with both removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completers</td>
<td>62.10%</td>
<td>62.72%</td>
<td>67.66%</td>
<td>69.91%</td>
</tr>
<tr>
<td>Noncompleters</td>
<td>29.29%</td>
<td>28.23%</td>
<td>31.92%</td>
<td>30.09%</td>
</tr>
<tr>
<td>Both</td>
<td>8.22%</td>
<td>9.21%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Defining, Background Characteristics and Academic Integration Behaviors (Help Seeking)

The demographic, defining, background characteristics of, and help seeking behaviors, as demonstrated by participation in READI and orientation and seeking technical support by, the participant sample are presented in Table 5.

Table 5

*Defining, Background Characteristics and Academic Integration of Participant Sample*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Classification</th>
<th>( N = 2449 )</th>
<th>% of the sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years</td>
<td>17 years and younger</td>
<td>3</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>18-24 years</td>
<td>1182</td>
<td>48.26%</td>
</tr>
<tr>
<td></td>
<td>25-29 years</td>
<td>442</td>
<td>18.05%</td>
</tr>
<tr>
<td></td>
<td>30-35 years</td>
<td>357</td>
<td>14.58%</td>
</tr>
<tr>
<td></td>
<td>36-40 years</td>
<td>184</td>
<td>7.51%</td>
</tr>
<tr>
<td></td>
<td>41-54 years</td>
<td>245</td>
<td>10.00%</td>
</tr>
<tr>
<td></td>
<td>55 years and older</td>
<td>36</td>
<td>1.47%</td>
</tr>
<tr>
<td>Average Age</td>
<td></td>
<td></td>
<td>28.03</td>
</tr>
<tr>
<td>Enrollment status</td>
<td>Full-time</td>
<td>949</td>
<td>38.71%</td>
</tr>
<tr>
<td></td>
<td>Part-time</td>
<td>1500</td>
<td>61.25%</td>
</tr>
<tr>
<td>Residence</td>
<td>Commuter</td>
<td>1711</td>
<td>69.87%</td>
</tr>
<tr>
<td></td>
<td>Noncommuter</td>
<td>737</td>
<td>30.09%</td>
</tr>
<tr>
<td>Defining variable</td>
<td>Traditional</td>
<td>599</td>
<td>24.46%</td>
</tr>
<tr>
<td></td>
<td>Nontraditional</td>
<td>1850</td>
<td>75.54%</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>American Indian</td>
<td>16</td>
<td>1%</td>
</tr>
</tbody>
</table>

*(table continues)*
Table 5 (continued)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Classification</th>
<th>N = 2449</th>
<th>% of the sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>255</td>
<td></td>
<td>10.41%</td>
</tr>
<tr>
<td>Black</td>
<td>268</td>
<td></td>
<td>10.94%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>230</td>
<td></td>
<td>9.39%</td>
</tr>
<tr>
<td>White</td>
<td>1636</td>
<td></td>
<td>66.80%</td>
</tr>
<tr>
<td>Undisclosed</td>
<td>44</td>
<td></td>
<td>1.79%</td>
</tr>
<tr>
<td>Minority total</td>
<td>769</td>
<td></td>
<td>31.40%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>768</td>
<td></td>
<td>31.36%</td>
</tr>
<tr>
<td>Female</td>
<td>1681</td>
<td></td>
<td>68.64%</td>
</tr>
<tr>
<td>Prior GPA</td>
<td></td>
<td>2.90</td>
<td></td>
</tr>
<tr>
<td>Majors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree seeking</td>
<td>2340</td>
<td></td>
<td>95.55%</td>
</tr>
<tr>
<td>Non-degree seeking</td>
<td>109</td>
<td></td>
<td>4.45%</td>
</tr>
<tr>
<td>Experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Novice</td>
<td>656</td>
<td></td>
<td>26.79%</td>
</tr>
<tr>
<td>Experienced</td>
<td>1793</td>
<td></td>
<td>73.21%</td>
</tr>
<tr>
<td>READI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participant</td>
<td>125</td>
<td></td>
<td>5.10%</td>
</tr>
<tr>
<td>Nonparticipant</td>
<td>2324</td>
<td></td>
<td>94.90%</td>
</tr>
<tr>
<td>Orientation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participant</td>
<td>284</td>
<td></td>
<td>11.60%</td>
</tr>
<tr>
<td>Nonparticipant</td>
<td>2165</td>
<td></td>
<td>88.40%</td>
</tr>
<tr>
<td>Technical support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support</td>
<td>80</td>
<td></td>
<td>3.27%</td>
</tr>
<tr>
<td>No support</td>
<td>2369</td>
<td></td>
<td>96.73%</td>
</tr>
</tbody>
</table>
Hypotheses

Research Question 1, Hypotheses 1-6

Research Question 1 was addressed by examining the differences between completers and noncompleters on the basis of definition and background variables. The analysis of pre-entry characteristics in relation to outcomes is critical in identifying differences that may indicate students at risk for completion. For testing Hypotheses 1–5, chi-square analyses were used due to nominal data that were either dichotomous or categorical. Statistical significance was determined by the Pearson chi-square ($\chi^2$) value which is calculated on the basis of observed frequencies in comparison to expected frequencies. The chi-square value is calculated over all categories; a significant $\chi^2$ value does not specify which categories have been major contributors to statistical significance (Hinkle, Wiersma & Jurs, 2003). To determine which categories were contributors to statistical significance, standardized residuals ($R$) were examined. According to Hinkle et al., a category with a standardized residual ($R$) greater than 2.00 (in absolute value) is considered a major contributor. For Hypothesis 6, a $t$ test was conducted to compare the mean prior GPA of completers to the mean prior GPA of noncompleters. For each comparison, an alpha level of $< .05$ was established as the level of statistical significance.

H$_1$. There will be a statistically significant difference between traditional and nontraditional students on online course completion and noncompletion.

Students were defined as nontraditional on the basis of a minimum of one of three characteristics (a) residency as a noncommuter (exclusively online), (b) $\geq$ 25 years of age, and/or (c) enrollment as a part-time student. The presence of any one characteristic resulted in classification as nontraditional. An absence of any nontraditional characteristic resulted in classification as traditional. The hypothesis that there would be statistically significant
differences was made on the basis of Bean and Metzner’s (1985) conceptual model of nontraditional student attrition, and prior research to support the varied perceptions and differences that exist between those students attending college that meet the traditional definition as compared to those who do not. There were 599, or 24.46% traditional participants in the sample and 1850, or 75.54% nontraditional participants.

A 2 x 2 contingency table was used to examine differences between traditional and nontraditional completers and noncompleters. For the defining variable, traditional or nontraditional classification, nontraditional students had higher rates of completion than traditional students. There were 1323, or 71.51% nontraditional completers as compared to 527, or 28.49% nontraditional noncompleters. There were 389, or 64.94%, traditional completers compared to 210, or 35.06% traditional noncompleters. The differences between the cells were statistically significant $\chi^2 (1, N = 2449) = 9.29, p = .002$. Based on the statistical significance of the Chi-square value, the hypothesis was supported. Additionally, examination of residual values revealed that the major contributor to statistical significance was found within the category of traditional noncompleters, with more traditional noncompleters than expected ($R = 2.21$).

$H_2$. There will be statistically significant differences among ethnicities on online course completion and noncompletion.

Frequency distribution of the participant sample by ethnic origin included 16 American Indian (1%); 255 Asian (10.41%); 268 Black (10.94%); 230 Hispanic (9.39%), 1638 White (66.80%) and 44 undisclosed or unknown (1.79%). In 2 x 6 chi-square analyses by ethnicity, there were 527, or 68.44% minority completers as compared to 243, or 31.56% noncompleters. There were 1154, or 70.54% nonminority completers as compared to 482, or 29.46% nonminority noncompleters. Among all ethnicities within the participant sample, the highest rate
of completion was found with American Indian with 81.25% completers; Asian with 78.43% completers, White with 70.54% completers, Hispanic with 63.91% completers; Black with 62.31% completers. The group classified as unknown or undisclosed ethnic origin had a completion rate of 70.45%. Specifically, within minority participants, there were 13, or 81.25% American Indian completers as compared to 3, or 18.75% noncompleters; 200, or 78.43% Asian completers as compared to 55, or 21.57% noncompleters; 167, or 62.31% Black completers in comparison to 101 or 37.69% noncompleters; 147, or 63.91% Hispanic completers in comparison to 83, or 36.09% noncompleters. For the category undisclosed or unknown, there were 31, or 70.45% completers as compared to 13, or 29.55% noncompleters. The differences between the cells were statistically significant $\chi^2 (5, N = 2449) = 21.376, p = .001$.

Examination of residual values indicated that the major contributors to statistical significance were found within two categories, Asian noncompleters and Black noncompleters. In the category of Asian noncompleters, there were less noncompleters than expected ($R = -2.47$); in the category of Black noncompleters, there were more noncompleters than expected ($R = 2.26$). The hypothesis was supported.

$H_3$. There will be a statistically significant difference between males and females (gender) on online course completion and noncompletion.

As was the case throughout the literature, there were a significantly larger number of females enrolled in online classes as compared to males. There were 768, or 31.36% male participants and 1681, or 68.64% female participants. Although statistical significance of outcomes by gender has been mixed throughout the literature, it was hypothesized that there would be statistically significant differences in course completion or noncompletion by gender.
A 2 x 2 chi-square analysis by gender revealed statistically significant differences for male and female gender with females completing online courses at a higher rate than males. There were 1224, or 72.81% female completers in comparison with 457, or 27.19% noncompleters. There were 488, or 63.54% male completers as compared with 280, or 36.46% noncompleters. The differences between the cells were statistically significant $\chi^2 (1, N = 2449) = 21.543, p < .001$. Based on the statistical significance of the chi-square value, this hypothesis was supported.

Examination of residuals revealed that the categories that were major contributors to statistical significance were found in the category for male noncompleters, with more male noncompleters than expected ($R = 3.21$); male completers, with less male completers than expected ($R = -2.11$); and female noncompleters, with less female noncompleters than expected ($R = -2.17$).

$H_4$. There will be a statistically significant difference between degree seeking and non-degree seeking students on online course completion and noncompletion.

