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FACTORS AFFECTING RETENTION IN ONLINE COURSES

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ABSTRACT

The purpose of this study was to expand what is known regarding the factors that relate to successful completion of online, undergraduate college courses. It addressed 13 student factors available through archival data at Northern Kentucky University based on 1,493 students enrolled in fully online courses in fall 2008. It included programmatic membership as the fourteenth variable. The study employed both logistic regression analysis and multiple regression analysis. The dependent variable for the logistic regression analysis was dichotomous based on completion of all online courses with a grade of “D” or better (yes or no). The dependent variable for the multiple regression analysis was a continuous variable, percentage of online courses completed. The following variables were found to have a positive relationship to successful completion of online courses: applying for financial assistance, GPA, senior year in college, major in health and human sciences, major in a STEM field, and tuition residency of metro rate. The following variables were found to have a negative relationship to successful completion of online courses: race of Black and freshman year in college. The freshman year in college only showed as a significant variable in the multiple regression analysis.

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CHAPTER 1

Introduction

The Commonwealth of Kentucky is committed to improving higher education and with good reason: The state ranks second to last in bachelor degree attainment. Approximately 27% of Americans aged 25 or older hold a bachelor degree compared to only 19% in Kentucky (UNITED STATES Census Bureau, 2005-2007 American Community Survey). In 1997, the state legislature passed the Kentucky Postsecondary Improvement Act which articulated a clear goal that Kentucky reach the national bachelor-attainment level by the year 2020 (State of Kentucky, 1997). Reaching the national level will require consistent and persistent improvement at all educational levels. The Kentucky Council for Postsecondary Education (2005) has identified five specific goals: improved high school graduation rates; increased college-going rates among high school graduates; more matriculations from associate-degree holders to bachelor programs; more returning adult learners; and better retention rates of existing students.

At Northern Kentucky University (NKU), retention is a serious problem. NKU ranks seventh of eight state public institutions in retention of first-time freshman students (Kentucky Council for Postsecondary Education, 2008) and has begun several initiatives to determine why more students do not persist to graduation. Through one such initiative, the university polled students to learn more about what would encourage them to persist. Both current and withdrawn students suggested that increased flexibility in course delivery methods and specifically more

online courses may positively impact their retention (Noel Levitz, 2008b; Northern Kentucky University, 2007, 2008). However, prior industry research indicates that students who take online courses complete them less frequently than they do face-to-face courses (Bernard et al., 2004; Mitchell, 2009; Sapp & Simon, 2005). In fact, some institutions report that retention in online course sections is as much as 20% lower than in face-to-face courses (Aragon & Johnson, 2008; Carr, 2000).

This creates a dilemma. Students indicate they want more online classes to increase their persistence, but encouraging students to take online courses may actually negatively impact retention. Ideally, NKU should determine what types of students are most likely to successfully complete online courses before encouraging them to take them, either directly through advising or indirectly by increasing the number of online course sections.

NKU is not the only institution lamenting low retention rates. In fact, retention is a much-discussed issue in higher education (Bean & Metzner, 1985; Kuh, 2008; Tinto, 2006). Yet even as more emphasis is placed on retaining students, retention rates are actually decreasing as evidenced by the 2007-08 freshman-to-sophomore retention rates, which sunk to the lowest point in 25 years (Lederman, 2009). Retention is a complex issue involving a multitude of academic, social, and behavioral factors that are difficult to define and harder to control (Astin, 1975, 1993; McGivney, 2004; Tinto, 1993, 2006). Further, these factors change over time as the needs and expectations of students and institutions change (Tinto, 2006). Despite the complexity of the problem, calls for accountability in higher education have heightened the need for institutions to improve retention. As Tinto (2006) aptly stated, retention “matters now more than ever” (p. 5).

