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Academic Predictors of Online Course Success in the Community College

Christy D. Hawkins
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**ACADEMIC PREDICTORS OF ONLINE COURSE SUCCESS IN
THE COMMUNITY COLLEGE**

by

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A Dissertation Submitted to the Faculty of
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ABSTRACT

ACADEMIC PREDICTORS OF ONLINE COURSE SUCCESS IN THE COMMUNITY COLLEGE

Christy D. Hawkins
Old Dominion University, 2012
Advisor: Dr. Philip A. Reed

The purpose of this study was to identify academic factors that might predict online course success for community college students. Online course success was a focus of national research and debate as studies consistently indicated lower success rates in online courses as compared to traditional courses; however, research that identified academic predictors to guide the development of policies and services that support student success in online courses was limited.

A random sample of 20 online course sections held at one multi-campus, urban community college resulted in 491 enrollees being examined for seventy-eight factors that might predict online course success. Factors present prior to online course enrollment included GPA; test scores; developmental coursework in reading, writing, and mathematics; college-level coursework in specific disciplines; and enrollment history. Factors present during the semester of online course enrollment included student status, current enrollment measures such as total number of courses attempted, total credits, and course duration. Demographic factors included gender, age, race/ethnicity, financial aid status, and geographic proximity to campus.

Data extracted from the student registration system included demographic characteristics, course rosters, test scores, and enrollment history. Data were grouped into three blocks prior to analysis: demographics, academic factors prior to online enrollment,

and academic factors during online enrollment. An unordered logistical regression evaluated the predictive value of these factors for online course success.

Results of the logistical regression analysis indicated that the predictor model did not provide a statistically significant improvement over the constant-only model; the addition of variables did not improve the ability to predict the outcome, online course success. Continued analysis identified four statistically significant predictors of online course success in community college students. For factors measured prior to enrollment, cumulative college GPA was a positive predictor of online course success. For demographic factors, geographic proximity to campus was a negative predictor of online course success. For factors present during enrollment, total courses attempted (during the semester studied) was a positive predictor, and total credits attempted (during the semester studied) was a negative predictor of online course success.

The researcher concluded that online course success in community college students was a complex issue that could not be explained by academic factors alone and suggested that future studies attempting to predict online course success in community college students be comprehensive in addressing the multitude of academic, social, and other factors that may influence online course success. Additional suggestions for further study included evaluating the relationship individual factors have to online course success and seeking out student perspectives regarding online courses to determine other factors that contribute to successful and unsuccessful online course experiences for community college students.

DEDICATION

My dissertation is dedicated to the memory of Tiffany, Jake, and Dorothy. Thank you for leaving me with cherished memories, teaching me hard lessons, and helping me to maintain perspective on life's journey.

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An accomplishment such as this does not come quickly or without a lot of help. Thus, I want to take this opportunity to acknowledge the many people in my life who have contributed to my success at this milestone.

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CHAPTER I

INTRODUCTION

Online learning removed barriers of time and place for students, allowing many who might not otherwise have access to higher education an opportunity to gain transferrable job and life skills (Hawkins, 2009). Over the past decade, online course enrollment soared at institutions of higher education in the United States. The National Center for Educational Statistics (NCES, 2011) reported that distance education courses accounted for nearly three million undergraduate enrollments in the 2003-04 academic year. Four years later, distance enrollments were nearly 4.3 million with 20% of undergraduates completing at least one course online and 4% completing their entire program online (NCES, 2011). In that same time frame, two-year institutions produced more than 50% of all undergraduate online course enrollments and were the fastest growing segment of online higher education (Allen & Seaman, 2007).

Although popularity of the online learning environment increased, online course retention, the continued participation of a student in the same course, remained a significant challenge. Empirical studies demonstrated the broad discrepancy in online course retention rates at the post-secondary level. Diaz (2002) compared online and face-to-face versions of health education courses held at one college over three semesters. Although achievement at the end of each semester revealed higher grades for the online students, drop rates were almost twice as high for online students (13.5%) as for those in face-to-face courses (7.2%). In a case study of distance learning at a university serving primarily working adults, Lynch (2001) found drop rates of 35-50% in online courses as compared to 14% for face-to-face courses. Thus, though the exact discrepancy in

retention varies, retention in online courses at the post-secondary level was consistently lower than that seen in face-to-face courses (Diaz, 2002; Lynch, 2001; Manchura, 2004; Nelson, 2006).

Attempts to describe the underlying causes of this discrepancy abounded with the majority focused on online course retention from the perspectives of student performance, student satisfaction, or as they related to specific instructional methodologies and technologies. Researchers attempted to draw conclusions about student retention by comparing grades in online and face-to-face courses (Ashkeboussi, 2001; Davies & Graft, 2005; Edmunds, 2006). Others evaluated student satisfaction with individual courses and programs, asserting that a satisfied student was more likely to remain in and complete a course (Barakzai & Fraser, 2005; Fearing & Riley, 2005; Willging & Johnson, 2004). Still others scrutinized the impact of specific instructional methodologies on student engagement, retention, and satisfaction with the course (Jin, 2005; Poole, 2000; Simpson & Du, 2004; Wang, 2007). These efforts described some of the behaviors exhibited in online course environments, but a comprehensive set of predictors for online course retention had yet to be developed.

Statement of Problem

The purpose of this study was to identify academic factors that might predict online course success for community college students.

Research Objectives

Specifically, this study examined academic factors of online course enrollees to answer the following research questions:

1. What academic factors measured prior to online course enrollment might be predictors of online course success for community college students?
2. What academic factors present during enrollment in the online course might be predictors of online course success for community college students?

Background and Significance

Research has shown that the nature of the online learning environment required high initiative, autonomy, and time management skills, and a lack of these attributes was thought to contribute to decreased student retention (Holder, 2007; Vonderwell & Zachariah, 2005). As a result, some institutions of higher learning used screening instruments to help students determine if online courses provided an appropriate learning environment to meet their individual needs (Liu, Gomez, Khan, & Yen, 2007).

Although these instruments assessed some combination of motivational factors, personal characteristics, and technology skills that characterized the “ideal” online learner, most institutions did not restrict enrollment to those that displayed these characteristics; instead, assessments were intended as guides for students to self-select out of online courses (Liu et al., 2007). Though the intent was admirable, the benefit was lacking for the student that failed to comprehend the assessment, heed the warning, and act based on the results.

Why was retention so important to student success in higher education?

Retention was a critical link in the chain of educational attainment. The relationship of retention to accomplishing educational goals was easy to recognize: one must complete individual courses in order to complete an entire degree or credential. Liu et al. (2007)

emphasized the study of retention not in terms of benefits but by highlighting the damage that results when students are not retained. "The costs of course drop out are borne by the student in terms of lost potential, by community colleges in terms of lost revenue, and by the society in terms of lost productivity" (Liu et al., 2007, p. 520). With continued demand for flexible online learning environments, assembling an accurate inventory of factors that might predict retention was critical to these students, colleges, and communities.

Online course retention was a focus of national research and debate as well as a consideration of policy and practice at individual colleges and within college systems. In 2004, the chancellor of the Virginia Community College System (VCCS) established a system-wide, five-year strategic plan with general directives to increase student enrollment, retention, and graduation rates by 2009 (VCCS, 2009). One method of increasing total enrollment was to increase enrollment in distance learning throughout the community college system.

From the 2001 to 2006 academic year, the number of distance learning enrollments in the system of 23 Virginia community colleges more than doubled from 34,718 to 73,871 (VCCS, 2007). By the 2009-2010 academic year, distance learning enrollments accounted for 43.7% of the total enrollment and 23% of the full-time equivalents (FTEs) in the community college system with 122,974 enrollments (VCCS, 2012a). Although the definition of distance learning used by the VCCS included technologies other than online courses, web-based instruction accounted for the great majority of distance learning enrollments. A report released by the VCCS in 2008 stated that approximately one-third of all students completed at least one online course during

their program of study. However, a system-wide online course withdrawal rate of 17% as compared to 10% for face-to-face courses (Farrell, 2008) and 11% discrepancy in success rates between online and face-to-face courses (VCCS, 2009) confirmed that the Virginia Community College System experienced similar retention challenges to those common throughout higher education.

The outcomes of this study offered a significant contribution to higher education, particularly at the community college level. Though previous studies examined predictors of online course success, this study was unique in its approach because it examined a comprehensive list of academic factors during two timeframes, both prior to and during enrollment in an online course. No empirical evidence was found to indicate that developmental course enrollment, concurrent online course enrollment, disability status, or military status were previously evaluated as predictors of online course success in community college students. Thus, inclusion of these variables as part of the retention puzzle not only made this study unique, but it also filled gaps in the academic literature. Finally, from a practical perspective, identified predictors might be used to guide advising sessions, develop or enhance student support services (Dupin-Bryant, 2004), establish prerequisites and policies that limit online course enrollment to those students most suited to success in the online environment (Hawkins, 2009), or implement an 'early warning system' for students with few or decreased factors for online course success.

Limitations

The following limitations applied to this study:

- The population was limited to students enrolled in online courses at one urban, multi-campus community college.
- The method of course delivery was limited to asynchronous online courses distributed through Blackboard[®] course management software.
- Measurement of pre-entry reading, writing, and mathematics skills was limited to those evaluated with COMPASS placement tests.
- This study was limited to academic factors that might predict online course success. Demographic factors were also included.

The factors examined in this study were selected based on identified gaps found in the literature. It is possible that additional variables were overlooked. These limitations affected the ability to generalize the results of this study to dissimilar populations but served as a starting point for future studies.

Assumptions

The following assumptions applied to this study:

- The subjects had access to instructional technology resources if problems were encountered.
- The subjects had access to adequate computer technology (e.g., high speed connection, software programs, speakers) to receive the course.
- All attempts at developmental and collegiate coursework were recorded in the community college system or, if completed at another institution, present on the academic transcript.

Procedures

The subjects in this study were students completing online courses delivered via Blackboard[®] course management software at one urban, multi-campus community college in the Mid-Atlantic region of the United States. Enrollees in a random sample of online courses held in the Fall 2009 semester were evaluated for academic factors that might predict online course success. For the purposes of this study and consistency with other studies of similar populations, the dependent variable, course success, was defined as receiving a passing grade (A, B, or C) and non-success as receiving a non-passing grade (D, F, W, or I).

Factors examined in the study were divided into three categories: those present prior to online course enrollment, those present during online course enrollment, and demographic factors. Factors present prior to online course enrollment included GPA; test scores; developmental coursework in reading, writing, and mathematics; college-level coursework in specific disciplines; and enrollment history. Factors present during the semester of online course enrollment included GPA, student status, current enrollment, and course duration. The rationale for inclusion of each factor was outlined in the next chapter.

Demographic variables collected for the purpose of describing the sample and ensuring consistency with the distribution of those characteristics in the population of students completing online courses at the individual community college included gender, age, race/ethnicity, marital status, military status, receipt of financial aid, geographic proximity to campus, and disability status. Course attributes collected for the purpose of organizing the data included academic semester, course discipline, course number, and

section number. Data were collected from course rosters, queries from the student registration system, and academic transcripts.

An unordered logistical regression evaluated the predictive value of academic factors on online course success in community college students. This statistical method was selected for its ability to predict the impact of multiple factors (independent variables) on a dichotomous criterion (dependent) variable. Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 15 software.

Definition of Terms

To establish a general understanding of special terms associated with this research study, the following definitions are provided for the benefit of the reader.

Attrition referred to the discontinuance of participation of a student in a program through failure to enroll in subsequent semesters (Berger & Lyon, 2005). The opposite of attrition was persistence. The literature referenced both concepts, the main difference between the two lying in the focus on positive (persistence) or negative (attrition) aspects. Refer to the definitions for persistence and retention to distinguish between these concepts.

Blackboard[®], often described as a learning management system, was a proprietary software used to organize and deliver online courses. Blackboard[®] hosted the online courses in this study.

Course retention was defined as continued course enrollment without withdrawal (Jeffreys, 2004). Because of the precedent established in the literature to use the terms *course retention* and *course success* interchangeably, for the purposes of this study, the terms were assumed to be the same unless otherwise specified.

Course success was defined in a variety of ways in the literature. For the purposes of this study, course success was defined as receiving a passing grade of A, B, or C. Non-success was defined as receiving a grade of D, F, W, or I. While a grade of D was considered passing, it was not a transferrable grade. Further, the Virginia Community College System (Farrell, 2008) included D as an unsuccessful or non-productive grade. Because of the precedent established in the literature to use the terms *course success* and *course retention* interchangeably, for the purposes of this study, the terms were assumed to be the same unless otherwise specified.

Developmental course referred to a course designed to correct skill deficiencies in a fundamental area such as reading, writing, or mathematics. Those students deemed to have skill deficiencies were required to complete developmental courses. Developmental courses were typically held in the collegiate setting, graded as pass/fail, and did not count toward degree or graduation requirements (Beatty, 2003).

Distance and distributive learning referred to instruction that took place via distance with part or all of the instruction using a technology other than the web for delivery. By contrast, the terms *online learning* and *web-based instruction* were used interchangeably to refer to instruction that took place via the Internet with no required in-person meetings.

Face-to-face course described courses that took place in a classroom with both the instructor and student present at the same time. Another term used to describe this type of course was *brick and mortar course*, referring to the facility in which the

course was held. *Traditional course* and *face-to-face course* were used interchangeably to describe this type of course in this study.

Grade point average (GPA) referred to a measure of academic performance. Beatty (2003) defined grade point average as the numeric average when grades of A=4, B=3, C=2, D=1, and F=0. Grade point averages were calculated for an individual semester and for all college coursework (termed a cumulative grade point average). From this point forward, grade point average was referred to by the acronym, GPA.