The overwhelming majority of online students were declared as degree seeking. The total number of degree seeking students was 2340, or 95.55%, as compared to 109, or 4.45% non-degree seeking students. A 2 x 2 chi-square analysis by degree seeking revealed no significant differences on completion or noncompletion by degree seeking and non-degree seeking. There were 1629, or 69.62% degree seeking completers as compared with 711, or 30.38% noncompleters. There were 83, or 76.15% non-degree seeking completers in comparison with 26, or 23.85% noncompleters. The differences between the cells were not statistically significant $\chi^2 (1, N = 2449) = 2.112, p = .146$. Therefore, this hypothesis was not supported.
H5. There will be a statistically significant difference between novice and experienced distance learning students on online course completion and noncompletion.

Experience was classified according to previous enrollment in distance learning courses. Students with a record of previous distance learning enrollment were categorized as experienced and all others were classified as novice. The determination of group assignment was limited to distance learning course enrollment at the single institution. There were a total of 656, or 26.79% novice participants and 1793, 73.21% experienced participants.

In a 2 x 2 chi-square analysis of novice and experienced online students, novice (first time) students completed online courses at a higher rate than experienced students (those with prior online experience). There were 533, or 81.25% novice completers as compared to 123, or 18.75% novice noncompleters. There were 1179, or 65.76%, experienced completers as compared to 614, or 34.24% experienced noncompleters. The differences among the cells were statistically significant $\chi^2 (1, N = 2449) = 54.808, p < .001$. This hypothesis was supported.

Examination of residuals revealed that all categories were major contributors to statistical significance. There were less novice noncompleters than expected ($R = -5.30$); more novice completers than expected ($R = 3.48$); more experienced noncompleters than expected ($R = 3.20$); and less experienced completers than expected ($R = -2.10$).

H6. There will be a statistically significant difference between community college online course completers and noncompleters based on prior GPA.

The participant sample was composed of 1712, or 69.91% completers of all online courses and 737, or 30.09% noncompleters of all online enrollments. A $t$ test was performed to determine if the mean prior GPA of completers ($M = 3.09, SD = .745, n = 1712$) was
significantly different from the mean prior GPA of noncompleters ($M = 2.47, SD = 1.01, n = 737$). The alpha level was .05. Table 6 provides the group statistics.

Table 6

*Completer and Noncompleter Group Statistics Differences by Prior GPA*

<table>
<thead>
<tr>
<th>DV Outcome</th>
<th>Completers; Noncompleters</th>
<th>N</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Std. error of mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior GPA</td>
<td>Completers</td>
<td>1712</td>
<td>3.09</td>
<td>.745</td>
<td>.018</td>
</tr>
<tr>
<td></td>
<td>Noncompleters</td>
<td>737</td>
<td>2.47</td>
<td>1.014</td>
<td>.037</td>
</tr>
</tbody>
</table>

The *t* test conducted to examine differences between prior GPA of completers and noncompleters violated Levene’s test for equality of variances. Therefore, equal variances not assumed was used. Table 7 provides the results of the *t* test.

Table 7

*Completer and Noncompleter Differences by Prior GPA*

<table>
<thead>
<tr>
<th>Prior GPA</th>
<th>Levene’s test for equality of variances</th>
<th><em>t</em>-test for equality of means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>F</em></td>
<td>Sig.</td>
</tr>
<tr>
<td>Equal variances</td>
<td>102.298</td>
<td>.000</td>
</tr>
<tr>
<td>assumed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>14.824</td>
<td>1091.944</td>
</tr>
</tbody>
</table>

*(table continues)*
Table 7 (continued)

<table>
<thead>
<tr>
<th>Prior GPA</th>
<th>t-test for equality of means</th>
<th>95% Confidence interval of the difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td></td>
<td>difference</td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td></td>
<td>.615</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td></td>
<td>.615</td>
</tr>
</tbody>
</table>

The results of $t$ test analysis indicated that the mean prior GPA of noncompleters was statistically different from the mean prior GPA of completers, with completers having a higher mean prior GPA than the mean prior GPA of noncompleters. This hypothesis was supported.

**Summary of hypotheses testing ($H_1$–$H_6$) for Research Question 1.**

The defining variable, traditional or nontraditional, and background variables, ethnicity, gender, degree seeking and experience (novice or experience in online learning) were entered in either a $2 \times 2$, or a $2 \times 6$ contingency table, as appropriate. Table 8 provides the Pearson chi-square values and the level of significance found for the differences.
Table 8

Chi-Square Values of Defining and Background Independent Variables with Dichotomous Outcome Variable (Completion or Noncompletion)

<table>
<thead>
<tr>
<th>Independent (predictor)</th>
<th>Pearson chi-square</th>
<th>df</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defining variable</td>
<td>9.290</td>
<td>1</td>
<td>.002*</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>21.376</td>
<td>5</td>
<td>.001*</td>
</tr>
<tr>
<td>Gender</td>
<td>21.543</td>
<td>1</td>
<td>.000**</td>
</tr>
<tr>
<td>Degree seeking</td>
<td>2.112</td>
<td>1</td>
<td>.146</td>
</tr>
<tr>
<td>Experience</td>
<td>54.808</td>
<td>1</td>
<td>.000**</td>
</tr>
</tbody>
</table>

*p < .05, **p < .001

Chi-square analyses found statistically significant differences between completers and noncompleters based on definition, gender, and experience at p < .05, with nontraditional students, females, and novice students completing online courses with higher rates than traditional, male and experienced students. Chi-square analyses revealed statistically significant differences among ethnicities, with completion rates based on ethnic origin ranked from highest to lowest by American Indian, Asian, White, Unknown or Undisclosed, Hispanic and Black students. Therefore, Hypotheses 1–3 and Hypothesis 5 were supported. Hypothesis 4, differences by degree seeking, was not supported, with p = .146. The t test analysis found statistically significant differences between completers and noncompleters based on prior GPA at p < .001, with mean prior GPA of completers higher than mean prior GPA of noncompleters. Hypothesis 6 was supported.
Statistical significance may be influenced by the number of individuals in the sample. “The larger the sample size, the smaller the result needed to reach a given level of statistical significance” (Gall et al., 2007, p. 141). Given the large sample size, particular attention was given to the correlation coefficient, magnitude of the association, which is reported when addressing Research Question 3, Hypothesis 8.

Research Question 2, Hypothesis 7

\(H_7\) There will be statistically significant interactions between traditional and nontraditional students, novice and experienced students, READI assessment participation, orientation participation, and 24/7 technical help seeking, as demonstrated by course grade(s).

Six two-way between-subjects analysis of variance were conducted to evaluate the interaction between membership in groups as traditional and nontraditional students, novice and experienced distance learning students and READI participation, orientation participation and technical help seeking on the outcome of course grade(s). In each two-way ANOVA Levene’s test of equality of error variances was violated. Transformations that would have helped were not applicable because kurtosis and skewness were within acceptable range. According to Field (2000), “…transformations often don’t help at all and in these circumstances you are sometimes left with only the option of reporting an inaccurate \(F\) value” (p. 284). A summary of each 2 x 2 ANOVA is provided.

Definition x READI: A significant main effect was found for student definition (traditional or nontraditional), \(F (1, 2013) = 7.58, p = .006\). However, the main effect for READI participation was not significant, \(F (1, 2013) = .97, p = .326\). There was no significant interaction between the two factors, \(F (1, 2013) = 1.48, p = .225\). Based on the results of Levene’s test, the results are reported with inaccurate \(F\) values.
Definition x Orientation: A significant main effect was found for student definition (traditional or nontraditional), $F(1, 2013) = 14.62, p < .05$. The main effect for orientation participation was also significant, $F(1, 2013) = 5.80, p = .016$. There was no significant interaction between the two factors, $F(1, 2013) = 2.74, p = .098$. Based on the results of Levene’s test, the results are reported with inaccurate $F$ values.

Definition x Technical support: A significant main effect was found for student definition (traditional or nontraditional), $F(1, 2013) = 3.94, p = .047$. However, the main effect for technical support was not significant, $F(1, 2013) = .03, p = .856$. There was no significant interaction between the two factors, $F(1, 2013) = .70, p = .403$. The results of Levene’s test require reporting the results with inaccurate $F$ values.

Experience x READI: No significant main effect was found for distance learning experience (novice or experienced), $F(1, 2013) = .02, p = .904$. However, the main effect for READI participation was significant, $F(1, 2013) = 4.68, p = .031$. There was no interaction between the two factors, $F(1, 2013) = .20, p = .653$. Given the results of Levene’s test, the results are reported with inaccurate $F$ values.

Experience x Orientation: There was no significant main effect found for student distance learning experience (novice or experienced), $F(1, 2013) = .19, p = .664$. But, the main effect for orientation participation was significant, $F(1, 2013) = 17.77, p < .001$. There was no significant interaction between the two factors, $F(1, 2013) = 2.03, p = .154$. Based on the outcome of Levene’s test, the results are reported with inaccurate $F$ values.

Experience x Technical support: There was no significant main effect found for student distance learning experience (novice or experienced), $F(1, 2013) = .45, p = .502$. Additionally, the main effect for technical support was not significant, $F(1, 2013) = 1.01, p = .316$. Further,
there was no significant interaction between the two factors, $F(1, 2013) = .06, p = .812$. The results are reported with inaccurate $F$ values, as is indicated by the significance of the Levene’s test.

Descriptive statistics of READI, orientation, and technical help seeking participants indicated that mean end-of-term grade of READI participants ($M = 3.04, SD = 1.30, n = 107$) was higher than READI nonparticipants ($M = 2.73, SD = 1.41, n = 1910$); Orientation participants ($M = 3.08, SD = 1.21, n = 246$) was higher than orientation nonparticipants ($M = 2.70, SD = 1.42, n = 1771$); and those who sought technical help ($M = 2.95, SD = 1.28, n = 67$) was higher than those who did not ($M = 2.74, SD = 1.41, n = 1950$).

**Summary of hypothesis testing ($H_7$) for Research Question 2.**

This hypothesis was not supported. Six two-way analyses of variance were conducted. In each case, Levene’s test of equality of error of variances was violated. Further, although there were significant main effects, no significant interactions were found in analysis of Definition x READI, Definition x Orientation, Definition x Technical support or Experience x READI, Experience x Orientation, Experience x Technical support.

In an effort to attain a Levene’s test of equality of error variances that met the assumption of equal variances across groups, the sample was reduced to a contain only those students that had participated in one of three help seeking behaviors (READI, orientation, and technical help seeking). The resulting sample, $n = 295$, met Levene’s test with a significance level of .107; however, as was the case in the six two-way between-subjects analysis of variance, no significant interactions were found.