Statement of the Problem

In summary, universities are scrambling to increase retention at the same time retention rates are tumbling. Meanwhile students indicate they want more flexible delivery options and specifically more fully online courses. Enrollment growth in the online courses over the past decade illustrates this (Allen & Seaman, 2007, 2008). Yet research indicates students drop online courses more frequently than face-to-face courses, further lowering retention rates.

What makes some students successful in online courses while others do not successfully complete them? This is not an easy question to answer because so many types of factors could impact both course completion and overall college retention. Some factors relate directly to the student (such as college readiness and motivation), some relate to the institution (such as faculty involvement and student services), and some relate to the external environment (such as family support and non-school commitments) (Astin, 1975; Bean, 1980; Pascarella & Terenzini, 2005; Spady, 1970; Tinto, 1993, 2006). With regard to online learning, researchers have also linked student satisfaction with learning in an online environment and specific course design to course completion (Aragon & Johnson, 2008; Bernard et al., 2004; Dobbs, Waid, & del Carmen, 2008; Sun, Tsai, Finger, Chen, & Yeh, 2008).

NKU has just begun to study retention and, like many institutions (Carr, 2000), has not studied online course retention at all. If the university could understand the relationship between a variety of factors and online course completion, it could help students make good decisions about enrolling in online undergraduate courses. This in turn may impact overall retention rates and persistence to graduation.

Purpose of Study

The purpose of this study was to expand what is known regarding the factors that relate to successful completion of online, college courses. Specifically, it addressed 13 factors available through archival data at NKU. These variables encompassed a variety of demographic and academic characteristics that will be described and discussed in detail in Chapter 3. They were:

1. Age
2. Gender
3. Race
4. Residency
5. Application for federal financial assistance
6. Receipt of federal financial assistance
7. Placement in developmental reading, writing or mathematics course(s)
8. Prior completion of an online course at NKU
9. Prior completion of an introductory computer/information technology course
10. Academic major
11. Year in college
12. Credit hours attempted in fall 2008
13. College grade point average at start of fall 2008

While other studies have explored similar student characteristics and academic characteristics, NKU is uniquely positioned to add to the body of research with regard to the fourteenth factor: programmatic membership. Five distinct types of students take undergraduate online courses at NKU. Each student was identified as belonging to one of the following five categories. All students were categorized in only one category.

Employer-sponsored students. These students have been selected by their employer to enter an academic program (pending admission by the university), and the employer pays the students' tuition and fees directly to the university. Often courses are delivered at the employer's site or through a combination of onsite and online coursework. Typically, employer-sponsored programs are delivered in a cohort model. In a *cohort model*, students take a series of courses as a group. NKU partners with several healthcare employers to provide onsite, cohort-based degree completion programs to nurses and allied health professionals. These programs include a mix of face-to-face and online courses. In some cases, the online courses are "closed" or exclusive to the cohort members; in other cases, cohort members take online courses with the general student population.

Fully online students. In fall 2008, NKU offered five undergraduate programs fully online (Bachelor of Arts in organizational leadership; Bachelor of Science in construction management for surveyors; Bachelor of Science completion program for registered nurses; Bachelor of Science in Health Science completion program for allied health professionals; and a non-degree certificate in business informatics). These students have indicated a desire to complete their entire program in the online format. They are given priority in registering for the online course sections. Near the start of a new session, enrollments in online program courses are opened to the general student population if space is available.

The Program for Adult-Centered Education (PACE). PACE is a hybrid program that combines weekly face-to-face meetings with web-enhanced instruction. While PACE is not truly a cohort-based program, the lock-step nature of the course sequencing means that most PACE students entering in a given semester take the majority of their courses together and thus function largely like a cohort group. Some PACE courses are 100% online and offered as

“closed” sections (only open to PACE students). However, non-PACE students are permitted to take PACE classes when space is available.

Interlopers. Students who took available seats offered initially for employer-sponsored, fully online, and PACE students were classified in this study as interlopers.

General student population. NKU offers many sections of fully online courses that are open to the general student population. Any student who did not fit in one of the other four groups and took at least one online course during fall 2008 was identified as part of the general student population. Students taking only face-to-face courses were not included in the study.