Online learning referred to instruction that took place via the Internet with no required in-person meetings. In this study, the terms *online learning* and *web-based instruction* were used interchangeably to refer to the same instructional method. By contrast, the term *distance learning and distributive learning* were used to describe instruction that took place via distance with part or all of the instruction using a technology other than the Internet for delivery.

Persistence referred to the continued participation of a student in subsequent courses, usually toward a goal of completing a particular program or degree (Berger & Lyon, 2005). Attrition was the opposite of persistence. The literature referenced both concepts; the main difference between the two lying in the focus on positive (persistence) or negative (attrition) aspects. Refer to the definitions of attrition and retention to distinguish between these concepts.

Placement test referred to reading, writing, and mathematics assessments used to determine if a student has the requisite skills for college-level coursework in these disciplines. COMPASS^R, College Placement Test (CPT), and ASSET^R are

commonly cited in the literature as placement tests used for community college students (Ames, 2003; Aragon & Johnson, 2008; Leal, 2008; Wojciechowski & Palmer, 2005).

Retention referred to the continuation of a student in a single course or a program of study. Though it typically refers to the latter, for the purposes of this study, the term retention will be synonymous with course success unless otherwise noted. Refer to the definitions of attrition and persistence to distinguish between these concepts.

Traditional course described courses that took place in a classroom with both the instructor and student present at the same time. Another term used to describe this type of course was *brick and mortar course*, referring to the facility in which the course was held. *Face-to-face course* was also used to describe this type of course and the terms were used interchangeably in this study.

Web-based instruction referred to instruction that took place via the Internet with no required in-person meetings. In this study, the terms *online learning* and *web-based instruction* were used interchangeably to refer to the same instructional method. By contrast, the term *distance learning and distributive learning* were used to describe instruction that took place via distance with part or all of the instruction using a technology other than the Internet for delivery.

Withdrawal referred to formally changing registration status by removing oneself from a course or program for personal or academic reasons (Jeffreys, 2004). For the purposes of this study, withdrawal referred to that change in registration status after a drop date whereby no penalty was imposed, but before the published

deadline for receiving a final grade of W. Withdrawal was initiated by the student or the course instructor.

Summary and Overview

The popularity of the online learning environment increased over the past decade, but online course retention, the continued participation of a student in the same course, remained a significant challenge. Attempts to describe the underlying causes of this discrepancy abounded with the majority focused on online course retention from the perspective of student performance, student satisfaction, or as they related to specific instructional methodologies and technologies. Although these efforts described some skills and behaviors exhibited in online course environments, a comprehensive set of predictors for online course retention had yet to be developed. Therefore, the purpose of this study was to identify academic factors that might predict online course success for community college students. Factors examined in the study were divided into three categories: those present prior to online course enrollment, those present during online course enrollment, and demographic factors.

Enrollees in a sample of online courses held during the Fall 2009 semester at a single community college were evaluated for academic factors that might predict online course success. Data sources included course rosters, queries from the student registration system, and academic transcripts. An unordered logistical regression evaluated the predictive value of these factors for online course success. The study sought to establish predictors that could be used to guide advising sessions, develop or enhance student support services, establish prerequisites and policies that limit online course enrollment to

those students most suited to success in the online environment, or implement an early warning system for students with few or decreased factors for online course success.

Chapter II provided a review of the relevant literature on models of college student retention and distance learning, as well as literature on each of the academic factors addressed in this study. Chapter III provided more detail on the methods and procedures used to conduct this study, and Chapter IV described the findings of the study. Finally, Chapter V provided a summary, conclusions, and recommendations for community college practitioners and future study.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this study was to identify academic factors that might predict online course success for community college students. Specifically, this study examined academic factors of online course enrollees at two timeframes in order to answer the following research questions:

1. What academic factors measured prior to online course enrollment might be predictors of online course success for community college students?
2. What academic factors present during enrollment in the online course might be predictors of online course success for community college students?

A thorough review of the literature sought first to examine studies of retention and success of online students at community colleges. In areas where limited studies met this criterion, the review was expanded to include studies of traditional courses and retention at community colleges and studies of online courses in four-year institutions.

This review of literature was divided into three sections. The first section, theoretical frameworks, examined two models of college student retention, three models of retention specific to distance education, and concluded with an analysis of the merits and detriments of each model and justification for the model selected as the framework for this study. The second section, factors related to retention in online learning, provided a brief historical overview of research on online learning and examined a series of factors related to retention in online learning. Those factors were organized into three categories congruent with the research questions as factors present prior to online course enrollment,

and factors during online course enrollment, as well as demographic characteristics. The final section examined literature related to predicting online course success by first describing statistical methods appropriate for prediction and concluding with an analysis of three prediction studies most relevant to this study.

Theoretical Frameworks

Conducting a research study was much like building a house in that a solid foundation and framework was needed for the desired outcome. The background and significance provided the foundation and the researcher used the existing theories and literature review to develop a framework through which others might view the study. Lack of a theoretical framework was identified as a weakness of many retention studies (Liu et al., 2007). This section of the review of literature examined two models of college student retention, three models of retention specific to distance learning, and concluded with an analysis of the merits and detriments of each model and justification for the model(s) chosen as a framework for this study.

Models of College Student Retention

Models of retention in higher education described the relationships among many factors that influenced the decision to complete a college degree or credential. Once identified, these factors were used by collegiate advisors, educators, and administrators to develop curricula and student services that promoted retention. Existing models described factors influencing retention for a particular type of institution, student, or method of course success. Two models of college student retention were described herein, followed by some explanation of how they were applied to explain retention, or lack thereof, in the community college setting.

Student integration model. Tinto's Student Integration Model (1975, 1993) stood out as the most widely accepted retention model in higher education and served as the foundation for subsequent models. Inspired by Spady's (1970, 1971) first modern inquiry into student attrition, loosely based on Emile Durkheim's theory of suicide, and borrowing the cost-benefit analysis concept from the economics discipline, the model described the timeframes and inputs that contributed to a student's decision to drop out of college. Initially developed based on the experiences of the traditional student at a four-year college or university, the model has been applied to differing student populations and institutional types.

Tinto's model considered six components: (a) pre-entry factors, (b) goals and commitment, (c) instructional experiences, (d) academic integration, (e) social integration, and (f) academic outcomes. Pre-entry factors such as family background, prior schooling, and skills converged to influence the development of academic goals and commitment. These academic goals and commitment were further shaped by instructional experiences (academic) and extracurricular (social) interactions with peers and faculty, ideally resulting in academic and social integration of the student. A distinction was made between academic and social integration because one might potentially be integrated in one realm, but not the other. The theory concluded that the extent or lack of integration ultimately determined the decision to remain in or exit college (Tinto, 1975, 1993).

Model of nontraditional student attrition. Bean and Metzner's (1985) model of nontraditional student attrition found its roots in Bean's (1983; 1985) earlier work translating the process of turnover in work organizations to higher education and his

earlier model of drop out syndrome (Bean, 1985). In contrast to Tinto's model, however, Bean and Metzner focused on the influx of nontraditional students into higher education and explained the drop out decision for this population. The first challenge in developing this model came in defining the 'nontraditional student' and they developed a definition that extended beyond that typically seen in the literature focused purely on age. Bean and Metzner (1985) defined the nontraditional student as one that met at least one of three criteria: (1) age 25 or older, (2) part-time student, and/or (3) non-residential (commuter) student. They took the position that nontraditional students differed from traditional students in several ways, and these differences impacted the ability to describe and predict student retention.

The conceptual model considered three primary inputs: (a) background and defining variables, (b) academic variables, and (c) environmental variables. Background and defining variables included age, gender, ethnicity, residence, high school performance, enrollment status, and educational goals. Academic variables included academic advising, study habits, certainty of major, absenteeism, and course availability. Environmental variables included finances, family responsibilities, employment, outside encouragement, and opportunity to transfer (Bean & Metzner, 1985).

These inputs had either direct or indirect effects on (d) academic outcomes, (e) psychological outcomes, and (f) intent to leave, and ultimately resulted in the decision to drop out of college. Academic outcomes were reflected in GPA. Psychological outcomes included utility, satisfaction, goal commitment, and stress. All these outcomes, combined with background and defining variables, made a direct contribution to the decision to drop out of college (Bean & Metzner, 1985). Social integration variables were included

in the model as indirect effects between background and defining variables, and the decision to drop out.

Models of Retention in Distance Education

Distance education initiated with correspondence courses. The study of retention specific to distance learning dated back to the late 1960s with the influx of a greater adult population in higher education (Billings, 1988). Although models of college student retention provided the framework for many studies of distance learning, models of retention specific to distance learning were discussed and tested with less frequency in the literature. The possible explanations for this discrepancy were varied.

First, although distance learning was not a new phenomenon in higher education, historically it accounted for a small proportion of overall enrollments and thus attracted little research attention. Second, drop out from correspondence courses was initially thought to be different from that in the rest of higher education and it was not until a second influx of adult students in higher education in the 1980s that distance learning was recognized as more similar to other higher education settings (Billings, 1988). Third, the natural progression of research required an understanding of the new population before theorizing about the processes that occurred within that new population; this has been the case with distance education as well (Kember, 1989). The recent surge in distance learning in the form of online instruction resulted in many studies that described distance learners, perhaps signifying that research into distance learning was still in its infancy. Fourth, models of student retention have focused on student characteristics and interactions, all of which existed in distance learning; the mode of delivery was the only variance (Bean & Metzner, 1985; Tinto, 1975, 1993). Finally, the relative acceptance of

existing models of college student retention as applicable to online courses might have resulted in less need to develop models specific to distance learning.

Regardless of the reasons for the paucity of studies that examined models of retention in distance learning, it was important to consider the similarities and differences in models of college student retention and those specific to distance learning. Three prominent models to explain retention in distance, and later, online learning were relevant to this study (Billings, 1998; Kember, 1989, 1990; Rovai, 2003). The foundation and basic tenants of each model were discussed in this section.

Model of correspondence course completion. In 1988, Billings advanced a conceptual model of correspondence course completion adapted from one of Bean's earlier models, the Synthetic Model of Student Attrition. Billing's (1988) model contained four categories of variables proposed to impact retention: (a) background variables, (b) organizational variables, (c) environmental variables, and (d) outcome/attitudinal variables.

Background variables included SAT scores and previous college experience/college preparation. Organizational variables included characteristics such as GPA, class level, experience with correspondence courses, and support from classmates. Environmental variables included employment, support from employer, family responsibilities, support from family, and geographic distance from instructor. Outcome/Attitudinal variables included perceived practical value of the course, educational goals, loyalty to the institution, course difficulty, satisfaction with the course, satisfaction with lesson components, feedback, and isolation.

In addition to the four categories of variables, Billings (1988) included a variable not explained in previous models of retention: date of first lesson submitted. Because the correspondence course environment was self-paced, this measure of student initiative was not typical of other college courses. The four categories of variables interacted with one another and, combined with the date of first lesson submitted, impacted the student's intent to progress toward course completion.

Model of drop out from distance education. Kember's (1989, 1990) model of drop out from distance education was perhaps the most frequently-cited model in the distance learning literature. The model, an adaptation of Tinto's Student Integration Model (1975, 1993) and with much emphasis on Durkheim's theory of suicide (1961 in Kember, 1989), included (a) characteristics, (b) goal commitment, (c) academic components, (d) social and work components, (e) academic and social integration, and (f) external attribution variables. In Kember's model, characteristics include demographic factors related to the individual, family, employment, and academics known upon course entry converged to impact goal commitment much like the pathway of the Student Integration Model (Tinto, 1975, 1993). Goal commitment then influenced the academic environment and the social and work environment, the interaction of which impacted integration in both components.

Academic integration consisted of the student's study approach, motivation, language ability, and course evaluation. Social integration consisted of encouragement in enrollment and study, and a family environment that allowed integration of multiple responsibilities. Integration resulted in a student "cost/benefit analysis" to determine if

drop out or completion resulted (Kember, 1989, 1990). Finally, external attributions included unexpected events, distractions, and time constraints.

Composite persistence model. Taking into account the basic tenants of the Student Integration Model (Tinto, 1975, 1993) and Model of Nontraditional Student Attrition (Bean & Metzner, 1985), the Composite Persistence Model described the retention process specific to online students (Rovai, 2003). Previous models described retention for distance learning students in general, but the Composite Persistence Model was the first focused on those learning in an online environment. The model proposed four categories of factors impacting students at two different timeframes in the online learning process. The factors impacting students prior to admission were termed student characteristics and student skills. In this model, student characteristics prior to admission included previous academic performance, academic preparation, intellectual development, and demographic variables such as age, gender, and ethnicity. Based on those skills identified as important for online learners, Rovai (2003) included computer literacy, information literacy, time management, reading and writing, and computer-based interaction in the category of student skills prior to admission.

The factors impacting students after admission were external factors and internal factors (Rovai, 2003). Originating from Bean and Metzner's (1985) environmental variables, examples in the Composite Persistence Model of external factors after admission included family responsibilities, finances, employment, opportunity to transfer, life crises, and encouragement from those outside the institution. In contrast, the internal factors after admission category included all those identified by Tinto (1975, 1993) and Bean and Metzner (1985), but it added two new subcategories. One subcategory,

pedagogy, included teaching and learning styles. The second subcategory, student needs, included (a) clarity of programs, policies, and procedures, (b) self-esteem, (c) identification with school, (d) social integration with peers, faculty, and staff, and (e) access to support services such as advising, tutoring, bookstores, and financial aid (Rovai, 2003).

The pathway of the Composite Retention Model displayed prior to admission factors (student characteristics and skills) and external factors after admission filtered through internal factors that resulted in the decision to persist (Rovai, 2003). Thus, though student characteristics and skills prior to admission, and external factors after admission, played a role in the retention puzzle, it was the internal factors after admission that had the direct impact, or acted as the 'final straw', in the decision to drop out or persist in online learning environments.