Based on the results of six two-way analyses of variance, with no statistically significant interactions found, the hypothesis was not supported.
Research Question 3, Hypothesis 8

Correlation coefficients were used to determine the relationship or magnitude of association between student defining and background characteristics, the academic variable (self-reported hours of study), academic integration variables (participation in READI assessment, orientation participation, and technical help seeking), and the environmental integration variable (hours for work or family responsibility) and completion and noncompletion in online courses when a statistically significant difference was found as a result of chi-square and \( t \) test.

Use of Cramer’s \( V \).

In the case of 2 x 2 contingency tables, analysis of nominal variables, phi coefficients would be used to determine correlation coefficients. The phi coefficient is a special case of the Pearson \( r \), in which both variables are nominal dichotomous variables (Hinkle et al., 2003). However, the present study included nominal variables with more than two classification levels; therefore, a different correlation coefficient was needed. Cramer’s \( V \) coefficient, measure of association was used. For consistency purposes, Cramer’s \( V \) was reported for all nominal variables; however, it should be noted that, in the case of 2 x 2 contingency tables, the phi coefficient and Cramer’s \( V \) coefficient would be the same.

Academic variable (hours for study) and environmental variable (hours for work or family obligations).

Only those participants that completed the READI assessment had the opportunity to respond to the academic variable question, (a) how many hours do you have for online coursework, and environmental variable question (b) how many hours do you have for work and/or family responsibilities? Therefore, correlation analysis for study hours and work and family responsibility was examined using \( n = 128 \). Although only 125 students in the sample
completed the READI assessment prior to or within the first ten days of the term (established parameters for READI participation), 128 participants completed the READI assessment within the first three weeks of the term. The additional three cases were included for the analysis of the sub-sample. Results for correlational coefficient will be reported separately for the sub-sample.

\( H_8. \) There will be statistically significant relationships between defining and background variables, academic environment and academic integration variables, and the environmental variable and course completion or noncompletion.

Results of chi-square analyses indicated statistical significance for differences between completers and noncompleters based on the defining variable, ethnicity, gender, experience, and orientation with nontraditional students, female students, novice students and orientation participants completing courses at a higher rate than traditional students, males, experienced students, and orientation nonparticipants. Among ethnicities, chi-square revealed statistically significant differences with completion rates ranked from highest to lowest by American Indian, Asian, White, Undisclosed or Unknown, Hispanic and Black students. Results of \( t \) test indicated statistical significance for differences between completers and noncompleters on the basis of prior GPA with the mean prior GPA of completers higher than the mean prior GPA of noncompleters. All statistically significant variables by differences were subject to correlation coefficient analysis to determine statistically significant relationships and the strength of the relationships. All variables were found to have statistically significant relationships at \( p < .05 \). However, according to descriptors for chi-square magnitude of association in contingency tables, for definition, ethnicity, gender and orientation, the relationships were weak (Gall et al., 2007; Hopkins, Hopkins & Glass, 1996; Rea & Parker, as cited in Warmbrod, 2001). For experience,
the magnitude of the association was small to moderate. Table 9 presents the Cramer’s $V$
coefficient and significance with $N = 2449$.

Table 9

*Cramer’s V Coefficients for Dichotomous or Categorical Defining, Background and Academic Integration Variables and Completion and Noncompletion*

<table>
<thead>
<tr>
<th>Defining variable</th>
<th>Cramer’s $V$</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional or nontraditional</td>
<td>.062</td>
<td>.002*</td>
</tr>
<tr>
<td>Background variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>.093</td>
<td>.001*</td>
</tr>
<tr>
<td>Gender</td>
<td>.094</td>
<td>.000**</td>
</tr>
<tr>
<td>Experience</td>
<td>.150</td>
<td>.000**</td>
</tr>
<tr>
<td>Academic integration variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orientation</td>
<td>.085</td>
<td>.000**</td>
</tr>
</tbody>
</table>

*p < .05, **p < .001

Table 10 presents the correlation between prior GPA and course completion and noncompletion. A biserial correlation was used due to one variable measured on the interval or ratio scale and the other variable dichotomous with underlying continuity (Hinkle et al., 2003). Correlation coefficient indicates a moderate effect size.
Table 10

*Biserial Correlation Coefficient for Prior GPA and Completion and Noncompletion*

<table>
<thead>
<tr>
<th>Background variable</th>
<th>Biserial coefficient</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior GPA</td>
<td>.421</td>
<td>.000**</td>
</tr>
</tbody>
</table>

**p < .001**

In the sub-sample, $n = 128$, results of chi-square analysis indicated statistical significance for differences between completers and noncompleters based on study hours, with students’ self-reporting greater than 10 hours available for study completing courses at a higher rate than those students self-reporting 10 hours or less for study. The differences between the cells were statistically significant $\chi^2 (1, N = 128) = 7.683, p = .006$, Cramer’s $V = .245$. Descriptors for chi-square magnitude of association in contingency tables, this is a moderate association (Gall et al., 2007; Hopkins et al., 1996; Rea & Parker as cited in Warmbrod, 2001).

*Summary of hypothesis testing (H₈) for Research Question 3.*

This hypothesis was supported. There were statistically significant relationships found for the defining and background variables of definition, ethnicity, gender, experience, prior GPA, and the academic integration variable, voluntary participation in distance learning orientation. However, degree seeking, READI participation and technical help seeking were not found to be statistically significant as the result of chi-square analyses and therefore, were not subject to correlation.

Additionally, results for hours of study and hours for work and family responsibility were not available in the total population and therefore, were reported separately. In the sub-sample, $n = 128$, the relationship between study hours and course completion or noncompletion was found
to be statistically significant at $p = .006$; hours for work and family obligations was not found to be statistically significant.

Research Question 4, Hypothesis 9

Logistic regression analysis was used to examine defining and background variables, academic and environmental variables as statistically significant predictors of group membership of completers and noncompleters in online courses.

Binary logistic regression is used with a dichotomous outcome variable and a set of predictor variables that are continuous or categorical (Field, 2000). The dichotomous dependent variable has a value of 1 with a probability of success (completion) and a probability of 0 with failure (noncompletion). The predicted outcome or dependent variable is a function of the probability that, given a particular set of values of the predictor variables, the participant will be in one of the dependent categories; therefore, it does not predict whether an event occurred or not, but instead predicts the probability of an event (Hair, Anderson, Tatham & Black, 1995; Wuensch, 2008). The impact of the predictor variables is generally in the form of odds ratio (Garson, 2009). The goal of logistic regression is to try to create a model that allows researchers to estimate values of the outcome variable from known values of the predictor variable or variables (Field, 2008). In the case of the present study, the variables and outcome contained within the model adapted from Bean and Metzner’s (1985) conceptual model of nontraditional student attrition, critical interests to higher education decision makers, and those of a particular institutional interest were included in the logistic regression model. Although study hours (Variable 7) was found to be significant in the sub-sample, only those variables examined in the full participant sample were considered for the logistic regression model. All predictor variables
were entered in the model simultaneously to test the hypothesis regarding the relationship of predictor variables to outcomes.

The Hosmer-Lemeshow chi-square test of goodness-of-fit was used to test the overall fit of the model and Wald’s statistic assessed the significant of individual independent variables. For the purposes of logistic regression, preterm and early term READI participation were collapsed into participation; preterm and early term orientation participation were collapsed into participation; resulting in two dichotomous nominal variables of participation and nonparticipation. All cells met the minimum criteria for cell frequencies of no less than 1 and no more than 20% of the cells < 5 (Garson, 2009). Pedhazur (as cited in Garson, 2009) recommended sample size be at least 30 times the number of parameters being estimated. Hosmer and Lemeshow (as cited in Garson, 2009) recommended a minimum of 10 cases per independent variable. In the case of the full participant sample logistic regression, all greater values were met. In the case of the sub-group analysis, n = 128, Hosmer-Lemeshow levels were employed with no cells less than five.

Table 11 identifies the coding for the dichotomous independent variables, the categorical independent variable and the dichotomous dependent variable entered in the logistic regression.

Table 11

| Independent Predictor Variables and Dependent Variable Coding in Binary Logistic Regression |
|-----------------------------------------------|-----------------------------------------------|
| Variable                                      | Code  | Variable             | Code  |
| Defining variable                             |       |                      |       |
| Traditional                                   | 0     | Nontraditional       | 1     |
| Background variables                          |       |                      |       |

*(table continues)*
Table 11 (continued)

<table>
<thead>
<tr>
<th>Ethnicity (categorical with nonminority reference group)</th>
<th>Ethnicity (minority by American Indian, Asian, Black, Hispanic, Unknown)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Unknown</td>
<td>1</td>
</tr>
<tr>
<td>Male</td>
<td>0 Female</td>
</tr>
<tr>
<td>Female</td>
<td>1</td>
</tr>
<tr>
<td>Non-degree seeking</td>
<td>0 Degree seeking</td>
</tr>
<tr>
<td>Degree seeking</td>
<td>1</td>
</tr>
<tr>
<td>Novice</td>
<td>0 Experienced</td>
</tr>
<tr>
<td>Experienced</td>
<td>1</td>
</tr>
</tbody>
</table>

**Academic integration variables**

<table>
<thead>
<tr>
<th>READI nonparticipation</th>
<th>READI participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Orientation nonparticipation</th>
<th>Orientation participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No technical support</th>
<th>Technical support</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**Dependent variable**

<table>
<thead>
<tr>
<th>Noncompletion</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

The logistic regression table includes (a) \( B \), the unstandardized regression coefficient, referred to as parameter estimate (Garson, 2009), (b) the standard error of \( B \), (c) the Wald statistic, (d) Wald significance, (e) the odds ratio, \( \text{Exp}(B) \) and (f) the confidence limits of the odds ratio. The \( B \), or parameter estimate, tells you about the amount of increase or decrease (if the sign of the coefficient is negative) in the predicted log odds of the outcome variable that would occur by a 1 unit increase or decrease in the predictor, holding all other predictors constant (Garson, 2009). The odds ratio is the ratio of the two odds (completion/noncompletion).
when comparing the two groups. In the case of a continuous independent variable, the odds ratio represents the factor by which the odds (event) change for a one-unit change in the variable. If the value of \( \text{Exp}(B) \) is greater than 1.0, it means as the independent variable increases from 0 to 1 (dichotomous) or 1 unit (continuous), the odds of the event occurring increase. If \( \text{Exp}(B) \) is less than 1.0, then the independent variable decreases the logit (negative relationship), and the odds decrease. If \( \text{Exp}(B) = 1.0 \), the independent variable has no effect (Garson, 2009).