Fourteen variables were considered for this archival study with programmatic membership highlighted as a key feature of the study. There are pros and cons of using archival or secondary data in research. On the positive side, archival data are readily available. It is conceivable that other institutions of higher education capture many or all of the same variables used in this study. Archival data also eliminate the researcher bias that is often unavoidable in studies. On the other hand, there are several disadvantages to using archival data. Because data are limited to previously captured information, the data can dictate the research parameters. In this study, questions addressing student perceptions of course effectiveness, learning outcomes, and several other factors are omitted because they are not available via archival methods. Archival data also may limit the application of findings to the study institution if other institutions are not able to replicate the study variables. Plus, archival data prevent including current trends as study parameters (Boyd, Dess, & Rasheed, 1993).

Research Questions

There were two research questions for this study:

1. Is there a relationship between each of 13 student variables and successful completion of online, credit-bearing, undergraduate courses at NKU?
2. Is there a relationship between membership in one of five programmatic types and successful completion of online, credit-bearing, undergraduate courses at NKU?

Definitions

Following are definitions that were used throughout this study.

Cohort group. This refers to groups of students who take a series of courses together. For the purposes of this study, PACE students were considered to be part of a cohort group. This definition was somewhat loose in that students have the flexibility to alter their schedules or to sit out some terms and still remain part of the program. In some programs at other institutions, the cohort group is more rigidly defined in that students must take all coursework together and may not alter their schedules in any way.

Course completion. This term was used synonymously with *retention* and *persistence* and meant that students finish an online course with a passing grade. Courses for which a student received a grade of “F” or “I” was counted as unsuccessful completions.

Degree completion. This term was broadly applied to reflect satisfaction of the requirements for a bachelor’s degree. At NKU, one fully online undergraduate program (i.e., the certificate in business informatics) does not lead to a bachelor degree. Students in this program could not be expected to fulfill the requirements of a bachelor degree.

Distance learning. In this study, *distance learning* was used synonymously with the term *online learning* and referred to courses delivered wholly through the use of Internet-based

technology. Similarly, the terms *distance learners* and *online learners* were used synonymously. In some other studies, *distance learning* is used to describe a variety of modalities that can be employed to deliver academic content at a distance (i.e., telecourses, correspondence courses, etc.) (Keegan, 2002).

Employer-sponsored program. Students whose employers have entered into a relationship with NKU to provide bachelor programs were part of employer-sponsored programs. In employer-sponsored programs, employers may encourage but do not require their employees to enroll in the programs. The employer pays the tuition charges for the students enrolled in the program directly to NKU.

Fully online program. This term referred to academic programs that can be completed with no face-to-face coursework. These students were assigned special program codes in the student database and were offered priority registration in designated online course sections.

General student population. This term referred to students who are not part of employer-sponsored, PACE, or fully online programs. Many fully online courses were open to these students, and they could take them without special permission as long as they meet the course prerequisites and there is availability in the section for them.

Hybrid course or hybrid program. This term referred to an academic course or program that combines face-to-face and online instruction.

Interlopers. Students from the general university population who complete online course sections intended primarily for students enrolled in a cohort, fully-online or employer-sponsored program were called *interlopers* in this study.

Lock-step program. In a lock-step program, students complete courses in a prescribed sequence, and each course is typically offered only during a specifically published timeframe.

Persistence. This term was used synonymously with *course completion* and *retention* and meant that students finished an online course with a grade of “D” or better.

Program for Adult-Centered Education (PACE). PACE is a lock-step program with courses offered in year-round eight-week sessions. Through the PACE program, students may complete baccalaureate degrees in computer information technology, business, organizational leadership, and integrative studies. An associate degree in integrative studies is also offered. PACE is intended for the working adult student who has completed a minimum of three to five years of full-time work experience (three years if the student has at least 60 transferrable semester hours, and five years if the student has completed no previous college experience or fewer than 60 hours).