Comparison of Retention Models

The models of both Tinto (1975, 1993) and Bean and Metzner (1985) addressed contributions of many factors to the decision to drop out of college. Although the most obvious difference between the two models was the contrast in type of student they hoped to describe (traditional versus nontraditional), there were other important differences. These differences were considered when determining which model provided the most appropriate theoretical framework for this study.

The key attribute in Tinto's Student Integration Model (1975, 1993) was integration. In contrast to Tinto's (1975, 1993) emphasis on the importance of academic and social integration for traditional college students, Bean and Metzner (1985) argued that nontraditional students were less influenced by the social aspects of the collegiate

environment, and more influenced by family, friends, and colleagues external to the college environment. They proposed that nontraditional students were interested primarily in the academic deliverables of the college (i.e., courses, certificates, degrees) rather than the social aspects that might have enticed the traditional college student (Bean & Metzner, 1985).

The key attribute of the Bean and Metzner (1985) model was the emphasis on environmental variables that impacted the decision of nontraditional students to continue or drop out of college. “For nontraditional students, environmental support compensates for weak academic support, but academic support will not compensate for weak environmental support” (Bean & Metzner, 1985, p. 492). Thus, the nontraditional student that experienced positive interaction with professors and advisors, but did not have the support of family members for quiet study time or the support of an employer to arrange work hours around class schedules, was more likely to drop out of college.

Community colleges served a very diverse population in terms of age, gender, ethnicity, academic skill level, and goal orientation. The open door policy practiced by community colleges as a means of providing higher education access to all that seek it had been described by many commentaries as a “revolving door policy” because many enter, but few persist (Stahl & Pavel, 1992).

According to the National Center for Educational Statistics (NCES, 2008), over six million students were enrolled in community colleges in the 2006-07 academic year, accounting for approximately 35% of the national enrollment in post-secondary education. Community college enrollment continued to surge through the next three academic years as an economic recession sent more high school graduates to a less

expensive higher education venue and as downsized workers returned to learn new careers and skill sets (Pew Research Center, 2009). The American Association of Community Colleges (AACC, 2009a, 2009b) reported that the majority of community college students were female (61%) and were enrolled part-time (59%). The average age of the community college student was 29, but approximately 47% of students were under 21 years of age. Community colleges served a larger proportion of first-generation college students than their four-year counterparts (AACC, 2009b), and more community college students were underprepared academically as evidenced by over 60% needing study in developmental courses (Developmental Education Task Force, 2009). This diversity in student population presented a great challenge for those attempting to determine which model was most appropriate for the study of community college students or developing a model more appropriate for the community college setting.

Both agreement and criticism existed regarding the applicability of Tinto's model to retention in community colleges and online students (Borglum & Kubala, 2000; Damon, 1997; Henningsen, 2003; Metz, 2005; Napoli & Wortman, 1998; Nelson, 2006; Nora, Attinasi & Motonak, 1990; Yorke, 2004). Two studies addressed the fit of Tinto's (1975, 1993) model for the community college population. Nora, Attinasi, and Motonak (1990) evaluated the fit of Tinto's model through a three-year, longitudinal study of first-time, first-semester freshmen enrolled in developmental courses at a community college. Using a 55-item instrument with variables for each of the categories provided in Tinto's model, Chi-Square analysis determined 'goodness of fit' with Tinto's model. They concluded that Tinto's Student Integration model proved plausible for retention among "academically disadvantaged" community college students (Nora, Attinasi & Motonak,

1990, p. 348). Employing a similar methodology with predominantly Asian American/Pacific Islander students at a community college, Damon (1997) also concluded that Tinto's model was a good fit for the community college population. Consistent with Bean and Metzner's model, however, Damon (1997) noted that the relationship of social integration to retention was not supported in Tinto's (1975, 1993) model.

Fewer studies have attempted to test Bean and Metzner's Model of Nontraditional Student Attrition in the community college setting and those studies available provided conflicting results. Stahl and Pavel (1992), following a similar path to that of Nora, Attinasi, and Motonak (1990) in testing Tinto's model, provided a survey to 597 community college students addressing each of the categories specified in Bean and Metzner's (1985) model as contributing to the drop out decision. They concluded that Bean and Metzner's (1985) model was a weak fit and used factor analysis to develop their own model, the Community College Retention Model. In essence, this model re-categorized the components and paths provided in the Nontraditional Student Attrition Model. In this literature review, no empirical studies were found that supported the model beyond the initial study.

Boyles (2000) proposed a new model targeted to explain community college dropout based loosely on Bean and Metzner's (1985) model which included three dimensions: background and defining variables, environmental variables, and academic variables. However, other studies have not used the model as a theoretical framework and little reference to it existed in the literature. Thus, although others examined specific aspects of Bean and Metzner's (1985) model, none have come into favor.

In addition to the two models of college student retention, this review of literature discussed three models of retention specific to distance learning. The benefits of evaluating these models were the inclusion of variables unique to distance education and the distance learning population. The detriment was that because these models addressed a smaller population and were more recent, they have not undergone the extensive testing seen with Tinto (1975, 1993) or Bean and Metzner (1985). The contribution of the distance education retention models, however, was critical to this study.

Billings' (1988) model of correspondence course completion differed from previous retention models in three ways. First, this model specifically addressed retention in a distance learning environment. Second, a new variable, date of first lesson submitted, and the interaction impacts of that event, was included. Third, although the variable categories were similar to other models, Billings (1988) included two components that were not previously discussed. These components applied exclusively to distance learning: (a) experience with correspondence courses, and (b) distance from instructor. It was these unique components of Billings' (1988) model that made it invaluable to studies of distance education.

Kember's (1989, 1990) model of drop out from distance education was unique because it emphasized the potential institutional impact on some variables of retention. Because distance education was often associated with the open-access policy in community colleges, the institution was typically unable to influence the characteristics of a student population with admissions policies that might be seen in four-year institutions. In other words, because the institution could not measure the academic quality of the student in a selection process, it was forced to rely on other measures to

impact student retention. Kember (1989, 1990) also made an important distinction that though distance education might be nontraditional, distance education students were not the same as nontraditional students as defined by Bean and Metzner (1985). Like Bean and Metzner (1985), however, Kember (1989, 1990) emphasized that because the student studied in an environment away from the institution, the impact of family and employment played a greater role in student success.

The final model of retention in distance education was the Composite Persistence Model provided by Rovai (2003). One strength of this model was that it integrated factors related to traditional and nontraditional students. A second strength of the Composite Persistence Model was the inclusion of new variables specific to the online course environment. Rovai (2003) included the role of pedagogy, defined as both learning and teaching styles, in this model. He also identified computer, reading, and writing skills as critical in the online learning environment.

Theoretical Framework for This Study

When evaluating retention models to determine an appropriate theoretical framework, Liu et al. (2007) pointed out that all the models emphasized that multiple factors, and the interaction of those factors, influenced the decision to drop out or complete an academic course or program. Differences in methodology, time constraints, and access to students to measure the multitude of variables included by these models limited the ability of researchers to measure all the proposed factors at one time and do it well. Thus, this study was viewed as the first step in a process to determine which academic factors might predict online student success.

The first step in that process of determining which factors might predict online student success started with a single online course. All of the models of student retention presented made contributions to understanding the retention process. Nevertheless, because the theoretical framework provided the lens through which the results were analyzed, the researcher used caution in selecting the most appropriate model for a study.

For this study, Rovai's (2003) Composite Model of Persistence was selected as the theoretical framework for several reasons. The model focused specifically on the online learning environment and integrated the most well-known and tested models (Bean & Metzner, 1985; Tinto, 1975, 1993). The model considered factors influencing both traditional and nontraditional students, and other factors identified in the literature as impacting community college students. Finally, the Composite Persistence Model considered the timeframe, prior to enrollment and during enrollment, in which skills and other factors emerged and contributed to the online learning process.

However, individual factors that might predict online course success were also adopted from the other models of distance education. Both Billings (1988) and Kember (1989, 1990) focused on retention for an individual course, not whole programs of study. Billings (1988) included proximity to instructor, experiences specific to distance learning, and date of first lesson as factors impacting retention. Likewise, Kember (1989, 1990) emphasized variables influenced by the institution, which had policy implications and supported the purpose of this study. Thus, the Composite Persistence Model was selected as the theoretical framework for this study, and individual variables supported by the other models of retention in distance education were included.

Factors Related to Retention in Online Learning

Before examining factors that might predict retention and course success in the online learning environment, it was helpful to obtain a historical perspective on empirical research of online learning. Previous research explored online learning from the perspectives of student performance (Ashkeboussi, 2001; Davies & Graft, 2005; Edmonds, 2006), student satisfaction (Barakzai & Fraser, 2005; Fearing & Riley, 2005; Simpson & Du, 2004), and specific interactive tools (Jin, 2005; Poole, 2000; Wang, 2007). Others examined personal characteristics (i.e., age, gender, language), academic factors (i.e., GPA, SAT scores, academic major, computer skills and study skills), and other factors as they related to success in the online learning environment (Holder, 2007; Vonderwell & Zachariah, 2005).

A plethora of research focused on comparing the learning outcomes of students in online and traditional versions of the same course, so much so that Russell (2001) coined the term “no significant difference phenomenon” in his book by the same title. Russell chronicled over 300 studies that cited no significant difference in learning outcomes for the two course formats. To account for studies conducted since the publication of the book, the website “www.nosignificantdifference.org” continued to chronicle such studies. This study, however, did not address learning outcomes, but rather the retention of students in the online learning environment.

Retention was not a new problem in education, but retention of online learners was of great concern. Because the online learning environment was one that required high initiative, autonomy, time management, and technology skills, lower student

retention rates were described in online courses as compared to face-to-face courses (Diaz, 2002; Machuca, 2004; Nelson, 2006).

Diaz (2002) evaluated drop rates for students in online and traditional health education courses. He found that drop rates were almost twice as high for online students (13.5%) than for face-to-face courses (7.2%). In a study of California community colleges, Machuca (2004) found a 24.2% discrepancy between completion rates in online courses (46.6%) and overall completion rates (70.08%) at the same college. He conceded that the overall completion rate was higher than that reported by many sister community colleges. Still, the difference in completion rates for online students could not be overlooked. Finally, Nelson (2006) found discrepancies in completion rates for online and face-to-face course students; the completion rate for students in online courses was 77% as compared to those in face-to-face courses of 81%. Thus, there was agreement in the literature that retention in online courses was lower than in face-to-face courses, though the discrepancy varied with each study.

A review of the research on student retention in online learning environments resulted in a variety of studies that sought to determine which factors were related to retention. For the sake of organization, these factors were organized in categories relevant to the research questions of this study. The first section analyzed factors present prior to enrollment in online courses such as GPA, test scores, developmental coursework, college-level coursework, and enrollment history. The second section examined factors present during online course enrollment such as GPA, student status, current enrollment, and course duration. The final section analyzed demographic characteristics as they

related to retention, as well as those not described in the literature but included in this study.

Factors Present Prior to Online Course Enrollment

This section analyzed existing research on factors present prior to online course enrollment. These factors were merged into five subcategories for ease of reading: (a) GPA, (b) test scores, (c) developmental coursework, (d) college-level coursework, and (e) enrollment history.

Grade point average (GPA). It was well established in the literature that high school GPA was related to persistence in college (Ransdall, 2001). However, the degree of impact and usefulness as a predictor varied based on a number of factors. Bean and Metzner (1985) emphasized that GPA impacted retention for both traditional and nontraditional college students. Andrea (2002) concurred that GPA was an important factor in studies that focused on community college student retention.

Morris, Wu, and Finnegan (2005) conducted a study with 211 lower division college students enrolled in online courses and sought to determine how well information collected during the admissions process could predict performance in online courses. They examined high school GPA and college GPA as factors and were able to predict student withdraws from online courses with 62.8% accuracy. The factor contributing the most to the variance was high school GPA. In this literature review, this was the only study that included high school GPA as a predictor of online course success.

Three studies examined college GPA as it related to online course success. For university students, Dupin-Bryant (2004) reported that non-completing students tended to be lower division students with lower cumulative grade point averages. Though not a

predictive study, Aragon and Johnson (2008) found a statistically significant positive relationship ($r=.24, p<.05$) between GPA and course completion for online community college students. However, the strength of the relationship was low.

For community college students, Wojciechowski and Palmer (2005) described a strong relationship ($r=.617, p<.000$) between online course completion and cumulative GPA. Further analysis in a regression model of all students found GPA and attendance at an orientation session accounted for 69% of the variance in course grade.

Test scores. Because community colleges had open admissions policies, college admissions test scores were typically not required. However, community colleges used placement tests to ascertain readiness for college-level work and the student starting point in reading, writing, and mathematics courses (Beatty, 2003). The use of placement testing was commonplace, and perhaps considered “the rule” in the community college setting (Ames, 2003). The intent of placement testing was to ensure that students were as successful as possible and initiated college study at a level of readiness determined to be necessary for performing college-level work (Beatty, 2003). COMPASS^R, CPT, and ASSET^R were commonly used placement tests to assess community college students (Ames, 2003; Aragon & Johnson, 2008; Leal, 2008; Wojciechowski & Palmer, 2005).

Two correlation studies determined the relationship between placement test scores and online course success. Aragon and Johnson (2008) found no significant relationship between COMPASS^R and ASSET^R placement test scores (reading, writing, and mathematics) and online course success in community college students. Likewise, Wojciechowski and Palmer (2005) found no significant relationship between ASSET^R reading and writing scores and online course success for community college students.

Neither study, however, evaluated the predictive validity of placement test scores for retention in online courses.

Developmental coursework. Developmental coursework was designed to correct skill deficiencies in a fundamental area such as reading, writing, or mathematics. The available research on developmental coursework did not distinguish between course formats, online or traditional classroom. In this literature review, no empirical studies were found that evaluated developmental coursework as a predictor of online course success for community college students.