Confidence intervals of \( \text{Exp}(B) \) represent the upper and lower limits of the event; when the confidence interval around the odds ratio includes the value of 1.0, it indicates that a change in the value of the predictor (independent variable) is not associated with a change in the odds of the dependent variable, resulting in the variable not being considered a useful predictor in the model (Garson, 2009).

\[ H_9. \text{ Defining and background variables, academic variables and the environmental variable (included in the model) will be statistically significant predictors of group membership of completers and noncompleters in online courses.} \]

The defining variable (traditional and nontraditional) and background variables of ethnicity, gender, prior GPA, degree seeking, experience, and academic integration variables, READI participation, orientation participation, and technical help seeking were entered in a single binary logistic model with the dichotomous outcome variable of completion or noncompletion. Definition (traditional or nontraditional), gender, prior GPA, experience, and orientation participation were statistically significant in the model with non-traditional, female, higher prior GPA and orientation participation positively related to course completion and experience negatively related to course completion. The results are presented in Table 12.
Table 12

*Primary Model Binary Logistic Regression Results*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>95% C.I.</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Trad/Non)</td>
<td>.349</td>
<td>.112</td>
<td>9.726</td>
<td>1</td>
<td>.002*</td>
<td>1.418</td>
<td>1.138</td>
<td>1.765</td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td>10.852</td>
<td></td>
<td>5</td>
<td>.054</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.316</td>
<td>.101</td>
<td>9.730</td>
<td>1</td>
<td>.002*</td>
<td>1.372</td>
<td>1.125</td>
<td>1.673</td>
<td></td>
</tr>
<tr>
<td>Prior GPA</td>
<td>.806</td>
<td>.057</td>
<td>201.944</td>
<td>1</td>
<td>.000**</td>
<td>2.240</td>
<td>2.004</td>
<td>2.503</td>
<td></td>
</tr>
<tr>
<td>Degree seeking</td>
<td>-.226</td>
<td>.246</td>
<td>.845</td>
<td>1</td>
<td>.358</td>
<td>.797</td>
<td>.492</td>
<td>1.292</td>
<td></td>
</tr>
<tr>
<td>Experience</td>
<td>-1.036</td>
<td>.126</td>
<td>67.801</td>
<td>1</td>
<td>.000**</td>
<td>.355</td>
<td>.277</td>
<td>.454</td>
<td></td>
</tr>
<tr>
<td>READI</td>
<td>.171</td>
<td>.229</td>
<td>.554</td>
<td>1</td>
<td>.457</td>
<td>1.186</td>
<td>.757</td>
<td>1.858</td>
<td></td>
</tr>
<tr>
<td>Orientation</td>
<td>.341</td>
<td>.169</td>
<td>4.065</td>
<td>1</td>
<td>.044*</td>
<td>1.406</td>
<td>1.010</td>
<td>1.960</td>
<td></td>
</tr>
<tr>
<td>Technical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>support</td>
<td>.101</td>
<td>.278</td>
<td>.132</td>
<td>1</td>
<td>.716</td>
<td>1.106</td>
<td>.642</td>
<td>1.906</td>
<td></td>
</tr>
</tbody>
</table>

* *p < .05, ** p < .001

Student definition was statistically significant at p = .002. The parameter estimate (B) of .394 indicated that when the student changed from 0 (traditional) to 1 (nontraditional) and all other independent variables were held constant, the log odds of a student being successful increased by approximately .39. The Exp (B) of 1.418 indicated a positive relationship between nontraditional definition and course completion. The odds ratio of completion by nontraditional students to traditional students in online courses was 1.418, or about 42% higher for nontraditional students. The confidence interval around the odds ratio does not include the value
of 1.0, indicating that the variable is considered a useful predictor in the logistic model (Garson, 2009).

Ethnicity was not statistically significant. The statistic given in Table 12 indicates whether the dummy variables that represent ethnicity, taken together, are statistically significant (UCLA Academic Technology Services, retrieved from http://www.ats.ucla.edu/stat/SPSS/output/logistic.htm). In this case, they were not; however, within ethnicity, Asian ethnicity, as compared to the reference group, nonminority white, was significant at \( p = .009 \). The \( \text{Exp}(B) \) 1.577 indicated a positive relationship between Asian ethnicity and online course completion. A \( B \) of .456 indicated that when ethnicity changed from the reference group nonminority white (0) to Asian (1) and all other independent variables were held constant the log odds of Asian students being completers increased by about .46. The confidence interval around the odds ratio, 1.121 to 2.218 does not include the value of 1.0, indicating that the variable is considered a useful predictor in the logistic model (Garson, 2009).

Gender was statistically significant at \( p = .002 \). The parameter estimate of .316 indicated that when the gender changed from 0 (male) to 1 (female) and all other independent variables were held constant, the log odds of a student being successful increased. The \( \text{Exp}(B) \) of 1.372 indicated a positive relationship between female students and course completion. The odds ratio of completion by female students to male students in online courses was 1.372, or about 37% higher for female students. The confidence interval around the odds ratio, 1.125 to 1.673, does not include the value of 1.0, indicating that the variable is considered a useful predictor in the logistic model (Garson, 2009).

Prior GPA was statistically significant at \( p < .000 \). A one unit increase in prior GPA, with all other independent variables held constant, increased the log odds of being a completer by .81.
The Exp $(B)$ of 2.240 indicated a positive relationship between prior GPA and online course completion. A one-unit increase in prior GPA increases the odds of completing an online course by 124%. The confidence interval around the odds ratio, 2.004 to 2.503, does not include the value of 1.0, indicating that the prior GPA is a useful predictor in the model (Garson, 2009).

Degree seeking was not statistically significant at $p = .358$. The parameter estimate $(B)$ of -.226 indicated that when the degree seeking changed from 0 (non-degree seeking) to 1 (degree seeking) and all other independent variables were held constant, the log odds of a student being a completer decreased by about .23. The Exp $(B)$ of .797 indicated a negative relationship between degree seeking students and course completion. The odds ratio of completion by degree seeking to non-degree seeking students in online courses was .797, or about 20% lower for degree seeking students. The confidence interval around the odds ratio, .492 to 1.292, includes the value of 1.0, indicating that the variable is not a useful predictor in the logistic model (Garson, 2009).

Experience was statistically significant at $p < .000$. The $B$ of -1.036 indicated that when experience changed from 0 (novice) to 1 (experienced) and all other independent variables were held constant, the log odds of a student being successful decreased. The Exp $(B)$ of .355 indicated a negative relationship between experienced students and course completion. The odds ratio of completion by experienced students to novice students in online courses was .355, or about 64% lower for experienced students. The confidence interval around the odds ratio, .277 to .454, does not include the value of 1.0, indicating that the variable is considered a useful predictor in the logistic model (Garson, 2009).

READI participation was not statistically significant at $p = .457$. The parameter estimate $(B)$ of .171 indicated that when the READI participation changed from 0 (nonparticipation) to 1 (participation) and all other independent variables were held constant, the log odds of a student
being a completer increased by about .17. The Exp ($B$) of 1.186 indicated a positive relationship between READI participation and course completion. The odds ratio of completion by READI participation to nonparticipation students in online courses was 1.186, or about 19% higher for READI participants. However, the confidence interval around the odds ratio, .757 to 1.858, includes the value of 1.0, indicating that the variable is not a useful predictor in the logistic model (Garson, 2009).

Orientation participation was statistically significant at $p = .044$. The parameter estimate ($B$) of .341 indicated that when orientation changed from 0 (nonparticipation) to 1 (participation) and all other independent variables were held constant, the log odds of a student completing online courses increased. The Exp ($B$) of 1.406 indicated a positive relationship between orientation participation and course completion. The odds ratio of completion by orientation participants to nonparticipants was 1.406, or about 41% higher for orientation participants. The confidence interval around the odds ratio, 1.010 to 1.960, does not include the value of 1.0, indicating that the variable is a useful predictor in the logistic model (Garson, 2009).

Technical support was not statistically significant at $p = .716$. The ($B$) of .101 indicated that when technical support changed from 0 (no support) to 1 (support) and all other independent variables were held constant, the log odds of a student being a completer increased by about .10. The Exp ($B$) of 1.106 indicated a positive relationship between technical support and course completion. The odds ratio of completion by students that sought technical support to those that did not was 1.106, or about 11% higher for those that sought technical support. However, the confidence interval around the odds ratio, .642 to 1.906, includes the value of 1.0, indicating that the variable is not a useful predictor in the logistic model (Garson, 2009).

The variables in the equation for the null model are provided in Table 13.
Table 13

Variables in the Equation for Intercept Only Model

<table>
<thead>
<tr>
<th>Step 0</th>
<th>Constant</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>-.843</td>
<td>.044</td>
<td>365.984</td>
<td>1</td>
<td>.000</td>
<td>2.323</td>
</tr>
</tbody>
</table>

The overall fit of the model was tested using the Hosmer-Lemeshow chi-square goodness-of-fit test. A finding of nonsignificance indicated that the model adequately fit the data. The result of the Hosmer-Lemeshow test is provided in Table 14.

Table 14

Hosmer-Lemeshow Test for Defining, Background and Academic Integration Variables and Course Completion and Noncompletion

<table>
<thead>
<tr>
<th>Step</th>
<th>Chi-square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7.005</td>
<td>8</td>
<td>.536</td>
</tr>
</tbody>
</table>

Additionally, in binary logistic regression, the Omnibus tests of model coefficients reports significance levels by traditional chi-square method. A finding of significance demonstrated an adequate fit of the data to the model, meaning at least one of the predictors is significantly related to the dependent variable (Garson, 2009). The Enter method was used in analysis; therefore, there is no difference in the step, block or model results. The model was statistically significant at \( p < .001 \). Table 15 provides the Omnibus tests of model coefficients.
Table 15

Omnibus Tests of Model Coefficients for Defining, Background and Academic Integration Variables and Course Completion and Noncompletion

<table>
<thead>
<tr>
<th></th>
<th>Chi-square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 Step</td>
<td>359.092</td>
<td>13</td>
<td>.000</td>
</tr>
<tr>
<td>Block</td>
<td>359.092</td>
<td>13</td>
<td>.000</td>
</tr>
<tr>
<td>Model</td>
<td>359.092</td>
<td>13</td>
<td>.000**</td>
</tr>
</tbody>
</table>

**p < .001

*Multicollinearity.*

According to Field (2000), logistic regression is prone to the biasing effect of collinearity between two or more predictors and therefore, it is essential to test for collinearity following logistic regression analysis. According to Menard (as cited in Field, 2000), a tolerance value of less than 0.1 and a variance inflation factor (VIF) value of greater than 10 is of concern. Results of the analysis indicate no multicollinearity. Tests for collinearity of predictor and outcome variables indicated tolerance values > .1 and VIF values < 2.