Proprietary education providers or for-profit institutions. Used synonymously, these terms referred to a category of higher education providers with a profit motive. That is, they operate under a business model focused on financial gain through the provision of educational programming. Some proprietary companies are privately owned and some are publicly traded.

Retention. This term was used synonymously with *course completion* and *persistence* and means that students successfully finish an online course with a passing grade. The term was also used in relation to the body of literature addressing student persistence in academic programs.

Delimitations

This study considered only undergraduate courses. It addressed only course retention, not program or degree completion, and results should not be applied to program retention or persistence to graduation. The research was based on student archival data only. It did not consider student attitudes toward distance learning, satisfaction with the course or the instructor,

nor the students' personal learning styles. It did not attempt to factor in the difficulty or typical drop rate of any courses.

The study also did not consider issues of instructional design and interaction (i.e., how well designed or “good” the course is). Faculty expertise and experience with distance learning was not addressed. The faculty member's ability to engage students was not considered. It did not address cultural issues that may affect how easily minority and culturally diverse students comprehend the content or delivery methodologies. These factors could well be significant contributors to retention rates but were outside the scope of this student.

Limitations

Not all data were available on all students. For example, not all students apply for federal Title IV financial assistance. It is unknown if this reflects a lack of knowledge about how to apply, an assumption of ineligibility, or some other factor. Therefore, it is impossible to fully address the impact of Title IV eligibility on retention in online courses. Apart from those students whose tuition charges were covered by employer sponsorship, other forms of financial assistance (scholarships and tuition reimbursement) are not captured, and may significantly impact retention decisions. Further, since this study is confined to undergraduate courses, the results should not be applied to online graduate courses.

Summary

Online formats may provide increased flexibility to help students complete their courses, but prior research indicates that students tend to drop online courses more frequently than face-to-face courses. The purpose of this study was to expand what is known regarding the factors that relate to successful completion of online, undergraduate courses. It addressed 13 factors

available through archival data at NKU. It included programmatic membership as the fourteenth variable. There were two research questions for this study:

1. Is there a relationship between each of 13 student variables and successful completion of online, credit-bearing, undergraduate courses at NKU?
2. Is there a relationship between membership in one of five programmatic types and successful completion of online, credit-bearing, undergraduate courses at NKU?

Chapter 2 explores the history and proliferation of distance education and its impact on the landscape of higher education among a variety of learners. It highlights the findings of many previous studies regarding online learning and discusses research relevant to the key elements of this study.

CHAPTER 2

Literature Review

The purpose of this study was to expand what is known regarding the factors that relate to successful completion of online, undergraduate courses. It addressed 13 student factors available through archival data at NKU based on fall 2008 enrollment in fully online courses. It included programmatic membership as the fourteenth variable. There were two research questions for this study:

1. Is there a relationship between each of 13 student variables and successful completion of online, credit-bearing, undergraduate courses at NKU?
2. Is there a relationship between membership in one of five programmatic types and successful completion of online, credit-bearing, undergraduate courses at NKU?

This chapter explores trends and existing research regarding online learning. It also discusses other relevant elements of this study, such as hybrid learning models, employer sponsorship, cohort programs, and a variety of student characteristics. Because online learning is still predominantly accessed by nontraditional students, this chapter includes detailed descriptions of the literature that relates to nontraditional college students. Online learning is not limited to nontraditional students, however, and thus literature related to traditional students in online courses and overall student retention in higher education is also considered.