Kolajo (2004) conducted an ex-post facto analysis at a single community college comparing the success rates of developmental and non-developmental students once they entered college-level courses. He concluded that those students requiring only one developmental course performed as well as those that did not require developmental coursework. However, as the number of required developmental courses increased, the GPA decreased and overall time to graduate increased. Hawley and Harris (2006) evaluated factors related to persistence in first-year community college students. They concluded that the number of developmental courses required was a strong predictor of attrition. It should be noted, however, that these conclusions were based on a small sample at one institution and were not exclusive to online students.

Fike and Fike (2008) examined developmental coursework as a factor in predicting retention in first-time, first-semester, community college students. The sample was not exclusive to online students, but approximately 35% of those students sampled were enrolled in an online course. They developed regression models that accounted for approximately 30% of the variance in fall-spring and fall-fall student retention. In both

models, passing a developmental reading course was the strongest positive predictor of student retention, and not needing a developmental reading course was also a positive predictor of student retention. The latter finding was justified because those that did not take a developmental reading course would have demonstrated college-level reading skills on a placement test. These conclusions were consistent with Nash's (2005) finding from a survey of community college students in online courses that reading assignments were among the most difficult items to complete.

In the fall-to-fall retention regression model, Fike and Fike (2008) concluded that passing a developmental writing course was a positive predictor of student retention. Finally, in both models, passing a developmental mathematics course was a positive predictor of student retention. Unfortunately, a sub-sample was not used to evaluate retention in those enrolled exclusively in online courses. However, the study was included in this literature review because it was one of few that evaluated the impact of developmental course enrollment and completion on community college student retention.

College-level coursework. Previous college coursework, both as a whole and for specific courses that might provide skills needed for distance learning, was examined in this section. Examples of specific courses included English composition, computer skills, and student orientation.

Prior grades in an English composition course were a factor in this study. In this literature review, only one study was found that included prior English grades as a variable for retention in community college online students (Menager-Beeley, 2001). Based on correlation analysis, Menager-Beeley (2001) concluded that students who

performed well in prior English courses were more likely to remain in an online course. Limitations to this study, however, included a small sample size, self-reported data, and a low response rate.

Prior computer courses were a factor in this study. In this literature review, no studies were found that evaluated completion or grades in computer courses as predictors of online course success. Although numerous studies addressed computer skills, only those that identified computer skills as a factor in prediction models were included.

DeTure (2004) used two instruments to measure cognitive style and self-efficacy with online technologies and concluded these were poor predictors of online course success for community college students. The small sample size made it difficult to generalize these conclusions, yet it was frequently cited by other studies evaluating predictors for success in online community college students. Puzziferro (2008) completed a correlation study similar to that of DeTure (2004) with a larger sample and found no statistically significant relationship between self-efficacy with online technologies and course completion or student satisfaction.

In contrast, Dupin-Bryant (2004) found previous training in (a) searching the Internet, (b) operating systems, (c) file management, and (d) Internet applications were significant predictors of online course completion for university online students. These skill sets were often addressed in college-level computer courses.

Orientation courses were typical of both four-year and community college environments. Satisfaction with orientation courses was examined from various perspectives, but studies of online course success were limited to evaluating the importance of a single orientation session for online students.

Murtaugh, Burns, and Schuster (1999) used a regression analysis to determine factors that predicted retention for 8,867 first-time freshmen at a state university. In addition to high school GPA and first semester college GPA, “completion of a freshman orientation course” was a predictor of continued enrollment in college. For community college students, Derby and Smith (2004) found those that completed a student orientation course took less time to finish an associate degree program. Although recognizably an older study and not one of online learners, Hyers and Joslin (1998) concluded that orientation course grades were better predictors of achievement and persistence than SAT scores or high school rank.

Some institutions or individual instructors held an orientation session for online students, but the impact of those one-time orientation sessions was not evaluated in the studies found for this literature review. In a survey of community college students, Nash (2005) asked previous online course enrollees if they would have benefited from a pre-course orientation. The majority of students, both those that passed and failed, responded affirmatively. Conversely, only 36% of those who dropped agreed that an orientation would have been useful.

Wojciechowski and Palmer (2005) found a statistically significant relationship ($r=.24, p<.05$) between attendance at an orientation session and online course completion for community college students. Further analysis in a regression model of all students found GPA and attendance at an orientation session accounted for 69% of the variance in final course grade.

Enrollment history. Several proposed that previous college enrollment provided the student with expectations for the learning environment. Halsne and Gatta (2002)

described previous coursework and previous college degree in online community college students. They found that nearly 67% of online community college students had previously taken college courses. Degrees were held by 26% of the sample; two-thirds were undergraduate degrees and the remainder graduate or professional degrees. However, they simply described the population and did not evaluate the relationship or predictive validity of these variables. In this literature review, no studies were found that evaluated previous college enrollment or previous college degrees as predictors of online course success for community college students.

Previous online coursework was examined by limited studies of online learners. Dupin-Bryant (2004) found previous online course work was a significant predictor of online course success in university online students. In contrast, Wojciechowski and Palmer (2005) found no significant relationship between previous online coursework, measured as number of courses, and course success for community college students. They did, however, find a statistically significant negative correlation ($r = -.198, p < .05$) between number of previous course withdrawals and online course success, meaning that as the number of course withdrawals increased, online course success decreased. In this literature review, no empirical studies were found that evaluated previous online coursework as a predictor of online course success in community college students.

Factors Present During Online Course Enrollment

Factors present during the semester of online course enrollment were examined in this study. These factors were organized into four subcategories for ease of reading: (a) GPA, (b) student status, (c) current enrollment, and (d) course duration.

Grade point average (GPA). Grade point average (GPA) was the first factor during online course enrollment examined in this study. Although other studies examined cumulative college GPA, in this literature review, no empirical studies were found that evaluated GPA in the semester of online coursework as a predictor of online course success for community college students.

Student status. Student status was the name given to the second subcategory of factors present during online course enrollment. Two factors were presented in the literature review for descriptive purposes. The first factor of student status was designation as either a full-time student or part-time student. For most academic institutions that received federal student aid, *full-time student* was defined as a student enrolled in 12 or more credit hours, and *part-time student* was defined as a student enrolled in less than 12 credit hours.

Two studies of community college students evaluated this variable of student status and reported conflicting results. Wojciechowski and Palmer (2005) found no significant relationship between student status (part-time/full-time) and online course success. However, Moore, Bartkovich, Fetzner, and Ison (2002) compared online and traditional enrollees at a community college and concluded that part-time students were more likely to succeed in online courses (18% higher success rate), and full-time students were more likely to succeed in traditional courses (14% higher success rate). A subsequent logistical regression found student status to be a significant predictor of online course success in community college students (Moore et al., 2002).

Class rank, specifically measured as first-semester freshman, was the second student status factor in this study. The aforementioned study of community college

students by Moore et al. (2002) called into question the impact of *full-time* student status versus *first-time* student status, in online course outcome. In addition to their conclusions regarding full-time/part-time student status, Moore et al. (2002) noted that first-time, full-time students were the least likely to succeed in online courses with completion rates for this group nearly 32% lower in online courses than traditional courses. These results sharply contrasted with a study that found enrollment in an online course to be a significant predictor of retention for community college students (Fike & Fike, 2008). However, the sample in the latter study evaluated retention for all first-time, first-semester freshmen and approximately one-third were enrolled in an online course.

Two studies conducted with university students found significant differences in online course success based on class rank. Urtel (2008) defined non-success as a final course grade of D, F, or W. For freshmen students, he found that 65% of those in distance courses were unsuccessful as compared to 35% of those in traditional courses. In the second study, Dupin-Bryant (2004) included class rank as a demographic control variable in a regression analysis and found it to be a significant predictor of non-completion of online courses. Although these studies were conducted on university students, the focus on lower-ranking (freshman/sophomore) students and findings that these students were less likely to complete online courses supported the inclusion of class rank as a factor in this study of community college students.

This study, however, classified the variables based on their potential to impact course success during the semester of online course enrollment. For example, a student was only a first-semester freshman during a single semester. If the student enrolled in an online course during that semester, would class rank be a predictor of online course

success? Because the student status factors were evaluated as predictors of online course success during a single semester, they were included in this category.

Current enrollment. Two variables, first online course, and course load, constituted the current enrollment subcategory. Simpson (2006) argued the importance of identifying characteristics associated with student success at the point of registration. The downfall of previous studies, he concluded, was that much of the information was unknown until the student had already started the course. His conclusion was valid and supported the inclusion of such variables in retrospective study to evaluate patterns and predictive validity.

The first variable in this subcategory, first online course, was examined in two studies that presented conflicting results. In a sample of first-time, first-semester students, Fike and Fike (2008) concluded that taking an online course in the first semester was the second strongest positive predictor for fall-fall and fall-spring overall retention for community college students. Although only 35% were enrolled in an online course, this was indeed their first online course because they were first-semester freshmen. However, for online community college students, a correlation analysis revealed no significant relationship between first online course and course completion (Menager-Beeley, 2001). In this literature review, no empirical studies were found that evaluated this variable as a predictor of online course success for community college students.

The second variable, course load, was examined from two perspectives as related to online course enrollment. Course load was expressed both as credit hours and number of courses depending on the study. In contrast to student status of part-time or full-time, a set of dichotomous variables, course load was expressed numerically. The initial studies

described herein evaluated overall course load, and the final study addressed online course load.

Using discriminate analysis, Morris, Wu, and Finnegan (2005) predicted student withdraws from online courses with 62.8% accuracy for lower division university students. The most important predictors were high school GPA, mathematics ability, and current course load. Other studies at a four-year university (Szafran, 2001) and a community college (Fike & Fike, 2008) examined course load for the general student population, but not specifically for online learners.

At a four-year university, Szafran (2001) evaluated the relationship between course load, GPA, and retention in a sample of full-time, first-semester freshmen. He concluded that "any effect of credit load on retention appears to work through GPA" (Szafran, 2001, p. 27). In contrast, Fike and Fike (2008) identified 'semester hours enrolled in the first fall semester' as a positive predictor of fall-fall and fall-spring retention in community college students.

Finally, for online community college students, Aragon and Johnson (2008) evaluated total course load and online course load separately and found significant positive relationships between total course load and online course success, as well as online course load and online course success. In this literature review, no empirical studies were found that evaluated course load as a predictor of online course success for community college students.

Course duration. Course duration was the final variable present during online course enrollment. Lack of time was identified as the primary reason that students drop out of online courses (Holder, 2007; Vonderwell & Zachariah, 2005), and one might

deduce that students already experiencing a lack of time found that condition compounded in an accelerated course. In line with that argument, Wojciechowski and Palmer (2005) found a statistically significant relationship ($r=.188, p<.05$) between course duration and online course completion for community college students. The positive correlation indicated that the longer the duration of the course, the more likely a student was to complete the course.

However, other empirical evidence supported the opposite conclusion. Diaz and Cartnal (2006) compared drop rates for online courses in 6-week, 9-week, and 18-week formats. The lowest drop rates were recorded for the short duration (6 to 9 week) online courses. Specific drop rates were 22.1% for 18 week online, 7.7% for nine week online, and 7.4% or six week online. Diaz and Cartnal (2006) concluded that accelerated courses allowed the student to focus on the course material for a short period of time, potentially maintaining motivation and completing the course faster.

Demographic Characteristics

Andreu (2002) recommended that future retention research at the community college examine demographic variables such as gender, age, race/ethnicity, disability status, zip code, and receipt of financial aid. This final section of the literature review analyzed demographic characteristics described in the literature as they related to retention, as well as those not described in the literature, that were examined in this study. These demographic characteristics included gender, age, race/ethnicity, marital status, military status, receipt of financial aid, geographic proximity, and disability status. Demographic characteristics, although not used for policy purposes, were used to ensure

similarity between the sample and population of online learners and provide a more complete profile of the online learner in this study.

Gender. Gender was a demographic characteristic frequently examined across studies of online course retention. Females accounted for the majority of undergraduate online learners in both university (Dupin-Bryant, 2004) and community college settings (Aragon & Johnson, 2008; Halsne & Gatta, 2002). Several analyses of the differences between genders for both university and community college students concluded that male students were less likely than female counterparts to complete online courses (Barakzai & Fraser, 2005; Nelson, 2006; Willging & Johnson, 2004). In contrast, Wojciechowski and Palmer (2005) found no significant relationship between gender and online course completion for community college students.

Two relevant studies evaluated the predictive validity of gender for online course completion, neither finding it was a statistically significant contributor to the predictive equation for university (Morris & Finnegan, 2009) or community college students (Moore et al., 2002). In the later study, both males and females were less likely to be successful in online courses as compared to traditional course counterparts.

Age. Halsne and Gatta (2002) found the majority of online community college students were nontraditional age (defined by this study as 26 or older). The average age for online learners was similar, 29 years for online university undergraduates (Dupin-Bryant, 2004) and 28 years for online community college students (Aragon & Johnson, 2008). Other studies analyzing age and online course success included (a) comparisons of drop/withdrawal rates by age group, (b) correlation studies examining the relationship

between age and some performance measure, and (c) predictive studies that included age as an independent or control variable.

Comparisons of online course drop/withdrawal rates by age group presented conflicting results and inconsistent explanations for the differences. At the Hellenic Open University, online students in the 39+ age group were least likely to drop out than other age groups (Pierrakeas, Xenos, Panagiotakopoulos, & Vergidis, 2004). Similarly, Nelson (2006) found that community college students under 29 years of age had statistically significant higher withdrawal rates than their older counterparts. However, Nelson's (2006) study found comparable differences for students in face-to-face versions of the same course, so it was difficult to explain the finding as simply a phenomenon of online learners.