*Summary of hypothesis testing (H₉) for Research Question 4.*

This hypothesis was supported. Data analysis by logistic regression revealed that definition, gender, prior GPA, experience, and orientation were statistically significant predictors of completion or noncompletion with nontraditional, female, higher prior GPA, and orientation increasing the likelihood of completion. Experience was a statistically significant predictor; however, logistic regression indicated that within the participant sample, having prior online experience decreased the likelihood of completion. Ethnicity, degree seeking, READI participation, and technical help seeking were not statistically significant predictors of
completion or noncompletion. Additionally, the model was found to be a good fit for the data according to the Omnibus tests of model coefficients with $\chi^2 (13, N = 2449) = 359.092, p < .001$. A nonsignificant result of Hosmer-Lemeshow test further supports that the data fit the model well.

Additional Analyses

With the focus of Bean and Metzner’s (1985) conceptual model of nontraditional student attrition and the numbers of nontraditional participants, the decision was made to analyze nontraditional and traditional on the basis of the classification variables. Students were defined as nontraditional on the basis of a minimum of one of three characteristics (a) residency as a noncommuter (exclusively online), (b) $\geq 25$ years of age, and/or (c) enrollment as a part-time student. The presence of any one characteristic resulted in classification as nontraditional. An absence of any nontraditional characteristic resulted in classification as traditional.

The variables were examined using chi-square frequencies test for homogeneity to determine differences by residency, between noncommuters and commuters; age, between students age $\geq 25$ and $\leq 24$; and enrollment status, between students enrolled part-time and full-time. Additionally, correlation analyses using Cramer’s $V$ was conducted to determine significance of relationships with course completion and finally, the three independent variables were entered in logistic regression analysis with the remaining (other than traditional and nontraditional) predictor variables to determine any impact on the model.

Chi-Square Test for Frequencies Test for Homogeneity and Cramer’s $V$ for Defining Characteristics

For definition by residency, noncommuters completed courses at a higher rate than commuters. There were 639, or 86.59% noncommuter (online only) completers as compared to
99, or 13.41% noncommuter noncompleters. There were 1073 or 62.71%, traditional commuter completers compared to 638, or 37.29% commuter noncompleters. Residuals revealed that all categories were major contributors to statistical significance with more commuter noncompleters than expected \((R = 5.4)\); less commuter completers than expected \((R = -3.6)\); less noncommuter noncompleters than expected \((R = -8.3)\); and more noncommuter completers than expected \((R = 5.4)\). The differences between the cells were statistically significant \(\chi^2 (1, N = 2449) = 139.687, p < .001\), Cramer’s \(V = .239\). According to descriptors for chi-square magnitude of association in contingency tables, this indicated a moderate association (Gall et al., 2007; Hopkins et al., 1996; Rea & Parker as cited in Warmbrod, 2001).

In comparison by age, students age 25 or older completed courses at a higher rate than students 24 or younger. There were 942, or 74.53% nontraditional age \((\geq 25)\) completers as compared to 322, or 25.47% nontraditional age noncompleters. There were 770, or 64.98% of traditional age \((\leq 24)\) that were completers as compared to 415, or 35.02% of traditional age that were noncompleters. The differences between the cells were statistically significant \(\chi^2 (1, N = 2449) = 26.295, p < .001\), Cramer’s \(V = .104\). Residuals revealed that two categories contributed to statistical significance with more traditional age noncompleters than expected and less nontraditional age noncompleters than expected. Descriptors for chi-square magnitude of association in contingency tables indicated a weak association (Gall et al., 2007; Hopkins et al., 1996; Rea & Parker as cited in Warmbrod, 2001).

For definition by enrollment status, students enrolled part-time completed courses at a higher rate than students enrolled full-time. There were 1076, or 71.73% nontraditional part-time completers as compared to 424, or 28.27% part-time noncompleters. There were, 636 or 67.02%, traditional full-time completers compared to 313, or 33.98% full-time noncompleters. The
differences between the cells were statistically significant $\chi^2(1, N = 2449) = 6.143, p = .013$, Cramer’s $V = .050$. According to descriptors for chi-square magnitude of association in contingency tables, this was a negligible association (Gall et al., 2007; Hopkins et al., 1996; Rea & Parker as cited in Warmbrod, 2001). Residuals revealed that no one category contributed to statistical significance.

The logistic regression (revised model) was completed by entering the three defining characteristics of residency, age, and enrollment status (replacing the original tradition/nontraditional variable), and background variables of ethnicity, gender, prior GPA, degree seeking, experience, and academic integration variables, READI participation, orientation participation, and technical help seeking in a single binary logistic model with the dichotomous outcome variable of completion or noncompletion. Coding for the dichotomous replacement variables is presented in Table 16.

Table 16

<table>
<thead>
<tr>
<th>Variable</th>
<th>Code</th>
<th>Variable</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commuter</td>
<td>0</td>
<td>Noncommuter</td>
<td>1</td>
</tr>
<tr>
<td>Age $\leq 24$</td>
<td>0</td>
<td>Age $\geq 25$</td>
<td>1</td>
</tr>
<tr>
<td>Full-time</td>
<td>0</td>
<td>Part-time</td>
<td>1</td>
</tr>
</tbody>
</table>

Residency, age and enrollment status (replacement variables entered in the model), were found to be statistically significant in the revised model. Gender, prior GPA, and experience remained statistically significant in the revised model; ethnicity was significant and orientation was not statistically significant in the revised model. The results are presented in Table 17.
### Table 17

**Revised Model Binary Logistic Regression Results including Defining Characteristics**

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>95% C.I.</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residence</td>
<td>1.473</td>
<td>.134</td>
<td>121.036</td>
<td>1</td>
<td>.000**</td>
<td>4.360</td>
<td>3.354</td>
<td>5.668</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.272</td>
<td>.107</td>
<td>6.413</td>
<td>1</td>
<td>.011*</td>
<td>1.313</td>
<td>1.063</td>
<td>1.620</td>
<td></td>
</tr>
<tr>
<td>Enrollment</td>
<td>-.248</td>
<td>.110</td>
<td>5.104</td>
<td>1</td>
<td>.024*</td>
<td>.780</td>
<td>.629</td>
<td>.968</td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td>11.132</td>
<td>5</td>
<td>.049*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.308</td>
<td>.105</td>
<td>8.662</td>
<td>1</td>
<td>.003*</td>
<td>1.361</td>
<td>1.108</td>
<td>1.671</td>
<td></td>
</tr>
<tr>
<td>Prior GPA</td>
<td>.816</td>
<td>.060</td>
<td>186.740</td>
<td>1</td>
<td>.000**</td>
<td>2.262</td>
<td>2.012</td>
<td>2.543</td>
<td></td>
</tr>
<tr>
<td>Degree seeking</td>
<td>-.159</td>
<td>.260</td>
<td>.374</td>
<td>1</td>
<td>.541</td>
<td>.853</td>
<td>.512</td>
<td>1.421</td>
<td></td>
</tr>
<tr>
<td>Experience</td>
<td>-1.092</td>
<td>.129</td>
<td>71.918</td>
<td>1</td>
<td>.000**</td>
<td>.336</td>
<td>.261</td>
<td>.432</td>
<td></td>
</tr>
<tr>
<td>READI</td>
<td>.120</td>
<td>.237</td>
<td>.254</td>
<td>1</td>
<td>.614</td>
<td>1.127</td>
<td>.708</td>
<td>1.794</td>
<td></td>
</tr>
<tr>
<td>Orientation</td>
<td>.248</td>
<td>.173</td>
<td>2.049</td>
<td>1</td>
<td>.152</td>
<td>1.281</td>
<td>.913</td>
<td>1.798</td>
<td></td>
</tr>
<tr>
<td>Technical support</td>
<td>-.056</td>
<td>.287</td>
<td>.037</td>
<td>1</td>
<td>.847</td>
<td>.946</td>
<td>.539</td>
<td>1.660</td>
<td></td>
</tr>
</tbody>
</table>

*p < .05, ** p < .001

The three replacement variables will be discussed briefly. Residency was statistically significant at $p = .000$. The parameter estimate ($B$) of 1.473 indicated that when residency changed from 0 (commuter) to 1 (noncommuter) and all other independent variables were held constant, the log odds of a student completing online courses increased. The $\text{Exp}(B)$ of 4.360 indicated a positive relationship between noncommuter residency and course completion. A change in residency from commuter to noncommuter increased the odds of the
event of completion by about 4.5 times. The confidence interval around the odds ratio, 3.354 to 5.668, does not include the value of 1.0, indicating that the variable is a useful predictor in the logistic model (Garson, 2009).

Age was statistically significant at $p = .000$. The parameter estimate ($B$) of .272 indicated that when age changed from 0 ($\leq 24$ years of age) to 1 ($\geq 25$ years of age) and all other independent variables were held constant, the log odds of a student completing online courses increased. The $\text{Exp}(B)$ of 1.313 indicated a positive relationship between age $\geq 25$ years of age and course completion. The odds ratio of completion by students $\geq 25$ years of age to those that $\leq 24$ years of age was 1.313, or about 31% higher. The confidence interval around the odds ratio, 1.063 to 1.620, does not include the value of 1.0, indicating that the variable is a useful predictor in the logistic model (Garson, 2009).

Enrollment status was statistically significant at $p = .024$. The parameter estimate ($B$) of - .248 indicated that when enrollment status changed from 0 (full-time) to 1 (part-time) and all other independent variables were held constant, the log odds of a student completing online courses decreased. The $\text{Exp}(B)$ of .780 indicated a negative relationship between part-time enrollment and course completion. The odds ratio of completion by part-time students to full-time students was .780, or about 22% lower. The confidence interval around the odds ratio, .629 to .968, does not include the value of 1.0, indicating that the variable is a useful predictor in the logistic model (Garson, 2009). However, it should be noted that the results of logistic regression for enrollment status in relation to course completion, although significant, did not support the findings of chi-square analysis or correlation with students enrolled part-time having higher completion rates than those enrolled full-time.
The overall fit of the revised model was tested using the Hosmer-Lemeshow chi-square goodness-of-fit test. A finding of nonsignificance indicated that the model adequately fit the data. The result of the Hosmer-Lemeshow test is provided in Table 18.