Evolution of Distance Education

Colleges and universities have taught students at a distance for centuries. Harting and Erthal (2005) traced the history of distance-based coursework in America to the early 1700s when professors first began offering correspondence courses, often arts-based, noncredit courses. In 1887, the Hatch Act provided federal funding for the establishment of research and experiment stations at land-grant universities that had been established under the Morrill Act of 1862 (Land-grant Colleges and Universities, 2009). The Smith-Lever Act of 1914 further expanded operations at experiment stations (now commonly called *extended campuses*) by providing federal funding for home economics and agriculture programs (Home economics, 2009). Then as media outlets developed, so, too, did their use for educational purposes. For example, institutions have used both radio and television for educational delivery. The advent of the personal computer led most institutions to shift emphasis to Internet and computer-based delivery (Harting & Erthal, 2005).

Collaborative educational systems like Western Governors University and statewide distance education systems in California and North Carolina are now the norm, as is distance delivery by for-profit entities. In the 2000-01 academic year, most institutions reported using the Internet and two-way video technology to deliver distance courses (Natriello, 2005). Draves (2000) concludes that online learning will continue to grow in popularity. Pressure from industry, young learners who are “technology natives” and online educational providers will lead to continued expansion of online programs. Draves believes institutions will ultimately embrace education as “an activity, not a place” (p. 23). Bonk (2009) takes this further and concludes that technology has forever changed education, stating “learning technologies of today not only

extend the places and times in which learning can occur, but they also offer changes in the types of learning that are now possible” (p. 12).

Some equate the demand for more online courses to the general move toward more consumerism in higher education. Today’s students tend to think of themselves as *customers* and mimic behaviors often associated with the marketplace. “Students are far less apt to accept poor teaching and badly designed materials and they put legitimate pressure on an institution to be responsive and accountable for its programmes (sic) and services” (Paul & Brindley, 2008, p. 442).

As for learning outcomes, numerous studies have indicated that students learn as much in distance-based courses as they do in “conventional on-campus classroom settings” (Pascarella & Terenzini, 2005, p. 100). However, Pascarella and Terenzini hold that there is inherent bias in most of those studies because students self-select into distance classes. That is, “the reasons why students take courses on campus or at distance sites... may represent a constellation of uncontrolled influences that bias the findings on distance learning and student achievement in unknown ways” (Pascarella & Terenzini, 2005, p. 101).

Growth in Online Delivery

Regardless of why they take them, online courses are increasingly popular. Since 2000, online enrollments have grown at rates that far exceeded the growth in all higher education. In 2007, for example, online enrollments grew by 12.9% compared to a 1.2% growth in total higher education enrollment (Allen & Seamen, 2008). The compound growth rate in online enrollments has exceeded 20% since 2001 (Allen & Seamen, 2007). Community colleges posted the highest enrollment gains and have accounted for 50% of all online enrollments since 2001. The explosion of online delivery at community colleges will be addressed in more detail later.

During the same time frame, the lowest rates of growth in online enrollments came from baccalaureate institutions (Allen & Seamen, 2007). In total, more than 3.9 million students, or more than 20% of all U.S. higher education students, were taking at least one online course in fall 2007 (Allen & Seamen, 2008). Allen and Seamen (2008) attribute the growth to a number of factors including the increased number of adults returning to college (and seeking flexible ways to complete their coursework) and the increased cost of commuting due to high fuel prices (which has led many students to take online courses to save money on gasoline).

Allen and Seamen (2007) note that one-third of all education institutions accounted for three quarters of all online enrollments. Many of these institutions are proprietary or for-profit institutions of higher education. In many ways, proprietary institutions have spurred the development of online education.

Impact of Proprietary Institutions

The largest proprietary higher education provider -- in fact, the largest higher education provider of any type -- in the United States is the University of Phoenix (UOP), a subsidiary of the Apollo Group, Inc. Apollo Group was founded by John Sperling in the early 1970s. Sperling, a Cambridge-educated economist who taught at San Jose State University, started the company to address the needs of working adult students, who were disenfranchised by traditional higher education institutions. Sperling developed academic programs that were flexible and predictable and incorporated amenities such as ample parking and ease of enrollment ("Universities have become more businesslike," 2005).