Conversely, Menager-Beeley (2001) concluded that older community college students (over 28 years) were more likely to drop an online course. Diaz (2002) also found that older students were more likely than their younger counterparts to drop online courses but provided a unique explanation for lower retention in online learning and drops in older age groups. He argued that an older student with more experience and other life issues might determine it best to drop a course in lieu of receiving a failing grade. As compared to those in a traditional classroom, Diaz (2002) found that online students had higher grade point averages (GPA) and cited this as support for his theory that the high drop rates might be a reflection of academic experience and good decision-making skills, not academic failure of the student.

Other studies of online community college students evaluated the relationship between age and grades, but again the findings were inconsistent. Aragon and Johnson

(2008) found no relationship between age and online course success in community college students. In contrast, Wojciechowski and Palmer (2005) found a statistically significant positive relationship ($r=.395$, $p<.000$) between age and online course success. Menager-Beeley (2001) had similar findings ($r=.292$) in a comparable sample. Likewise, Moore et al. (2002) concluded that being less than 25 years of age was associated with decreased performance in online courses. Thus, the three latter studies concluded that as age increased so did completion rates in online courses and vice versa.

Although numerous studies described relationships between age and other variables in online learners, few included age as a predictor of course success. For university students, Morris and Finnegan (2009) predicted student withdraws from online courses with nearly 63% accuracy, but age was not a statistically significant contributor to the predictive formula. Jeffreys (2004) pointed out that age was tied to so many other variables (marital status, number of dependents, etc.) that it was difficult to separate out as a predictor. In this literature review, no studies were found that evaluated age as a predictor of online course success for community college students.

Race/Ethnicity. Two studies (Aragon & Johnson, 2008; Moore et al., 2002) examined race/ethnicity in online community college students and neither found a significant relationship between race/ethnicity and online course success. In this literature review, no studies were found that evaluated race or ethnicity as predictors of online course success for community college students.

Marital status. Bean and Metzner (1985) considered marital status as a variable relevant for nontraditional students in the decision to drop out of college. Halsne and Gatta (2002) described marital status in online community college students. The results

revealed an even split between those that were never married (48.2%) and those that were married/separated/widowed/divorced and 44% of the sample had dependent children. In this literature review, no empirical studies were found that evaluated marital status as a predictor of online course success for community college students.

Military status. McMurray (2007) provided a historical overview of distance education for military students and described the need for studies of the “soldier-student” completing college courses. Distance learning via correspondence courses and independent study were funded under the G.I. Bill from its inception in 1944, but it was not until the mid-90s that online learning was incorporated into military education. In 2001, the Army launched its own e-learning initiative, *eArmyU*. This program provided funding for students to complete coursework toward associate, bachelors, and graduate degrees regardless of their location within or outside of the United States (McMurray, 2007).

Three relevant contemporary concerns regarding military students participating in online learning were noted (McMurray, 2007). The first concern was the impact of being located in a hostile zone, and the stress endemic to that environment, on the student's academic performance. A second concern was the high attrition rate for military students taking online courses while located in combat zones. Finally, McMurray (2007) noted that few academic studies have addressed circumstances of the military student and recommended that future studies do so.

Consistent with McMurray's (2007) conclusion, little empirical evidence was found regarding military status and online course success. Artino (2008) examined the relationship between student motivation and self-regulation for a group of 646 service

academy undergraduates in a self-paced online course. This article was included not for its design or findings, but because it was the only article located that examined military students in an online learning environment. In this literature review, no empirical studies were found that evaluated military status as a predictor of online course success.

Financial aid. Receipt of federal financial aid was a demographic variable examined in this study. Financial aid was included as a variable in two retention studies of community college students. Fike and Fike (2008) developed a regression model that accounted for approximately 30% of the variance in fall-spring and fall-fall student retention for first-time, first-semester community college students. In both models, 'receiving financial aid' was a positive predictor of student retention. In contrast, Aragon and Johnson (2008) found no significant relationship between receipt of federal financial aid and online course completion in community college students. In this literature review, no empirical studies were found that evaluated receipt of financial aid as a predictor of online course success for community college students.

Geographic proximity to campus. Andreu (2002) recommended future studies of community college student retention include zip code as a research variable, noting that distance from the school might provide needed information on access to services. In an online environment, distance from the school was relevant if proctored exams were required, a condition for some of the online courses included in this study. In the larger context of retention literature, Billings (1988) included proximity to instructor as a variable in distance course completion. In this literature review, no empirical studies were found that considered proximity of instructor, as measured by zip code, as a predictor of online course success in community college students.

Disability status. Andreu (2002) recommended future studies of community college student retention include disability status as a research variable. National statistics on the number of disabled students served by institutions of higher education were not available because it was illegal to require disclosure on an application (Paist, 2003). The assumption, however, was that community colleges served a higher proportion of disabled students because of their open admissions policies. In this literature review, no empirical studies were found that considered disability status from a descriptive perspective or as a predictor of online course success.

Predicting Online Course Success

Regression analyses evaluated the impact of multiple independent variables, often termed *factors*, on a single dependent variable, often termed *criterion* (Meyers, Gamst, & Guarino, 2006). The main difference between the two types of regression analysis to address multiple variables, *multiple regression* and *logistical regression*, was the nature of the dependent variable. Multiple regression predicted the impact of various factors on a quantitative dependent variable. In contrast, logistical regression predicted the impact of various factors on a categorical or dichotomous variable (Meyers et al., 2006)

The use of logistical regression was initiated in the field of biomedical research, but the development of sophisticated statistical software packages led to increased use of this statistical method in other science and social science fields (Hosmer & Lemeshow, 2002 in Meyers et al., 2006). Logistical regression was selected in this study for its ability to predict the impact of multiple factors (independent variables) on a dichotomous criterion (dependent) variable, course success. Logistical regression required larger

sample sizes, but widespread agreement did not exist regarding how large the sample should be (Meyers et al., 2006).

A Closer Look at Relevant Prediction Studies

Previous sections of this review of literature described the existing models of retention in both college students and distance education and provided an overview of the existing empirical research involving each variable examined in this study. Several studies were mentioned multiple times because they used similar methodologies and inspired several of the variables examined in this study. The three most relevant predictive studies were included in this final section to justify the inclusion of variables and methodology employed in this study. The three studies examined prediction for university online students, community college students, and community college online students.

Predictive study 1: University online students. Dupin-Bryant (2004) conducted a study of university online students using a descriptive survey that focused on pre-entry variables to online course success. In that study, online course success was defined as course completion or non-completion, but parameters were not identified. A simple random sample was selected from students enrolled in online courses in a single semester. The final sample consisted of 1,000 students, of which 507 (51%) were returned and 464 (46%) deemed usable for analysis.

Descriptive statistics were calculated for each variable in relation to course completion and discriminate analysis was conducted to determine the best predictors of retention. The 2004 findings indicated that seven variables were significant predictors of online course completion and when analyzed through discriminate analysis accounted for

9% of the variability in course completion. Significant variables included cumulative GPA, class rank, previous courses completed online, years of computer experience, gender, age, and various computer skills.

Dupin-Bryant's (2004) research was one of few examples that evaluated pre-entry variables as predictors of online course success. However, the study could not be generalized to the population examined in this study because it was conducted on university, not community college, students. Other weaknesses included (a) failure to define course completion, (b) a mixture of undergraduate (82%) and graduate (18%) students with only 17% of those students ranked as freshmen or sophomores, and (c) the final predictive model accounted for a small percentage of variance in online course completion.

Predictive study 2: Community college students. In the wider context of community college students outside of distance education, Fike and Fike (2008) conducted a retrospective study to determine predictors of first-year retention in first-time-in-college students. In this study, retention was examined from semester to semester, not for completion of a single course. The sample consisted of 9,200 students enrolled over a four-year period at an urban community college. Independent variables relevant to this study included (a) completion status for developmental coursework, (b) receipt of financial aid, (c) enrollment in online courses, (d) semester hours enrolled in and dropped, and (e) demographics such as gender, age, and ethnicity.

Statistics employed included frequencies and distributions, correlation for dichotomous and continuous variables, and logistical regression for both fall-spring and fall-fall retention. Significant positive relationships were found between retention and the

following variables: completion of a developmental mathematics course, receipt of financial aid, enrollment in online courses, semester hours enrolled in, age, and semester hours dropped.

Logistical regression models both for fall-spring and fall-fall retention were developed using all independent variables, describing 31% and 29% of the variance in the dependent variable, respectively. The strongest predictors (ordered strongest to weakest) included passing a developmental reading course, enrollment in an online course, not needing a developmental reading course, passing a developmental mathematics course, receiving financial aid, and semester hours enrolled in the first semester. With the exception of 'passing a developmental writing course', which was included in the fall-fall retention model, the predictors were the same for both fall-spring and fall-fall.

Though this study focused only on first-time, first-semester freshman and included students enrolled in all courses, it was relevant to this study for its findings related to retention of community college students. As evidenced by this literature review, it was the only study that evaluated the predictive validity of developmental coursework variables in the retention of community college students. Further, enrollment in an online course was identified as a significant predictor of retention in the community college population.

Predictive study 3: Community college online students. Wojciechowski and Palmer (2005) examined characteristics of completers and non-completers in an online business course at a community college. Completion was defined as a final grade of C or better. Variables examined included gender, age, previous online courses completed, ACT English/reading/composite scores, reading and writing placement test scores, GPA,

previous course withdrawals, course duration, student status, and orientation attendance. Data were collected directly from the student information system over a period of three years for 179 students enrolled in the course.

Data were analyzed through multiple correlations and linear regression. A statistically significant relationship was found between course completion and the following variables: GPA, orientation attendance, previous course withdrawals, age, and course duration. Further analysis through linear regression resulted in a model including only grade point average (GPA) and orientation attendance that accounted for 69% of the variance in course grade.

Wojciechowski and Palmer's (2005) study was relevant to this study for the factors examined related to online course success for community college students, particularly test scores and orientation session attendance, which were not examined in other studies found during this literature review. In this literature review, it was the only study to evaluate the predictive validity of factors on online course success specifically for community college students. However, the findings could not be generalized to this study because of the small sample size drawn from a single academic discipline and institution.

Summary

The purpose of this study was to identify academic factors that might predict online course success for community college students. A review of the literature examined studies of online course success for community college students, as well as studies of traditional course retention at community colleges, and online course success at four-year institutions where applicable.

This review of literature was divided into three sections. The first section, *theoretical frameworks*, examined two models of college student retention, three models of retention specific to distance education, and concluded with an analysis of the merits and detriments of each model and justification for the model selected as the framework for this study. The second section, *factors related to retention in online learning*, examined research on the factors in this study as they related to online course success for community college students. Those factors were organized into three categories congruent with the research questions to include factors prior to online course enrollment, factors during online course enrollment, and demographic characteristics. Finally, the third section examined literature related to *predicting online course success* by first describing statistical methods appropriate for prediction, then detailing three prediction analyses most relevant to this study. Next, Chapter III detailed the methods and procedures used to conduct this study.

CHAPTER III

METHODS

This study was a cross-sectional, descriptive study that sought to determine academic factors that might predict online course success. Cross-sectional design referred to a “snapshot of data” at one point in time and was appropriate to describe this study because one course experience for the student was examined (Creswell, 2003). The study was also described as retrospective or ex-post facto because it examined existing data for trends. Andreu (2002), in recommending research design for community college retention studies, supported the ex-post facto design whereby data were extracted from a student registration system. This section detailed the sampling procedure, sample, data sources and collection procedures, and data analysis employed in this study.

Sampling Procedure

One multi-campus, urban community college in the Mid-Atlantic region of the United States served as the case for this exploration. In the 2009-10 academic year, the college reported an unduplicated headcount enrollment of nearly 16,000 students, equating to approximately 6,600 full-time equivalent students (FTE) (VCCS, 2012b). Over 5,400 of those enrollments (18% of total FTE) were in online courses (VCCS, 2012b). Though the college had offered online courses for several years, the enrollment for this timeframe marked a nearly 10% increase in distance learning FTE over just five years earlier (VCCS, 2012c). The sample for this study consisted of students enrolled in online courses at the community college.

To derive a sample, the researcher examined the online course offerings at the college for the Fall 2009 semester. All courses selected for the study took place online

using Blackboard[®] as the learning management system. Courses using another platform and hybrid courses were excluded from the sample. Courses were provided in two durations, sixteen week and eight week, and both were included in the sample.

Sample

During the Fall 2009 semester, a total of 159 online course sections were offered and 4,766 students were enrolled in those courses. Krejcie and Morgan (1970) offered a method for determining appropriate sample size for quantitative research based on the size of the population under study. For the population of online course enrollees in the Fall 2009 semester ($n=4,766$), Krejcie and Morgan (1970) indicated a sample size of at least 327 enrollees was needed. However, oversampling was employed because logistical regression required large sample size (Meyers et al., 2006) to allow for duplications for students enrolled in more than one online course, and to ensure that the sample demographics were consistent with those of the larger population.

A random sample of 20 online course sections resulted in 491 enrollees being examined for factors that might predict course success in community college students. Demographic variables collected for control variables and descriptive purposes included gender, age, race/ethnicity, marital status, military status, receipt of financial aid, geographic proximity, and disability status. Detailed frequencies and percentages for each demographic variable were included in the results section.

Data Sources and Collection Procedures

Secondary data used in this study, to include course rosters, test scores, and enrollment history, were extracted from the student registration system and online learning enrollment reports. Prior to initiating data collection, a proposal was approved

by the designated executive officer at the participating community college (see Appendix A) and the human subjects committee at the supervising university (see Appendix B). Copies of the approval memorandum from the designated executive officer at the participating community college were forwarded to the departments of institutional research, registration, distance and distributive learning, financial aid, and disability services. The departments were instructed to provide the researcher access to the requested data.