Table 18

*Hosmer-Lemeshow Test for Defining Characteristics (Residency, Age, and Enrollment Status), Background and Academic Integration Variables and Course Completion and Noncompletion*

<table>
<thead>
<tr>
<th>Step</th>
<th>Chi-square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11.403</td>
<td>8</td>
<td>.186</td>
</tr>
</tbody>
</table>

A finding of significance in the Omnibus tests of model coefficients of the revised model demonstrated an adequate fit of the data to the model, meaning at least one of the predictors was significantly related to the dependent variable (Garson, 2009). Once again, the Enter method was used in analysis; therefore, there is no difference in the step, block or model results. The model was statistically significant at $p < .001$. Table 19 provides the Omnibus tests of model coefficients for the revised model.

Table 19

*Omnibus Tests of Model Coefficients for Revised Model: Defining Characteristics, Background and Academic Integration Variables and Course Completion and Noncompletion*

<table>
<thead>
<tr>
<th></th>
<th>Chi-square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 Step</td>
<td>507.043</td>
<td>15</td>
<td>.000</td>
</tr>
<tr>
<td>Block</td>
<td>507.043</td>
<td>15</td>
<td>.000</td>
</tr>
<tr>
<td>Model</td>
<td>507.043</td>
<td>15</td>
<td>.000**</td>
</tr>
</tbody>
</table>

**$p < .001$**
Classification tables tally correct and incorrect estimates in the model. Block 0, the null model, classified output for the model including only the intercept, with a cut value of 0.5. This is the proportional reduction in error definition of “chance hit rate” (Garson, 2009). Table 21 presents the classification table for the null model (constant), for the model and the revised model. In the null model (constant) in Table 20, the overall percentage of cases predicted correctly was 69.9%. In the model, the overall accuracy increased slightly to 73.4% with 93.1% of the completers and 27.5% of the noncompleters accurately predicted. In the revised model, the overall accuracy increased to 74.4% and the accuracy of the noncompleters increased to 37.4%; however, the accuracy of the completers decreased slightly to 90.4%.

Table 20

*Classification Table for Constant, Model and Revised Model*

<table>
<thead>
<tr>
<th>Observed Outcome</th>
<th>Predicted Completion Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Noncompletion</td>
</tr>
<tr>
<td>Step 0</td>
<td></td>
</tr>
<tr>
<td>Noncompletion</td>
<td>0</td>
</tr>
<tr>
<td>Completion</td>
<td>0</td>
</tr>
<tr>
<td>Overall percentage</td>
<td></td>
</tr>
<tr>
<td>Step 1 model</td>
<td></td>
</tr>
<tr>
<td>Noncompletion</td>
<td>203</td>
</tr>
<tr>
<td>Completion</td>
<td>118</td>
</tr>
<tr>
<td>Overall percentage</td>
<td></td>
</tr>
<tr>
<td>Step 1 revised model</td>
<td></td>
</tr>
<tr>
<td>Noncompletion</td>
<td>276</td>
</tr>
<tr>
<td>Completion</td>
<td>165</td>
</tr>
<tr>
<td>Overall percentage</td>
<td></td>
</tr>
</tbody>
</table>
Chi-Square Analysis and Cramer’s V for Orientation by Time Period

An additional 2 x 3 chi-square analysis for orientation participation by time period revealed statistically significant differences between completers and noncompleters on the basis of preterm orientation participation, early term orientation participation and nonparticipation with the highest rate of completion by those students that voluntarily participated in preterm orientations. There were 151, or 82.97% preterm orientation participant completers as compared to 31, or 17.03% preterm orientation participant noncompleters. There were 76, or 74.51% early term participant completers as compared to 26, or 25.49% early term participant noncompleters. There were 1485, or 68.59% nonparticipant completers as compared to 680, or 31.41% nonparticipant noncompleters. The differences between the cells were statistically significant $\chi^2 (2, N = 2449) = 17.565, p = < .001$, Cramer’s $V = .085$.

Summary

Hypotheses testing addressed four research questions that provided the focus for the present study. To address Research Question 1, are there statistically significant differences between completers and noncompleters on the basis of defining variable and background variables, six hypotheses were tested. Hypothesis 1, Hypothesis 2, Hypothesis 3, Hypothesis 5 and Hypothesis 6 were supported, indicating that there were statistically significant differences between completers and noncompleters on the basis of student definition, ethnicity, gender, experience and prior GPA with nontraditional, female, and novice students completing courses at a higher rate; completers having a mean prior GPA higher than the mean prior GPA of noncompleters; and among ethnicities completion rates ranked from highest to lowest by American Indian, Asian, White, Undisclosed or Unknown, Hispanic and Black students.
Hypothesis 4 was not supported, indicating that there was no significant difference between completers and noncompleters on the basis of degree seeking.

Research Question 2, are there statistically significant interactions between traditional and nontraditional, novice and experienced and READI participation, orientation participation, and technical help seeking, was tested with one hypothesis. The hypothesis was not supported. There were no statistically significant interactions between Definition x READI, Definition x Orientation, Definition x Technical support, Experience x READI, Experience X Orientation, and Experience x Technical support. Significance level for all interactions was $p > .05$.

Cramer’s $V$ correlation coefficient was used to examine the relationships between defining and background variables, academic variables and environmental variables and course completion and noncompletion, to test Hypothesis 8, and to address Research Question 3. The hypothesis was supported with statistically significant relationships at $p < .05$ for definition, among ethnicity, gender, experience and orientation. However, according to descriptors for chi-square magnitude of association in contingency tables, for definition, ethnicity, gender and orientation, the relationships were weak (Gall et al., 2007; Hopkins et al., 1996; Rea & Parker, as cited in Warmbrod, 2001). For experience, with novice students completing courses at a higher rate than experienced online students, the magnitude of the association was small to moderate.

Prior GPA correlation coefficient was found to be statistically significant at $p < .001$ with moderate effect size. Degree seeking, READI participation and technical support were not statistically significant. A sub-sample, $n = 128$, was used to determine the statistical significance, if any, of hours for study and hours for work and family obligations. Results of data analysis found hours for study significant at $p = .006$, with students self-reporting greater than 10 hours
for study completing courses at a higher rate than those reporting 10 hours or less. Number of hours for work and family obligations was not statistically significant.

Logistic regression was used to address Research Question 4 and test Hypothesis 9. The outcomes of logistic regression analysis revealed that definition, gender, prior GPA, experience, and orientation participation were statistically significant predictors of completion or noncompletion. Definition (nontraditional), female, higher prior GPA, and orientation participation were positively related to course completion. Experience was found to have a negative relationship with course completion.

Additional analyses were completed to examine the sub-classifications of traditional or nontraditional. There were statistically significant differences between completers and noncompleters on the basis of residency, age, and enrollment status. There were statistically significant relationships between residency, age, and enrollment status and completion and noncompletion. When substituting the three classification variables for defining variables, logistic regression revealed that residency, age, enrollment, gender, prior GPA and experience were statistically significant predictors of completion or noncompletion. Noncommuter residency (online only), ≥ 25 years of age, female gender, and higher prior GPA were found to have positive relationships with course completion. Part-time enrollment and experience were found to have negative relationships with course completion.

Additional analyses also revealed statistically significant differences and relationships for completion and noncompletion by preterm orientation participation, early term orientation participation and nonparticipation.

A discussion of findings, conclusions and recommendations for research and practice are presented in chapter 5.
CHAPTER FIVE

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Introduction

As community colleges strive to meet the growing demand for access to higher education through online learning, they are challenged to determine the factors and behaviors that most closely align with successful completion of online courses. Research has demonstrated that course completion and persistence is not the result of a single pre-entry characteristic or isolated experience within the institution, but instead, the outcome of a complex set of variables. Institutions’ primary strategy for reducing dropout is the early identification of students most likely to leave and implementation of strategies and interventions for those students (Summers, 2003). However, there has been little research regarding the effectiveness of institutional practices in the online environment (Motteram & Forrester, 2005). The findings from an application of an adapted version of Bean and Metzner’s conceptual model of nontraditional student attrition (1985) to single term course completion or noncompletion provides some evidence that, within a single term, student outcomes are related to multiple pre-entry characteristics, enrollment practices and behaviors that occur prior to or early in the term.

The purpose of this study was to examine differences and relationships in student definition and background characteristics, academic integration and environmental variables between and among community college students at a single institution who successfully completed and those who did not complete online courses. More specifically, differences and relationships between traditional and nontraditional and novice and experienced students on course completion, as well as, help seeking behaviors among students were investigated. Four
research questions were examined using chi-square analyses, $t$ test, analysis of variance, Cramer’s $V$, and logistic regression.

The results of data analysis revealed statistically significant differences between completers and noncompleters on the basis of definition and background characteristics; statistically significant relationships between defining and background characteristics, academic integration (help seeking behaviors), and the academic variable and course completion or noncompletion; and statistically significant defining, background, and academic integration predictors of online course completion. A summary of the findings, discussion and conclusions, and recommendations for research and practice, follows.

Findings

Summary of Findings for Research Question 1

Research Question 1 examined the differences in the participant sample between 1712 completers and 737 noncompleters on the basis of defining and background variables. Defining and background variables identified in Bean and Metzner’s conceptual model of nontraditional student attrition (1985) and characteristics of interest as identified through the review of previous research were included. Variables included traditional or nontraditional (as classified by characteristics of residency, age and enrollment status), ethnicity, gender, degree seeking, experience and prior GPA. Statistically significant differences were found for definition, ethnicity, gender, experience and prior GPA with higher rates of completion for nontraditional students as compared to traditional; higher rates of completion by ethnic origin for students identified as American Indian, Asian and White than for those identified as undisclosed, Hispanic and Black students; higher rates of completion for female students as compared to male students; and higher rates of completion by novice students as compared to students with prior
online experience. The mean prior GPA of completers was higher than the mean prior GPA of noncompleters. Differences by degree seeking were not found to be statistically significant.

Based on initial findings regarding definition, additional analyses were conducted regarding the classification variables of residency, age and enrollment status. Statistically significant differences were found for completion and noncompletion on the basis of residency, age and enrollment status with higher rates of completion for noncommuters (students enrolled online only), students age 25 or older and students enrolled part-time as compared to commuters (students taking face to face classes in addition to online), students age 24 or younger and students enrolled full-time.