For its first 20 years of existence, the University of Phoenix primarily taught its courses in classroom settings. In 1989, it began offering courses in fully online formats via the newly

available Internet. UOP Vice President and Chief Operating Officer Brian Mueller said of early online delivery:

We were doing the experimenting necessary to figure out what the right model was. And so we went through that period of time where we lost money on (the online program), and we were willing to do that for the purpose of figuring out where we needed to be. By 1992, 1993 and 1994, we had developed the learning model that we knew would be successful in an online environment, so that when the Internet really started to explode we were in a perfect position to really be able to take advantage of that. (Roach, 2002, p. 54)

Kinser (2006) highlights UOP's heavy reliance on part-time instructors as one of its defining characteristics. Approximately 98% of UOP's 20,000 faculty members are part-time. This is in stark contrast to other proprietary institutions where 45% of faculty members are full time. Kinser further explains:

At 2-year for-profit institutions, 53% of the faculty work full-time. This is little different from the private, not-for-profit sector and substantially higher than the 33% full-time ratio at public community colleges. In short, the use of part-time faculty in for-profit higher education is principally a Phoenix contribution to the sector. (p. 27)

Kinser (2006) encourages looking at the operating practices of other institutions in the for-profit education industry in addition to UOP:

On the cusp of a new era in for-profit policy and practice, it is essential to acknowledge that this one institution is not representative of the for-profit world. The potential for the sector to make a substantial contribution to higher education options and opportunities is

significant. But the dynamics of the system should be the focus, not the University of Phoenix. (p. 27)

Indeed, the for-profit sector continues to outpace traditional institutions in terms of enrollment and revenues. The recent economic downturn has sent many adults back to school, and proprietary institutions have reaped the largest enrollment gain. The 10 largest for-profit college companies averaged 20% enrollment growth from fall 2008 to fall 2009 (Hendry, 2009).

The growth of the for-profit sector has forced traditional colleges and universities to take note and follow suit by offering online and hybrid programs. Most have moved reluctantly, and Cronin and Bachorz (2006) predict their hesitancy will last for some time:

The concepts of online education and for-profit providers will be accepted by the masses well before the academy concedes any merit. Online programs and degrees will continue to grow, and get better, because consumers and accreditors will force out the pretenders... accrediting association staffs have “gone to school” to learn about hedging the risks of for-profits and safeguarding online academic opportunities and student services. (p. 20)

They predict the families of traditional students will “dismiss the online options for their children” (p. 20) but that adult students will continue to clamor for online education.

Despite this reluctance, many of the most respected institutions in higher education, including Duke University, Harvard, Cornell, and New York University, now offer online and hybrid programs (Cronin & Bachorz, 2006). Often, they compete head-to-head for the same potential students as the for-profit institutions. Regional public universities have also found themselves competing with proprietary schools, and many have turned to residents in their own service area to market their online programs. Parry (2009) sums the movement in this way:

Commuter-serving urban universities can't match the marketing muscle of faster-growing, for-profit, online colleges. What they can try to do is parlay stronger local brands, cheaper tuition, and blended programs that shift a lot of class time online into an appealing package for area adults. The kind of adults who might value coming to campus periodically but struggle to do it three times a week. (p. A9)

Traditional 4-year public and private institutions are also being challenged by community colleges, which have aggressively developed online programs.

Explosion of Online Learning at Community Colleges

As noted earlier, more than half of all online enrollments between 2001 and 2006 were at 2-year institutions. This is particularly noteworthy because they teach only 37% of all higher education courses offered in the United States (Allen & Seamen, 2007). In total, 3.9 million community college students took at least one fully online course in 2008. Expansion of online learning has the potential to significantly impact the primary mission of community colleges, namely open access to higher education. Willis (2002) asserts that the “greatest benefit of distance education is its potential for providing access to historically underserved, place bound, and highly motivated populations” (p. 460).