A listing of online courses offered during the Fall 2009 semester was extracted from the college website (fed by the student registration system) and imported into an Excel spreadsheet. The researcher consulted with the department of distance and distributive learning to ensure that courses not using Blackboard[®] as the learning management system and hybrid courses were eliminated from the listing ($n=0$). Three additional courses were eliminated from the listing based on course characteristics. The three courses included two sections of an education course designed to provide advanced training for online course instructors (an atypical population) and one section of an information technology course offered in a five week duration (the only one of its kind offered that semester).

The listing of remaining online courses ($n=156$) was sorted based on course discipline, course number, and section number. The researcher used a random number table to select a random sample of courses from this listing for inclusion in the study. Four courses initially selected (MTH 04, ENG 111 (2), ITE 115) were eliminated as confounding variables. The next random number was used to select another course and the researcher prepared a final listing of the selected course numbers.

Next, a registration specialist downloaded the selected course rosters as separate Excel files. The researcher merged the twenty separate course rosters into one file (from here forward referred to as the master spreadsheet) and sorted the file by student ID number. Duplicates for students enrolled in more than one online course were eliminated by maintaining only the first online course enrollment (based on course sample number) for those students.

The researcher used the master spreadsheet to create a second Excel spreadsheet containing only student identification numbers. Electronic copies of the spreadsheet, along with the memorandum approving the study, were provided to the financial aid and student disability services personnel. Representatives from each office accessed records and recorded 'yes' or 'no' on the spreadsheet to indicate if students received those services during the Fall 2009 semester. Representatives were instructed to return the electronic version to the researcher and destroy any electronic or hard copies. The researcher merged the disability and financial aid status into the master spreadsheet and previous spreadsheets were destroyed.

The researcher met in person with representatives from the department of institutional research to determine parameters for queries that could secure demographic variables. At this meeting, it was determined that the information technology department was better suited to meet this data request. Thus, the researcher submitted a brief explanation of the needed data and an electronic copy of the spreadsheet containing only student identification numbers to the information technology supervisor. The departmental representative designed a query to extract gender, date of birth, race/ethnicity, marital status, zip code, and high school diploma/GED from the student

registration system and provided an electronic file sorted by student ID number to the researcher. The researcher later merged the data into the master spreadsheet and used an Excel formula to convert the variable provided for date of birth to age on the start date of the Fall 2009 semester.

Remaining variables, with the exception of variables that were already available on the original course grade roster, were extracted from the student information system for each course enrollee in the sample. The researcher reviewed a chronological transcript and enrollment history for each student and recorded each variable in the spreadsheet. For the dichotomous variables, the researcher recorded 'Yes' or 'No' in the spreadsheet. For the interval data, the researcher recorded a numeric score in the spreadsheet.

The dependent variable, course success, was determined based on the final grade recorded on the course roster. A column was added to the master spreadsheet to convert the final grade to a dichotomous variable. In the new column, 'Yes' was recorded for those that received a final grade of A, B, or C and 'No' was recorded for those that received a final grade of D, F, W (withdrawal) or I (incomplete). Students that dropped the course within the refund period were excluded from the analysis because no record appeared on the course roster or academic transcript when this occurred.

Table 1 detailed the pre-online course enrollment independent variables and measures. Table 2 detailed the during course enrollment independent variables and measures, and Table 3 detailed the demographic variables.

Data Analysis

Once the master spreadsheet contained all the variables evaluated in this study, coding and screening began. Data were imported to a new file in Statistical Package for

Table 1

Pre-Online Course Enrollment Variables and Measurements

Variable number	Variable title	Measure
1	High school diploma/GED	Nominal
2	College GPA (prior semester)	Interval
3	College GPA (cumulative)	Interval
4	COMPASS ^R reading score	Interval
5	COMPASS ^R writing score	Interval
6	COMPASS ^R mathematics algebra score	Interval
7	COMPASS ^R mathematics college algebra score	Interval
8	COMPASS ^R mathematics pre-algebra score	Interval
9	MTH placement test waiver	Nominal
10	ENG placement test waiver	Nominal
11	Attempted developmental reading course (ENG 04)	Nominal
12	Completed developmental reading course (ENG 04)	Nominal
13	Number of attempts to complete (ENG 04)	Interval
14	Attempted developmental reading course (ENG 05)	Nominal
15	Completed developmental reading course (ENG 05)	Nominal
16	Number of attempts to complete (ENG 05)	Interval
17	Attempted developmental writing course (ENG 01)	Nominal
18	Completed developmental writing course (ENG 01)	Nominal
19	Number of attempts to complete (ENG 01)	Interval
20	Attempted developmental writing course (ENG 03)	Nominal
21	Completed developmental writing course (ENG 03)	Nominal
22	Number of attempts to complete (ENG 03)	Interval
23	Attempted developmental mathematics course (MTH 01)	Nominal
24	Completed developmental mathematics course (MTH 01)	Nominal
25	Number of attempts to complete (MTH 01)	Interval
26	Attempted developmental mathematics course (MTH 03)	Nominal
27	Completed developmental mathematics course (MTH 03)	Nominal
28	Number of attempts to complete (MTH 03)	Interval
29	Attempted developmental mathematics course (MTH 04)	Nominal

Table 1 continued

Variable number	Variable title	Measure
30	Completed developmental mathematics course (MTH 04)	Nominal
31	Number of attempts to complete (MTH 04)	Interval
32	Attempted college composition course (ENG 111)	Nominal
33	Completed college composition course (ENG 111)	Nominal
34	Number of attempts to complete (ENG 111)	Interval
35	Attempted computer course (ITE 102, 115, 119 or IST 117)	Nominal
36	Completed computer course (ITE 102, 115, 119 or IST 117)	Nominal
37	Number of attempts to complete computer course	Interval
38	Attempted orientation course (SDV 100)	Nominal
39	Completed orientation course (SDV 100)	Nominal
40	Number of attempts to complete (SDV 100)	Interval
41	Attempted orientation course first semester	Nominal
42	Completed orientation course first semester	Nominal
43	Previous college degree	Nominal
44	Previous college credit*	Nominal
45	Total attempted college credit hours#	Interval
46	Total completed college credit hours#	Interval
47	Total grades of "W" withdrawal	Interval
48	Total grades of "F" failing	Interval
49	Total grades of "U" unsatisfactory	Interval
50	Attempted an online course	Nominal
51	Completed an online course	Nominal
52	Total number of online courses attempted	Interval
53	Total number of online courses completed	Interval
54	Total online course hours attempted	Interval
55	Total online course hours completed	Interval
56	Prior online course grade of "W" withdrawal	Interval

*Previous college credit includes transfer, advanced placement, CLEP, advanced standing, and credits from previous quarter system.

#Transfer and developmental credits earned are excluded from these totals.

Table 2

During Online Course Enrollment Variables and Measurements

Variable number	Variable title	Measure
57	Current semester GPA	Interval
58	Student status (FT/PT)	Nominal
59	First semester freshman	Nominal
60	First online course	Nominal
61	Total credit hours attempted this semester	Interval
62	Total credit hours completed this semester	Interval
63	Total courses attempted this semester	Interval
64	Total courses completed this semester	Interval
65	Online credit hours attempted this semester	Interval
66	Online credit hours completed this semester	Interval
67	Online courses attempted this semester	Interval
68	Online courses completed this semester	Interval
69	Online course withdrawals this semester	Interval
70	Online course duration	Nominal

Table 3

Student Demographic Variables and Measurements

Variable number	Variable title	Measure
71	Gender	Nominal
72	Age	Nominal
73	Race/ethnicity	Nominal
74	Marital status	Nominal
75	Military status	Nominal
76	Financial aid recipient	Nominal
77	Geographic proximity	Nominal
78	Disability status	Nominal

the Social Sciences (SPSS) version 15 software for analysis. Frequency tables were examined to screen for correct coding, observe the distribution of responses, and ensure adequate data were available for each variable. Data entry errors in coding were researched and corrected.

Nine of the initial variables were removed from the analysis because more than 5% of the data were missing (Meyers et al., 2006). These variables included: (a) high school diploma/GED, (b) COMPASS^R reading score, (c), COMPASS^R writing score, (d) COMPASS^R mathematics algebra score, (e) COMPASS^R mathematics college algebra score, (f) COMPASS^R mathematics pre-algebra score, (g) race/ethnicity, (h) marital status, and (i) military status. The demographic variables (race/ethnicity, marital status, military status) were reported to describe the demographics of the sample, but they were not included in the logistical regression equation.

An unordered logistical regression examined the predictive value of academic factors for online course success for community college students. This statistical method was selected for its ability to predict the impact of multiple factors (independent variables) on a dichotomous criterion (dependent) variable. Sixty-nine factors (independent variables) were divided into three blocks prior to analysis. Logistical regression analysis allowed variables to be grouped into blocks based on their relationship to one another in time or concept (Meyers, Gamst, & Guarino, 2006). In this case, the blocks were organized by two timeframes, before online course enrollment or during online course enrollment. A third block containing demographic variables was used for control variables.

Summary

This chapter detailed the sampling procedure, sample, data sources and collection procedures, and data analysis employed in the study. A random sample of 20 online course sections held at one multi-campus, urban community college resulted in 491 enrollees being examined for seventy-eight factors that might predict online course success. Factors present prior to online course enrollment included GPA; test scores; developmental coursework in reading, writing, and mathematics; college-level coursework in specific disciplines; and enrollment history. Factors present during the semester of online course enrollment included GPA, student status, current enrollment, and course duration.

Data extracted from the student registration system included demographic characteristics, course rosters, test scores, and enrollment history. Data were grouped into three blocks prior to analysis: demographics, academic factors prior to online enrollment, and academic factors during online enrollment. An unordered logistical regression evaluated the predictive value of these factors for online course success. The results of the analysis were reported in Chapter IV.

CHAPTER IV

FINDINGS

The purpose of this study was to identify academic factors that might predict online course success for community college students. Sixty-nine factors (independent variables) were examined for their usefulness in predicting the dichotomous criterion (dependent) variable, online course success. Factors were grouped based on the two research questions into the time frames of factors present prior or during online course enrollment. The findings were divided into demographic variables, logistical regression output, and factors by research question.

Demographic Variables

Student demographic variables collected in this study included gender, age, race/ethnicity, marital status, military status, financial aid recipient, geographic proximity, and disability status. The sample size was 491 students. The gender distribution of the sample was 68.2% female ($n=335$) and 31.8% male ($n=156$). The age distribution of the sample was 55% non-traditional aged students ($n=270$) and 45% traditional aged students ($n=221$). The sample consisted of individuals identifying with each of the seven racial/ethnic groups; the majority of students self-identified as white (46.2%, $n=227$) or black/African American (37.9%, $n=186$). Tables 4, 5, and 6 detail the frequencies and percentages for sample gender, age, and race/ethnicity, respectively.

Table 4

Frequencies and Percentages for Sample Gender

Attribute	Frequency	Percentage
Male	156	31.8%
Female	335	68.2%

Table 5

Frequencies and Percentages for Sample Age

Attribute	Frequency	Percentage
19 years or less	66	13.4%
20-24 years	155	31.6%
25-29 years	92	18.7%
30-39 years	123	25.1%
40-49 years	42	8.6%
50 years or more	13	2.6%

Table 6

Frequencies and Percentages for Sample Race/Ethnicity

Attribute	Frequency	Percentage
American Indian/Native American	2	0.4%
Asian	12	2.4%
Black/African American	186	37.9%
Hispanic or Latino	16	3.3%
Pacific Islander/ Native Hawaiian	2	0.4%
White	227	46.2%
Two or More Races	2	0.4%
Race Not Specified	44	9.0%

The marital status was unreported for 97.1% ($n=477$) of the sample. The reported marital status of students in the sample was 2.2% single ($n=11$) and 0.6% married ($n=3$). With respect to military status, the sample included more non-military students (51.3%,

$n=252$) than military students (23.3%, $n=115$). Of the military students, the most frequently represented subgroups were military dependents (6.9%, $n=34$), military spouses (6.1%, $n=30$), or veterans (5.5%, $n=27$). The military status was unreported for 25.3% ($n=124$) of the sample. Table 7 details the frequencies and percentages for sample marital status, and Table 8 details the frequencies and percentages for sample military status.

Table 7

Frequencies and Percentages for Sample Marital Status

Attribute	Frequency	Percentage
Single	11	2.2%
Married	3	0.6%
Marital Status Unknown	477	97.1%

Table 8

Frequencies and Percentages for Sample Military Status

Attribute	Frequency	Percentage
Active Duty	13	2.6%
Retired	5	1.0%
Veteran	27	5.5%
Reserves	6	1.2%
Military Spouse	30	6.1%
Military Dependent	34	6.9%
No Military Service	252	51.3%
Military Status Unreported	124	25.3%

The majority of students, 62.5% ($n=307$), were financial aid recipients during the semester examined. With respect to geographic proximity to campus, the majority of students, 86.2% ($n=423$) resided inside the service area of the community college. Less than 2% of the students in the sample received disability services during the semester in question (1.6%, $n=8$). Table 9 details the frequencies and percentages for the remaining sample demographics including financial aid recipient, geographic proximity to campus, and disability status.

Table 9

Frequencies and Percentages for Sample Remaining Demographics

Attribute	Frequency	Percentage
<u>Financial Aid Recipient</u>		
Yes	307	62.5%
No	184	37.5%
<u>Geographic Proximity</u>		
College service area	423	86.2%
Out of college service area (in state)	60	12.2%
Out of college service area (out of state)	8	1.6%
<u>Disability Services Recipient</u>		
Yes	8	1.6%
No	483	98.4%

One course variable, final grade, was converted to the dichotomous variable of completion/non-completion for the purposes of the logistical regression analysis. The final grade distribution was positively skewed with 67.9% ($n=333$) students receiving

grades of A, B or C. The remaining grades were distributed as follows: 7.1% ($n=35$) earned a final grade of D, 14.9% ($n=73$) earned a final grade of F, 8.6% ($n=42$) earned a final grade of W (withdrawal), and 1.6% ($n=8$) earned a final grade of I (incomplete).