Summary of Findings for Research Question 2

Research Question 2 examined the interactions between student groups, traditional and nontraditional, novice and experienced and the help seeking behaviors of READI participation, orientation participation and technical support on course grades. Data gathered from a sub-sample of 2017 students who received end-of-term grades were used for data analyses. Descriptive statistics by help seeking behavior revealed higher end-of-term grades for READI participants as compared to nonparticipants, for orientation participants as compared to nonparticipants, and for those who sought technical help as compared to those who did not. However, ANOVA analyses revealed there were no significant interactions between student groups and behaviors. Therefore, any differences between end-of-term grades could not be attributed to interactions by group and behavior.

Summary of Findings for Research Question 3

Research Question 3 addressed relationships between defining, background, academic variable (study hours), academic integration variables (READI, orientation, and technical help
seeking), and the environmental integration variable (hours for work or family responsibilities) and completion and noncompletion. When \( N = 2449 \), statistically significant relationships were found between definition, ethnicity, gender, prior GPA, experience and orientation and completion or noncompletion. The relationships with completion by definition, ethnicity, gender and orientation were weak, with the relationships by experience and prior GPA small to moderate. Degree seeking, READI participation and technical help seeking were not found to have significant relationships with completion or noncompletion.

Limited data was available for examination by study hours and hours for work and family obligations. Data was collected from a sub-group of participants that completed the READI assessment, \( n = 128 \). The relationship between study hours (academic variable) and course completion and noncompletion was found to be statistically significant. Students that had self-reported more than 10 hours available for online coursework completed courses at a higher rate than those that had self-reported 10 hours or less available for online coursework. The effect size was moderate. The relationship between hours available for work and family obligations (environmental variable), was not found to be statistically significant.

**Summary of Findings for Research Question 4**

The fourth research question examined whether student definition, ethnicity, gender, prior GPA, degree seeking, experience, READI, orientation participation and technical help seeking predicted the likelihood of course completion. The results of logistic regression indicated that definition, gender, prior GPA, experience and orientation were significant predictors with positive relationships between nontraditional, female, higher prior GPA, orientation participation and the likelihood of completion. With regard to experience, the results showed that the odds ratio was lower for experienced students as compared to novice students.
Conclusions

The challenge presented by current economic conditions driving individuals to reenroll or initiate college coursework, the need by students to continue to work as they attend college resulting in the increased demand for flexibility in the time and place for learning, in combination with the infusion of technology in every aspect of students’ lives may give the impression that online learning is the perfect institutional solution. However, being exposed to technology, or having the need to access higher education by alternate means, does not translate to automatic success as an online student. The findings of this study offer support for prior research and some new evidence suggesting characteristics and behaviors that are related to course completion. These findings may help to guide efforts by institutions to develop strategies that help transition the student toward successful online course outcomes.

Conclusions for Research Question 1

The findings provide some support for previous research. In a study of pre-entry variables related to course completion and noncompletion in university online classes, Dupin-Bryant (2004) found cumulative grade point average a significant discriminating variable of completion and noncompletion. Aragon and Johnson (2008) used chi-square analyses and found small but significant differences on the basis of gender and prior GPA. In contrast to the present study, Aragon and Johnson did not find significant differences on the basis of ethnicity and age. In a study of the relationship between demographic variables, epistemological beliefs and the readiness of learners to be self-directed, Boden et al. (2005/2006) found gender and age to be significant variables and suggested that different learning styles and developmental stage were influential in the student’s ability to be self-directed. Although the level of interaction within courses is increasing, the online learning environment is largely self-directed, with the
requirement for students to work independently. Powell et al. (1990) found females to be more successful than males in the online environment; however, the results suggested the outcomes were at least partially attributed to course selection. Given the higher completion rate by older students and female gender in the present study, it should be recognized that multiple factors not controlled for within the study may influence these findings.

The findings by experience indicated that novice students completed courses at a higher rate than experienced students. This finding did not support previous research findings. Previous research has found prior experience to be positively related to course completion or nonsignificant (Dupin-Bryant, 2004; Kemp, 2002; Thompson, 1997). The statistical significance and large margin between novice and experience rates of course completion (81.25% and 65.76%, respectively), indicates a need for further examination. The present study did not evaluate the results of previous online enrollment by those students designated as experienced, nor was the level of experience examined. Novice, or first time, enrollment in distance learning courses was the reference group with all others listed as experienced. No restriction was made to the designation based on outcomes, completion or noncompletion, for prior enrollments. Results indicate the need to examine whether returning online students were successful in online classes in prior terms and to further evaluate the reasons for noncompletion. Additionally, findings indicate the need to recognize that experienced online students are no less at-risk than novice students. This is an important finding but indicates the need for future research which will be discussed in subsequent sections.

No literature was found that addressed the differences between completion and noncompletion on the basis of students enrolled exclusively online as compared to students enrolled in online courses in addition to face to face courses. For the purposes of this research, a
residency classification for online students was created; the residency classification of the model was not used, nor was a similar definition found in the literature.

The finding that indicates that noncommuters (students enrolled exclusively online) were more successful than commuters may suggest the emerging differences between students who are self-selecting learning through the use of computer mediated instruction, those that prefer the self-directed independent nature of online learning, those that, due to family or work needs, need access to higher education without coming to a physical campus and students that enroll in online courses in addition to face to face as a means of gaining flexibility. In identification of the successful online learner, Palloff and Pratt (2003) made this comparison:

Time management is an important issue for students to think about before beginning a course. Generally speaking, students who are taking courses face-to-face gauge their time based on when classes meet. They may wait to complete their reading until the day before class or the day of class. The same may be true for completing assignments. But, the pacing of an online course is different. Because class never officially “meets” and is ongoing throughout the week, students need to find new ways to pace themselves in order to keep up with reading, posting to the discussion, and completing assignments. (p. 68)

Based on the limits of this study, the underlying reasons for higher rates of completion by noncommuters as compared to commuters are unknown. However, this finding indicates the need to make specific recommendations in institutional practices, as well as, recommendations for future research. The recommendations will be discussed in the upcoming sections.

Conclusions for Research Question 2

The finding that there were significant main effects, but no significant interactions between traditional and nontraditional, novice and experienced students and help seeking
behaviors of READI participation, orientation participation, and technical help seeking on course grade(s) warrants further examination. It is possible that limited participation within the participant sample in relation to group size affected the data analyses. Given the present sample and data analyses, one can only conclude that course grades were not affected by the interaction of student definition and READI participation, orientation participation and or technical help seeking; and they were not affected by the interaction between experience and READI, orientation participation and or technical help seeking.

Conclusions for Research Question 3

The findings of statistically significant relationships between definition, ethnicity, gender, experience, orientation participation, prior GPA and course completion or noncompletion, although of varying levels of strength, weak to moderate, provide support for practical consideration of the adapted model and inclusion of the variables in the framework. According to Gall et al. (2007), “many factors influence the behavior patterns and personal characteristics of primary interest to educations. Therefore, the influence of any one factor is not likely to be large” (p. 377).

As was previously discussed, the findings with regard to ethnicity, gender, and prior GPA generally support what has been found through previous research. Throughout the literature, GPA and prior academic performance have been found to have statistically significant relationships with completion, both onsite and online (Aragon & Johnson, 2008; Carr, 2000; Diaz, 2002; Morris et al., 2005, Summers, 2003). Although the focus of the present study is online completion, in a study of first-time full-time students in community college, Craig and Ward (2008) found cumulative GPA to be the student factor most strongly related to student
success. The finding demonstrates that similarities exist across all modalities of learning; successful students will most likely succeed across environments.

The relationships found by gender and ethnicity may indicate a variety of underlying relationships that were not part of the existing study. In prior research, ethnicity has not generally been found to be statistically significant; however, in several studies, gender (female to male) has been shown to have a significant relationship with completion (Aragon & Johnson, 2008; Boden et al., 2005/2006; Powell et al., 1990). Researchers should continue to evaluate the underlying relationships and address both the differing enrollment patterns by males and females as well as the differing outcomes.

Students’ practices with regard to three institutional support resources (academic integration variables) in relation to course outcomes were examined in the study. Of the three academic integration variables, voluntary participation by students to complete the READI assessment, participation in orientations to prepare for online learning, and contacting technical support, only orientation participation was found to be of statistical significance in relation to completion or course completion. Additional analyses indicated the highest rate of completion was by preterm orientation participants, followed by early term participants and nonparticipants.

This finding suggests some initial evidence to support the call throughout the literature for institutions to provide orientations specifically for online students (Lynch, 2001; Motteram & Forrester, 2005; Scagnoli, 2001). Although orientations are typically targeted to students new to the online learning environment, the findings by experience in the present study may indicate that the need to attend orientation may not only exist for students new to the online environment but may also provide critical assistance to those students who are experienced but were
previously unsuccessful in the online learning environment. This will be presented in recommendations for research.

Although the relationship between READI participation and course completion was not statistically significant, a brief discussion is warranted. The purpose of the READI assessment is to help students to determine their level of readiness for online learning prior to enrollment.

From READI administrative database records, it was determined that 377 prospective students participated in READI assessment between August 2008 and the end of spring registration but only 193 subsequently enrolled. Of those 193, 128, with only 125 meeting the defined parameters for participation or nonparticipation, were included in the participant sample. The conclusion might be drawn that the READI assessment was successful in informing some students that distance learning was not a good fit. Recommendations for research regarding preassessment will be discussed.

The relationship of technical support and course completion was not found to be statistically significant. At the onset of spring 2009, there were no known technical issues. It is unknown whether the level of technical issues encountered would result in changes in the help seeking behaviors of students. Karabenick and Knapp (1991) investigated the relationship of academic help seeking to the use of learning strategies and achievement behavior in college students. The findings indicated that many students never seek help to overcome what may be insurmountable deficiencies. With the implementation of new resources for student support, an understanding of the barriers to seeking help is needed so that strategies can be developed to assist students in overcoming the roadblocks to seeking assistance.

Examination of a sub-group of participants revealed a statistically significant relationship between number of hours available for study and course completion. Students self-reporting
more hours available for study completed courses at a higher rate. This finding supports prior research by Powell et al. (1990) that found that students who said they had a regular place for study, regular times for study and generously estimated the study time needed to complete courses were more likely to pass.

**Conclusions for Research Question 4**

The findings support the use of a model that includes multiple variables in predicting course completion. The study examined three components of Bean and Metzner’s (1985) model which contained 11 variables of interest. Two of the variables were removed from the full model analysis. Of the remaining nine, five variables were found to be statistically significant and should be included in data analysis for subsequent terms at the single institution. Of the predictors, prior GPA findings indicated that for every one unit increase in GPA, the odds of course completion were 2.24 times higher. The remaining variables of significance indicated increased odds of completion for nontraditional definition, orientation participation, and female gender. The odds of completion decreased with experience.