The access mission is foundational to community college operations:

The community colleges' proverbial *open door*, which ensures access for all who can benefit, is the foundation on which all other community college operations rest. The open door concept influences admissions and enrollment processes, curricular structures, faculty hiring, the relationships between community colleges and 4-year institutions, advising and counseling activities, and colleges' responses to the needs of the K–12 sector, as well as those of the local economy. (Shannon & Smith, 2006, p. 16)

Critics attribute the high dropout rate at community colleges to this open-door mission and note that the “revolving door” (Stahl & Pavel, 1992, p. 3) at many community colleges is costly both financially and in terms of “psychological loss, disappointment and decreased earning potential” (Stahl & Pavel, 1992, p. 3) among failed students. The high dropout rates are particularly noteworthy in light of the high percentage of minority and women students who attend community colleges.

Over the past decade, community colleges have turned toward online learning to support the open access mission and to offer options for course and degree completion to their students (Allen & Seamen, 2007; 2008). Community colleges often experience paradigm shifts in their operations in order to successfully implement online programs (Stumpf, McCrimon, & Davis, 2005). Mitchell (2009) noted that significant organizational changes are required to accommodate the online learning environment. She distinguishes between structural changes that include technology infrastructure and computer networks and what she termed “second order” or cultural changes (Mitchell, 2009, ¶ 5) in the organization. She notes the evolution of online learning from its early days when instructors provided content and students tended to regurgitate facts to today’s emphasis on collaboration, interaction, group work and engagement. This change may require “paradigmatic shifts in relation to technology and pedagogy” (Mitchell, 2009, ¶ 7) as online education becomes “ingrained” (¶ 7). Specifically:

The move toward online education requires an acceptance of technology in relation to teaching. The idea that teaching and learning can legitimately occur without regard to time, place, or proximity may require a rethinking of idealized conceptions of teaching and learning. Thus, organizational schemas about teaching, learning, and technology may be altered to accept online education as legitimate. (Mitchell, 2009, ¶ 10)

Using a variety of methods including surveys, interviews, document analysis and site visits, Mitchell (2009) conducted an in-depth case study of the impact of online learning on culture at a large, suburban community college. The college was one of the first in the nation to offer online courses; approximately 12% of its student body takes at least one online course each term. She concluded that significant changes had occurred in attitudes and beliefs about online learning. She noted language changes, for example, as the word “instructor” was replaced with “facilitator” in everyday conversation. She noted that training offered to faculty to help them teach effectively online also helped them engage students in their on-site courses. Faculty expected students to participate in constructing their own learning in the online environment. Despite the perception that online courses required more work, faculty members were enthusiastic about online learning and suggested their online courses rekindled their overall enthusiasm for teaching in general. Finally, Mitchell (2009) noted a broadened definition of “community” in which “students choose which communities they belong to in the virtual world and that choice may extend to community colleges that offer online education” (Mitchell, 2009, ¶ 64).

Both community colleges and propriety institutions have grown largely by attracting nontraditional students. Nontraditional students tend to be older, typically do not live on the college campus, and frequently have significant obligations outside of school that affect their enrollment patterns. Specific characteristics of nontraditional learners are discussed next.

Characteristics of Nontraditional Learners

“Nontraditional” is an imprecise term typically applied to adult (age 24+) and part-time students (Choy, 2002). The National Center for Education Statistics (NCES) identifies seven characteristics of nontraditional learners:

1. Delays enrollment (does not enter postsecondary education in the same calendar year that he or she finished high school);
2. Attends part time for at least part of the academic year;
3. Works full time (35 hours or more per week) while enrolled;
4. Is considered financially independent for purposes of determining eligibility for financial aid;
5. Has dependents other than a spouse (usually children, but sometimes others);
6. Is a single parent (either not married or married but separated and has dependents); or
7. Does not have a high school diploma (completed high school with a GED or other high school completion certificate or did not finish high school).

It is important to note that 75% of all post-secondary students demonstrate at least one of these characteristics. Students who demonstrate one or more of these characteristics may be considered nontraditional (Choy, 2002). Researchers have labeled students who display four or more of the characteristics as “highly nontraditional,” and they tend to be most often associated with nontraditional or adult-focused programs (Choy, 2002).