Table 10 details the frequencies and percentages for final course grade.

Table 10

Frequencies and Percentages for Final Course Grades

Final Grade	Frequency	Percentage
A	159	32.4%
B	100	20.4%
C	74	15.1%
D	35	7.1%
F	73	14.9%
W	42	8.6%
I	8	1.6%

Logistical Regression Output

Because the criterion variable was dichotomous (course completion or not), an unordered logistical regression was used for this analysis. Sixty-nine factors (predictor variables) were organized into blocks as previously indicated in Tables 1, 2, and 3.

Results of the logistical regression analysis indicated that the sixty-nine predictor model did not provide a statistically significant improvement over the constant-only model because the constant by itself was already a statistically significant predictor, as

evidenced by a significant Wald statistic ($p=.000$) in the control block of the regression output.

Further review of the data led the researcher to reduce the number of variables in the logistical regression analysis. Six of the factors were removed because they were influenced by the grade received in the course attempt under study. These potential confounding variables included: (a) current semester GPA, (b) total credit hours completed this semester, (c) total courses completed this semester, (d) online credit hours completed this semester, (e) online courses completed this semester, and (f) online course withdrawals this semester. Similar variables were collapsed to a single measure to reduce interactions within the data. For example, instead of including three variables for each of three developmental mathematics courses (attempted course, completed course, number of attempts), one input variable entitled “completed developmental mathematics course” was included in the subsequent analysis. Sixty-nine factors (predictor variables) were reduced to twenty-five factors (predictor variables). Table 11 detailed the revised predictor variables and assigned regression block.

With the 25 predictor variables, the results of the logistical regression analysis indicated that the constant by itself was already a statistically significant predictor, as evidenced by a significant Wald statistic ($p=.000$) in the control block of the regression output, meaning that the addition of variables did not improve the ability to predict the outcome, online course success. The value in continuing to analyze the remaining logistical regression output was twofold. First, it allowed the researcher to determine if the twenty-five predictors helped to account for additional variance in online course

Table 11

Revised Predictor Variables and Regression Block

Variable number	Variable title	Block
1	Gender	1
2	Age	1
3	Financial aid recipient	1
4	Geographic proximity	1
5	Disability status	1
6	College GPA (cumulative)	2
7	Completed developmental reading course	2
8	Completed developmental writing course	2
9	Completed developmental mathematics course	2
10	Completed college composition course (ENG 111)	2
11	Completed computer course (ITE 102, 115, 119 or IST 117)	2
12	Completed orientation course (SDV 100)	2
13	Previous college degree	2
14	Previous college credit*	2
15	Total completed credit hours [#]	2
16	Total grades of "W" withdrawal	2
17	Total number of online courses completed	2
18	Student status (FT/PT)	3
19	First semester freshman	3
20	First online course	3
21	Total credit hours attempted this semester	3
22	Total courses attempted this semester	3
23	Online credit hours attempted this semester	3
24	Online courses attempted this semester	3
25	Online course duration	3

*Previous college credit includes transfer, advanced placement, CLEP, advanced standing, and credits from previous quarter system.

[#]Transfer and developmental credits earned are excluded from these totals.

success. Second, it allowed the researcher to evaluate individual predictors that were statistically significant.

The Nagelkerke pseudo R^2 indicated that the model accounted for 14.8% of the total variance in online course success. Prediction success for the cases used in the development of the model varied little from the constant-only model (67.8%), with an overall prediction success rate of 69.5%. While correct prediction rates for those completing the course was relatively high, 90.7%, correct prediction rates for those not completing the course was very low, 24.7%. This means that the 25 predictor model could accurately predict (nine times out of ten) those students who would receive grades of A, B, or C in the online course. However, the 25 predictor model could not accurately predict (one time out of four) those students who would receive grades of D, F, W, or I in the online course.

This regression model failed both to explain a great proportion of the variance and to accurately predict students who would not be successful in online courses. The remaining value of the regression analysis was that it identified four factors as significant variables. While the contribution of individual factors cannot be evaluated, these factors informed some association with online course success. Table 12 presents the regression coefficients (B), the Wald statistics, significance level, odds ratio (Exp B), and the 95% confidence intervals (CI) for odds ratios for each predictor.

Research Question #1

In this study, two research questions sought to identify academic factors that might predict online course success for community college students. The first research question addressed academic factors measured prior to online course enrollment that

Table 12

Logistic Regression for Predicting Course Completion

Block Title	B	Wald	Sig.	Exp (B)	95% CI for Exp (B)	
					Lower	Upper
Gender	-.108	.212	.645	.898	.567	1.421
Age	.175	3.128	.077	1.191	.981	1.447
Financial aid recipient	-.228	.917	.338	.796	.499	1.270
Geographic proximity	-.633	4.717	.030*	.531	.300	.940
Disability status	-.043	.003	.959	.957	.180	5.087
Cumulative GPA	.293	5.858	.016*	1.340	1.057	1.698
Developmental reading	.596	.860	.354	1.815	.515	6.392
Developmental writing	.050	.018	.893	1.051	.512	2.156
Developmental math	-.013	.002	.962	.987	.584	1.668
College composition	-.066	.046	.830	.937	.515	1.703
Computer course	.351	1.612	.204	1.421	.826	2.442
Orientation course	.005	.000	.986	1.005	.590	1.711
Previous college degree	.138	.167	.683	1.148	.592	2.229
Previous college credit	.096	.119	.730	1.100	.639	1.897
Total credit hours	.003	.138	.710	1.003	.987	1.020
Total "W" grades	.025	.079	.779	1.025	.863	1.217
Total online courses	.049	.658	.417	1.050	.933	1.183
Student status (FT/PT)	-.321	.817	.366	.726	.362	1.454
First semester freshman	.209	.850	.357	1.233	.790	1.923
First online course	.278	.761	.383	1.321	.707	2.469
Credit hours (semester)	-.264	5.368	.021*	.768	.614	.960
Courses (semester)	.804	5.111	.024*	2.235	1.113	4.487
Online credits (semester)	-.111	.431	.512	.895	.643	1.246

*Significant at $p < .05$

Table 12 continued

Block Title	B	Wald	Sig.	Exp (B)	95% CI for Exp (B)	
					Lower	Upper
Online courses (semester)	-.092	.032	.859	1.097	.396	3.035
Course duration	-.267	.741	.389	.766	.417	1.406

**Significant at $p < .05$*

might be predictors of online course success. The results suggested cumulative college GPA as a positive predictor of online course success in community college students ($B = .293, p < .05$). Also, the results suggested that one demographic factor present prior to online enrollment, geographic proximity to campus, as a negative predictor of online course success in community college students ($B = -.633, p < .05$).

Research Question #2

The second research question addressed academic factors measured during online course enrollment that might be predictors of online course success. The results suggest that total courses attempted (during the semester studied) is a positive predictor of online course success in community college students ($B = .804, p < .05$). The results suggest that total credits attempted (during the semester studied) is a negative predictor of online course success in community college students ($B = -.264, p < .05$).

Summary

The purpose of this study was to identify academic factors that might predict online course success for community college students. Seventy-eight factors (independent variables) were initially examined for their usefulness in predicting one dichotomous criterion (dependent) variable. Research questions sought to determine (a) academic factors measured prior to online course enrollment and (b) academic factors present

during enrollment in the online course might be predictors of online course success for community college students.

Data screening and evaluation resulted in a reduction to twenty-five factors (independent variables) to remove confounding variables and reduce interactions within the data. An unordered logistical regression was conducted to examine the predictive value of twenty-five factors on online course success, and the results of the logistical regression analysis indicated that the constant by itself was already a statistically significant predictor, as evidenced by a significant Wald statistic ($p=.000$) in the control block of the regression output.

Continued analysis of the logistical regression identified four factors as significant predictors of online course success. For factors measured prior to enrollment, cumulative college GPA was a positive predictor of online course success. For demographic factors, geographic proximity to campus was a negative predictor of online course success. For factors present during enrollment, total courses attempted (during the semester studied) was a positive predictor and total credits attempted (during the semester studied) was a negative predictor of online course success. The final chapter summarized this study, provided conclusions based upon the data collected, discussed research findings relative to similar studies, established relevant implications for practice, and provided recommendations for future study.

CHAPTER V

SUMMARY, CONCLUSIONS & RECOMMENDATIONS

This study examined academic factors that might predict online course success for community college students. This chapter summarizes the study, presents conclusions based upon the findings, and provides recommendations for future studies based on the results of this study.

Summary

The popularity of the online learning environment increased over the past decade, but online course retention, the continued participation of a student in the same course, remained a significant challenge. Attempts to describe the underlying causes of this discrepancy abounded with the majority focused on online course retention from the perspective of student performance, student satisfaction, or as it related to specific instructional methodologies and technologies. Although these studies described some skills and behaviors exhibited in online course environments, a comprehensive set of predictors for online course retention had yet to be developed. Therefore, the purpose of this study was to identify academic factors that might predict online course success for community college students.

Seventy-eight factors (independent variables) were initially examined for their usefulness in predicting one dichotomous criterion (dependent) variable. Research questions sought to determine (a) academic factors measured prior to online course enrollment and (b) academic factors present during enrollment in the online course that might be predictors of online course success for community college students.

Online course retention was a focus of national research and debate as well as a consideration of policy and practice at individual colleges and within college systems (Allen & Seaman, 2011; NCES, 2011). The relationship of retention to accomplishing educational goals was easy to recognize: one must complete individual courses in order to complete an entire degree or credential. With continued demand for flexible online learning environments, assembling an accurate inventory of factors that might predict retention was critical to these students, colleges, and communities.

This study was unique because it included two academic factors (developmental course enrollment and concurrent online course enrollment) and two demographic factors (disability status and military status) not previously evaluated as predictors of online course success in community college students. This study also evaluated academic factors both prior to enrollment and during enrollment in an online course. The outcomes can offer a significant contribution to community college education because identified predictors might be used to guide the development of academic policies and student services that support success in online courses.

This study was limited to academic factors that might predict online course success. The population was limited to students enrolled in online courses at one urban, multi-campus community college, and the method of course delivery was limited to asynchronous online courses distributed through Blackboard[®] course management software. The factors examined were selected based on identified gaps found in the literature; additional variables might have been overlooked. These limitations will affect the ability to generalize the results of this study to dissimilar populations.

A random sample of 20 online course sections held during Fall 2009 semester at one multi-campus, urban community college resulted in 491 enrollees being examined for seventy-eight factors that might predict online course success. Secondary data included course rosters, test scores, enrollment history, and demographic characteristics. Data were extracted from the student registration system in queries, by departmental staff, and by the researcher during individual review of each student record. The researcher merged data into one master Excel spreadsheet and imported it into a new file in Statistical Package for the Social Sciences (SPSS) version 15 software for analysis. Frequency tables were examined to screen for correct coding, observe the distribution of responses, and ensure that adequate data were available for each variable. Data entry errors in coding were researched and corrected. Nine of the initial variables were removed from the analysis because more than 5% of the data were missing. These variables included: (a) high school diploma/GED, (b) COMPASS^R reading score, (c), COMPASS^R writing score, (d) COMPASS^R mathematics algebra score, (e) COMPASS^R mathematics college algebra score, (f) COMPASS^R mathematics pre-algebra score, (g) race/ethnicity, (h) marital status, and (i) military status.

Demographic variables collected in this study provided a description of the sample. The majority of students in the sample were female (68.2%, $n=335$) and non-traditional in age (55%, $n=270$). The sample consisted of individuals identifying with each of the seven racial/ethnic groups; the majority of students self-identified as white (46.2%, $n=227$) or black/African American (37.9%, $n=186$). The sample included more non-military students (51.3%, $n=252$) than military students, spouses, or dependents (23.3%, $n=115$). The majority of students, 62.5% ($n=307$), were financial aid recipients

and resided inside the community college service area (86.2%, $n=423$). Less than 2% of the students in the sample received disability services during the semester in question (1.6%, $n=8$). The marital status was excluded because it was “unreported” for 97.1% ($n=477$) of the sample.

An unordered logistical regression evaluated the predictive value of these factors for online course success. Sixty-nine factors (independent variables) were divided into three blocks prior to analysis. Results of the logistical regression analysis indicated that the sixty-nine predictor model did not provide a statistically significant improvement over the constant-only model because the constant by itself was already a statistically significant predictor, as evidenced by a significant Wald statistic ($p=.000$) in the control block of the regression output.

Further analysis of the data led the researcher to remove six confounding variables and reduce the predictor variables to a total of twenty-five. Again, the results of the logistical regression analysis indicated that the constant by itself was already a statistically significant predictor, meaning that the addition of variables did not improve the ability to predict the outcome, online course success. Continued analysis of the logistical regression output identified four factors as statistically significant predictors of online course success in community college students.

The first research question addressed academic factors measured prior to online course enrollment that might be predictors of online course success. The results suggest cumulative college GPA is a positive predictor of online course success in community college students ($B=.293$, $p<.05$). Also, the results suggest that one demographic factor

also present prior to online enrollment, geographic proximity to campus, is a negative predictor of online course success in community college students ($B=-.633, p<.05$).

The second research question addressed academic factors measured during online course enrollment that might be predictors of online course success. The results suggest total courses attempted during the semester is a positive predictor of online course success in community college students ($B=.804, p<.05$). The results suggest total credits attempted during the semester is a negative predictor of online course success in community college students ($B=-.264, p<.05$).

Conclusions

This study examined academic factors that might predict online course success for community college students. Research questions sought to determine academic factors measured prior to online course enrollment and academic factors present during enrollment in the online course that might be predictors of online course success for community college students. This section discussed the conclusions drawn from data analysis in light of the research for the predictive model and the individual research questions.