Additionally, when characteristic variables were substituted in the model in place of the definition variables (as part of additional analyses) the odds of completion was 4.36 times higher for students enrolled in online courses exclusively than for those that enrolled in online courses in combination with face to face courses. Age and enrollment status were also significant, with the odds of completion increasing for students 25 or older as compared to students 24 or younger and odds decreasing for part-time enrollment as compared to full-time.

The application of the adapted version of a conceptual model that has been the subject of considerable research proved to be more efficient than taking a shotgun approach (Gall et al., 2007). The majority of the variables were found to be of significance. The lack of significance
for degree seeking may indicate that the choice for measuring educational goals was not appropriate.

Additionally, results of analyses confirm the significance of those variables previously identified by Bean and Metzner (1985) as important to single term academic outcomes. Due to the limitations of the number of participants that completed the READI assessment, although not statistically significant, the number of hours for work or family responsibilities should remain in the model. Subsequent research should move forward to examine persistence by including the remaining variables of the model, as applicable to online learning.

Recommendations for Practice

First Recommendation for Practice

The only help seeking behavior found to be statistically significant in relation to course completion and as an indicator of the likelihood of course completion, was orientation participation. This initial finding offers some evidence suggesting that students who voluntarily participate in orientation are more likely to complete online courses. On the basis of prior research findings (Lynch, 2001; Milligan & Buckenmeyer, 2008; Motteram & Forrester, 2005; Pascarella et al., 1986), the call for orientations and early interventions for online and nontraditional students found throughout the literature (Bambara et al., 2009; Liu et al., 2007; Palloff & Pratt, 2003; Rovai, 2003; Scagnoli, 2001; Schuetz, 2005), and the findings of this study with regard to orientation participation at a single institution, the following recommendations for institutional practice are identified:

1. Preterm orientation should be required for any first time online student with a GPA below 2.0.

2. Preterm orientation should be strongly encouraged for all first time online students.
3. Preterm orientation should be strongly encouraged for students previously unsuccessful (F or W) in online courses.

4. Preterm orientation should be recommended for all students enrolled online that have not previously attended an orientation.

5. Preterm orientation should be strongly encouraged for all students when a significant technology change is planned by the institution.

At the present time at the single institution, orientations are offered either onsite face to face, live interactive online or self-paced online and take place on a single occasion. With the knowledge that experienced students may also be at risk, it is recommended that the institution evaluate the addition of an ongoing series of workshops, the development of an online orientation course available to students throughout semester within the current course management system, and the development of orientations targeting the specific needs of new and returning students.

Second Recommendation for Practice

Student services personnel such as online student support center staff, academic advisors, admissions personnel and others working with prospective online students should be made aware of the results of scholarly research and the findings of the initial institutional study so they can better inform those students expressing interest in online courses. In addition, the institutional questions currently made available through the READI assessment should be duplicated and provided to academic advisors and online support personnel so that they can routinely ask students the questions during advisement appointments and continue to gather data. Information to be communicated:
1. Recommendation for advisors to examine prior GPA and current academic status of prospective online students to guide students with lower GPA to face to face learning environments or at a minimum to inform them of the risks identified through present and prior research with regard to the relationship between academic performance and online completion.

2. Academic advisors should be made aware of the number of at-risk experienced students in the online environment and be prepared to routinely examine previous online outcomes when advising students with regard to second or third term online enrollment.

3. Advisors, faculty, and online support staff personnel should provide explanation to students of the additional challenges present in online learning when students are separated by time and distance from instructor, the challenges that can be faced with the addition of technology to the learning environment and the need for self-direction and time management skills by online students.

4. Advisors, faculty and online support personnel should be made aware of the potential for students to enroll in online classes (particularly those already enrolled in face to face classes) due to perception of flexibility and the perception that online classes are easier.

5. Academic advisors, faculty and online support personnel should inform all students of the time demands for online learning so that they are aware of the differences in time management between face to face and online learning (although reasons for statistical significance based on residency are unknown, the recommendation is included due to prior research findings, review of literature and the results of this study).

6. Academic advisors, faculty and online student support personnel should be made aware of the initial findings of this study and prior research (Powell et al., 1990) regarding
relationship between hours of study available and completion and, when asking the institutional questions, caution those students from enrolling that indicate they have less than ten hours available for study.

*Third Recommendation for Practice*

Community colleges typically offer a number of resources for online students; however, a model for support does not currently exist. Results will be shared with peer institutions in an effort to continue conversations regarding the support services that are currently being used by community colleges or are being considered for support of online students.

*Fourth Recommendation for Practice*

The results add support for the continued growth of programs and courses for those students that are taking courses exclusively online. In addition to the knowledge that there are a statistically significant differences and relationships between commuters and noncommuters and course completion, the knowledge that residency (noncommuter) is positively related to course completion should encourage institutions to continue to create avenues for those students taking classes exclusively online. The increased demand for accountability in student outcomes would suggest that those course formats that are not perceived as contributing to course retention and student persistence may see limited growth. The results of this study may contribute to the understanding by institutional decision makers and educational policy makers that online degrees and programs can successfully meet the needs of students accessing higher education through online education while maintaining standards of completion for online students.
Recommendations for Research

First Recommendation for Research

Based on the findings by experience, further examination of the sub-group of students identified as experienced, classified as noncompleters is needed. The variables in the study should be subject to data analysis for the sub-group identified. Additionally, as the study moves to examination of student persistence, successful novice students from the initial term of study should be tracked with regard to subsequent online enrollment and completion or noncompletion. Upon completion of data analyses, a survey instrument should be developed and distributed to students that were found to be previous completers, to evaluate reasons for subsequent noncompletion.

Second Recommendation for Research

The study yielded statistically significant results for a single institution in a single term. The study should be replicated by other community colleges to determine if similar results could be found for differences and relationships between defining, background, academic integration, academic and the environmental variable and course completion and noncompletion across community colleges. With regard to online student support, institutions could substitute any form of preassessment tool used by their institution, any orientation session, course or materials provided to online students, and evidence of technical support. Results could contribute significantly to the development of a model for online student support.
**Third Recommendation for Research**

The study should be replicated within the institution with data from several terms and should be extended to include the additional components not studied in the current research to examine student persistence in online courses or programs. The model adapted from Bean and Metzner’s (1985) conceptual model of nontraditional student attrition, with the addition of variables of institutional interest, was found to be a good fit for predicting course completion. It is recommended that it be evaluated as a model for student persistence.

**Fourth Recommendation for Research**

Further examination of the sub-group of students identified as commuters and noncommuters is needed. The variables in the study should be subject to data analysis for the sub-group identified. Those students in each group that were found to be noncompleters should be contacted or surveyed to gather information regarding the reasons for noncompletion and to determine the differences, if any, that exist between commuters and noncommuters that contribute to noncompletion.

**Fifth Recommendation for Research**

This study provides support for previous research findings which identified that more females enrolled and completed online courses. Further research is needed to examine the reasons why more females enroll and why they are completing courses at a higher rate than males.

**Sixth Recommendation for Research**

Further research is needed to examine the impact of preassessment on student course completion. The initial findings of nonsignificance for students’ behavior with regard to voluntary READI participation and course completion were limited to examination of behavior
toward participation. The results of READI assessment and the evidence of students’ subsequent enrollment decisions and the relationship of the results of READI assessment to course completion should be examined.

Summary

The findings of this study provide initial information to the institution and others seeking to determine those factors that most closely align with student success in the online environment and those that may indicate a student at risk for online course completion. The examination of pre-entry characteristics in the form of defining and background variables, is not be used to establish admission criteria for online classes, but instead to increase awareness of, and direction for, greater understanding of the relationships that exist. The findings support previous research with regard to prior GPA and gender. Findings regarding residency and experience contribute to new findings and indicate research that is needed both at the institutional level and across institutions.

As an initial study of the behaviors of students with regard to voluntary participation in preassessment, orientations, and technical support, findings were limited. Although students’ voluntary participation in orientation was found to have a statistically significant relationship with completion, the relationship was weak. Additional research is needed to evaluate students’ behaviors in relation to satisfaction and persistence, as well as, examination of behaviors in relation to course completion over several terms.

Recommendations for practice include continued practice of orientations with increased direction for select populations of online students based on experience, academic standing, and previous online outcomes; recommendations for shared discussion with peer community colleges and recommendations for academic advisors, faculty, and online student support personnel
regarding students that may be at increased risk for online course noncompletion.

Recommendations for research include replication of the study within the institution as a persistence model and replication of the study by other community colleges. Further study is needed to determine why the differences in outcomes exist between commuters and noncommuters and novice and experienced students. Further study is needed to examine the differences by enrollment and outcomes between males and females.

The results of the study are important to institutional decision makers and, although limited to a single, multi-campus community college district in Texas, may provide insights to other community colleges trying to determine practices and strategies for improving outcomes for online students.
APPENDIX

READI PERSONAL INFORMATION
Personal Information

First Name

Last Name

Email

Your email address is never released to third party as stated in our privacy policy.

Re-Enter Email

Note: Re-entering your email will help avoid typos, please enter your email just as you did above.

Age Range

Gender

Ethnicity

How many online courses have you taken before?

Other Information

What time of day and/or segment of the week best describes when you plan to complete your online coursework? (Choose all that apply)

- 8 am - 6 pm (Mon - Fri)
- 6 pm - 9 pm (Mon - Fri)
- 9 pm - 12 pm (Mon - Fri)
- After midnight (Mon - Fri)
- Sat and Sun

How many hours a week do you have for your online coursework?

How many hours a week do you work and/or take care of family obligations?

If you are a ____________ student, please enter your college wide ID (CWID).
Are you aware of the services and support available through the Online Student Support Center (located at the campus)?

- [ ] Yes
- [ ] No

Assessment Progress

- Personal Information
- Personal Attributes
- Learning Styles
- Reading Rate & Recall
- Technical Competency
- Technical Knowledge
- Typing Speed & Accuracy
- Confirm Email Address
- Results

I need help

Click here for technical support

REFERENCE LIST


House, J.D. (1999). The effect of entering characteristics and instructional experiences on student satisfaction and degree completion: An application of the input-environment-


Rovai, A.P. (2003). In search of higher persistence rates in distance education online programs. *Internet and Higher Education, 6*, 1-16.


http://www.thecb.state.tx.us/Reports/PDF/1699.PDF