The first research question asked, “what academic factors measured prior to online course enrollment might be predictors of online course success for community college students?” Twelve academic factors were examined in this research question; of those factors, cumulative college GPA was the only statistically significant predictor of online course success in this study ($B=.293, p<.05$). This finding was consistent with two existing studies in the literature that examined the relationship between college GPA and online course success (Aragon & Johnson; 2008; Wojciechowski & Palmer, 2005). Both

studies found statistically significant positive relationships between college GPA and online course success for community college students, though the strength of the relationship varied from low ($r=.24, p<.05$) in the former study (Aragon & Johnson, 2008), to strong ($r=.617, p<.000$) in the latter study (Wojciechowski & Palmer, 2005).

The second research question asked, “what academic factors present during enrollment in the online course might be predictors of online course success for community college students?” Eight academic factors were examined in this research question, and of those factors, two were statistically significant predictors of online course success in this study. Total courses attempted during the selected semester was a statistically significant positive predictor of online course success ($B=.804, p<.05$), and total credits attempted during the semester was a statistically significant negative predictor of online course success ($B=-.264, p<.05$).

The finding of total credits attempted (during the semester studied) as a negative predictor of online course success for community college students is inconsistent with the literature. Aragon and Johnson (2008) evaluated course load separately as total credits attempted and online credits attempted and found significant positive relationships between total credits attempted and online course success, as well as online credits attempted and online course success. The use of total courses attempted as a variable, as opposed to credit hours attempted, was unique to this study and not previously addressed in the literature.

Of the eight demographic variables collected to describe the sample, five were examined in the final regression analysis and one variable, geographic proximity, was a statistically significant negative predictor of online course success in this study ($B=-.633,$

$p < .05$). The inclusion of geographic proximity as a variable in this study was fueled by Billings (1988) theory on retention for distance learning/correspondence courses which suggested that proximity to the instructor was a valuable predictor of correspondence course completion, an earlier format of distance learning. The findings of the current study supported Billing's (1988) theory that proximity to instructor influenced student success in a distance learning course.

Finally, this study resulted in the broad conclusion that online course success in community college students is a complex issue that cannot be explained by academic factors alone. The study examined a multitude of academic factors, four of which have been discussed individually as significant predictors of online course success. Yet, the study failed to produce a set of academic factors that could accurately discriminate between community college students who were successful and those who were unsuccessful in online courses. This suggests that either the correct academic factors were not examined or that the prediction of online course success in community college students cannot be based solely on academic factors.

Success or non-success in online courses may not be as much of an academic factor as a combination of academic and social factors. Based on theoretical frameworks, overall college student retention is the result of many factors, and perhaps the same holds true for individual classes. When evaluating retention models to determine an appropriate theoretical framework, Liu et al. (2007) pointed out that all the models emphasized that multiple factors, and the interaction of those factors, influenced the decision to drop out or complete an academic course or program. Differences in methodology, time constraints, and access to students to measure the multitude of variables included by these

models limited the ability of researchers to measure all the proposed factors at one time and do it well. Thus, this study was viewed as the first step in a process to determine which academic factors might predict online student success. However, other retention models including both academic and social factors, and future studies attempting to predict online course success in community college students should be similarly comprehensive.

Recommendations

Based upon the findings of this study, the following recommendations are offered:

1. Cumulative college GPA was evaluated as a prior to online course enrollment factor and found to be a statistically significant positive predictor of online course success for community college students in this study. Further study should evaluate the role of grade point average in predicting online course success for community college students.
2. Course load (during the semester studied) was evaluated from two perspectives, total courses attempted and total credits attempted, as during online course enrollment factors. The total number of online and traditional courses attempted during the semester was a statistically significant positive predictor of online course success, and total number of credits attempted during the semester was a statistically significant negative predictor of online course success. Further study should evaluate the relationship between total courses and total credits as well as overall course load and online course success for community college students.
3. Geographic proximity to campus was evaluated as a demographic factor and found to be a statistically significant negative predictor of online course success in

community college students. Further study should address the relationship between geographic proximity and online course success for community college students.

4. COMPASS^R placement test scores for reading, writing, and mathematics were initially included as academic factors in this study, but later had to be excluded because more than 5% of the data were missing. Further study should determine methods to collect these missing variables to evaluate them as predictors of online course success in community college students. Future research might also focus on evaluating online course success exclusive to students required to complete developmental reading, writing, and/or mathematics coursework.
5. Marital status, military students, and race/ethnicity were initially included as demographic factors in this study, but later had to be excluded because more than 5% of the data were missing. Further study should determine methods to collect these missing variables to evaluate them as predictors of online course success in community college students. These data might also be utilized to describe the demographics of community college online students.
6. Disability status was included as a demographic factor in this study, but a very small portion of the sample (n=8, 1.6%) were students with documented disabilities. The challenges of online course success for community college students with disabilities remains relatively unexplored, and further study should focus on this demographic group.
7. Academic discipline was not included as academic factor in this study, but it may impact the methodologies utilized in the online course environment. Some

academic disciplines may be inherently more difficult than others, thus impacting online course success rates. Further study should evaluate the impact of academic discipline on online course success for community college students.

8. Course instructor was not included as academic factor in this study. The course instructor exercises great control over the learning environment, in many cases playing an active role in the course design. Course organization, communication style, and many other factors vary by instructor. Further study should remove the “instructor effect” by evaluating the online course success of a single or comparable courses taught by the same instructor.
9. In the conclusions, the researcher suggested that online course success in community college students is a complex issue that is not limited to academic factors. Further study should seek out student perspectives regarding online courses to determine what other factors may contribute to successful and unsuccessful online course experiences for community college students.
10. Finally, further study should be guided by the many theoretical models of retention to incorporate academic factors, social factors, and other relevant factors to provide a comprehensive analysis of online course success in community college students.

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APPENDIX A

LETTER OF APPROVAL FROM COMMUNITY COLLEGE



VICE PRESIDENT FOR STUDENT AFFAIRS

HAMPTON CAMPUS

December 3, 2009

TO: Christy Hawkins, Assistant Professor of Health

FROM: Dr. Beverly Walker-Griffea, Vice President of Student Affairs *BWG*

RE: Research Project Proposal

Thank you for meeting with me to discuss your research proposal entitled *Academic Predictors of Online Course Success in the Community College*. The project is quite timely as the system is working to develop strategies to increase online course retention. I believe your research may provide some insights to contribute to this process here at Thomas Nelson Community College. Therefore, I am pleased to grant approval to conduct this research project.

I understand that an *Application for Exempt Research* will be reviewed by Old Dominion University and approved prior to data collection. I understand that this research falls under exemption category 6.4, defined as "Research, involving the collection or study of existing data, documents, records . . ." of federal research standards. As outlined in the requirements for this exemption category, I expect that the information acquired from student records will be stripped of identifiers. I also understand that you intend to store data in password-protected files and locked filing cabinets during analysis, and dispose of data in a manner that protects confidentiality once the project and subsequent projects approved for this data are complete. While not included in your dissertation proposal, we have discussed additional variables that you wish to collect for a future research project and I understand that these additional variables will be included in the application. I further acknowledge that Old Dominion University will review procedures outlined in the application and make any needed modifications to protect the confidentiality of student records.

Based on your proposal, I understand that you will need access to student transcripts and enrollment records to collect the needed variables. Once the application is approved, I will follow the procedures outlined in your proposal to contact other departments and grant access to these records. It is my understanding that no student contact will be needed to collect this data. As a faculty member at this institution, I know you have the integrity to maintain confidentiality of individual student records you may access during this process.

As your research progresses, we can discuss if it is in the best interest for you to identify the institution in your dissertation. If your project is submitted for publication or presentation, I do request an opportunity to review your finalized proposal for the same reason. I look forward to working with you on this project and your findings that can assist in student success. If you have any questions or concerns, feel free to contact me at 757-825-3810 or WalkerGriffeaB@tncc.edu.

Serving Hampton James City County Newport News Poquoson Williamsburg York County

99 Thomas Nelson Drive • P.O. Box 9407 • Hampton, VA 23670 • Phone: 757.825.3810 • V/TDD: 757.825.2853 • Fax: 757.825.3857

www.tncc.edu

APPENDIX B

LETTER OF APPROVAL FROM OLD DOMINION UNIVERSITY



DARDEN COLLEGE OF EDUCATION
 OFFICE OF THE DEAN
 NORFOLK, VIRGINIA 23529-0136
 PHONE: 757-683-3936
 FAX: 757-683-3083

March 16, 2010

Proposal Number 200902086

Dr. Reed:

Your proposal submission titled, "Academic Predictors of Online Course Success In Community Colleges" has been deemed EXEMPT from IRB review by the Human Subjects Review Committee of the Darden College of Education. If any changes occur, especially methodological, notify the Chair of the DCOE HSRC, and supply any required addenda requested of you by the Chair. You may begin your research.

We have approved your request to pursue this proposal indefinitely, provided no modifications occur. Also note that if you are funded externally for this project in the future, you will likely have to submit to the University IRB for their approval as well.

PRIOR TO THE START OF YOUR STUDY, you must send a signed and dated hardcopy of your exemption application submission to the address below.
 Thank you.

Edwin Gómez, Ph.D.
 Associate Professor
 Chair, Human Subjects Review Committee, DCOE
 Human Movement Studies Department
 Old Dominion University
 2010 Student Recreation Center
 Norfolk, VA 23529-0196
 757-683-6309 (ph)
 757-683-4270 (fx)

VITA

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 STEM Education & Professional Studies
 Old Dominion University
 Education Building, Room 228
 Norfolk, Virginia 23529
 chawk014@odu.edu

ACADEMIC DEGREES

Masters of Science, Physical Education, University of South Carolina (1997)
 Bachelors of Science, Health Science, James Madison University (1996)

PROFESSIONAL EXPERIENCE

Thomas Nelson Community College, Hampton, Virginia
 2010-2012: Department Head/ Assistant Professor of Health
 2006-2010: Assistant Professor of Health
 2006: Director of Continuing & Professional Education (change of title)
 2003-2006: Program Administrator, Workforce Training & Continuing Education
 2001-2003: Program Manager, Workforce Training & Continuing Education

City of Newport News, Newport News, Virginia
 1998-2001: Recreation Program Coordinator

SELECT PRESENTATIONS, GRANTS AND PUBLICATIONS

Presentation: Hawkins, C. D. (2012, June). *Not Going the Distance: Perspectives of the Unsuccessful Online Student*. Distance Learning Administration Conference, Jekyll Island, Georgia.

Presentation: Hawkins, C. D., & Burge-Hall, V. (2012, March). *Survival of the Fittest: Maintaining Your Endurance Through a Doctoral Program*. New Horizons Conference, Roanoke, Virginia.

Presentation: Hawkins, C. D. (2011, April). *Who Will Reach the Finish Line: Predicting Student Success in Online Courses*. New Horizons Conference, Roanoke, Virginia.

Funded Grant: Thomas Nelson Community College Foundation. (February 2010). \$2,500 mini-grant to conduct research on academic predictors of student success in online courses, Hampton, Virginia.

Presentation: Hawkins, C. D. (2009, August). *E-Learning: Are You Engaging Generation Digital?* Society for Applied Learning Technologies Conference, Washington, DC.

Poster Presentation: Hawkins, C. D. (2009, June). *A Ten-Minute Appointment: Recipe for Student Success*. The Teaching Professor Conference, Washington, DC.

SELECT PRESENTATIONS, GRANTS AND PUBLICATIONS (continued)

Presentation: Hawkins, C. D., & Thomas, J. A. (2009, April). *Taming the Digital Natives*. On Course National Conference, Raleigh, North Carolina.

Presentation: Hawkins, C. D. (2009, April). *Faculty and Administrator Perspectives on Online Course Retention*. Council for the Study of Community Colleges (CSCC) Conference, Phoenix, Arizona.

Journal Article Publication: Hawkins, C. D. (2009). Faculty and administrator perspectives on online course retention: A case study. *Enrollment Management Journal*, 3(3), 74-89.

Presentation: Hawkins, C. D. (2007, March). *Transitioning Noncredit Workforce Development Courses to Create Credit Career Pathways*. New Horizons Conference, Roanoke, Virginia.

Funded Grant: Langley Air Force Base Family Support Services. (2007). \$8,000 grant to provide pharmacy technician training for military spouses in Hampton, Virginia (training partner for grant).

Presentation: Hawkins, C. D. (2006, October). *Combining Noncredit and Credit Courses: A Unique Career Pathway in Medical Office Administration*. National Council for Continuing Education & Training Conference, Milwaukee, Wisconsin.

Textbook Publication: Amato, H.K., Hawkins, C. D., & Cole, S.E. (2006). *Clinical Skills Documentation Guide for Athletic Training*. Slack, Incorporated.

Funded Grant: Langley Air Force Base Family Support Services. (2005). \$10,000 grant to provide medical office occupations training for military spouses in Hampton, Virginia (training partner for grant).

Funded Grant: Verizon Foundation. (2004). \$20,000 one year grant to provide computer training opportunities for underprivileged adults in Williamsburg, Virginia.

Presentation: Hawkins, C. D., & Cannon, T. D. (2003, April). *Partnerships Connect Students to New Careers in Allied Health and Technology*. New Horizons Conference, Roanoke, Virginia.

Presentation: Burrows, C., & Hawkins, C. D. (2002, October). *Medical Office Assistant: Pathway to a New Career*. National Council for Continuing Education & Training Conference, Richmond, Virginia.

HONORS AND AWARDS

2012, Virginia Community College System Leadership Academy
 2008-2009, Chancellor's Faculty Fellow, Virginia Community College System
 2008-2009, Iota Lambda Sigma Honor Society, Old Dominion University
 2007, President's Excellence Award, Thomas Nelson Community College
 2005, President's Excellence Award, Thomas Nelson Community College