For decades, educational theorists have held that adults learn in different ways than traditional aged students. Researchers have labeled the unique ways adults learn “andragogy,” as compared to “pedagogy,” which describes how youth learn (Knowles, Holton, & Swanson, 1998, p. 58). Based on a synthesis of learning theories advanced by Abraham Maslow, John Watson, Kurt Lewin, and others, andragogy attempts to define how the process of learning occurs among adults. As described by John Dewey, experience becomes the primary instrument of learning in andragogy (Knowles et al., 1998). In the early 20th century, Eduard Lindeman took Dewey’s theories and developed five key assumptions about adult learners, which are: (1) Adults are

motivated to learn as they experience needs and interests that learning will satisfy; (2) adults' orientation to learning is life-centered; (3) experience is the richest source for adults' learning; (4) adults have a deep need to be self-directing; and (5) individual differences among people increase with age (Knowles et al., 1998).

Lindeman (1926) envisioned a cooperative learning environment where adults help each other learn and the instructor plays the role of facilitator:

Small groups of aspiring adults who desire to keep their minds fresh and vigorous; who begin to learn by confronting pertinent situations; who dig down into the reservoirs of their experience before resorting to secondary facts; who are led in the discussion by teachers who are also searchers after wisdom and not oracles: this constitutes the setting for adult education, the modern quest for life's meaning. (p. 7)

More than 80 years later, Lindeman's assumptions and vision still guide curriculum development for adult programs (Knowles et al., 1998). How well most institutions do at implementing these assumptions is debatable, however. Through a five-year longitudinal study with randomly selected students at a community college system in California, Hagedorn (2005) identified the "four corners of friction" (p. 24) creating most obstacles for adults. These four factors are access, student success, retention, and institutional accommodation. Hagedorn asked students to rate obstacles to completion of their academic goals. She found statistical differences between traditional students (aged 18 to 22) and adults in the following categories: finding time for college, family responsibilities, and job responsibilities, among other factors. Specifically, adults find these factors to be bigger barriers to continued college enrollment. Therefore, adults "tend to seek out more flexible programs and are more likely to enroll in distance education than other students" (p. 25).

Kemp's (2002) results regarding persistence among adult learners in distance learning were more specific. She conducted a correlational study of 121 first-time distance students enrolled at Athabasca University in spring 2000. She tested for three predictors of retention, resilience, life events, and external commitments by using the Resiliency Attitudes Scale (RAS), the Life Events Inventory (LEI), and a questionnaire about external commitments. Online course completion was her dependent variable. Neither life events nor resilience attitudes were statistically significant in predicting persistence. Of the six external commitments tested (family, personal, home, work, community and financial obligations), only work commitments were found to be significant in predicting online course completion. Work commitments were negatively correlated with completion.

Kemp (2002) said her findings contradict other research regarding the impact of external commitments on nontraditional student persistence. Other studies have found a relationship between high levels of external commitments and drop out from academic courses or programs.

Once they have enrolled, nontraditional students are less likely to persist to graduation than traditional-aged students. In 2007, Noel Levitz used their "College Student Inventory, Form B" to survey 8,867 nontraditional students at 235 institutions about retention rates. The students came from 2- and 4-year institutions and public and private colleges and universities. Data from the adult population were compared to data from traditional-aged students who had completed the same survey instrument (Noel Levitz, 2008a). Findings reveal nontraditional students are harder to retain in all categories. Specifically, 56.5% of nontraditional students at 2-year institutions dropped out of school compared to 43.2% of traditional students. At 4-year institutions, 49.9% of nontraditional students left compared to 28.2% of traditional students. Other findings show that nontraditional students study harder, even for courses they do not like,

enjoy reading more, and are considerably more stressed and distracted by financial problems than traditional students (Noel Levitz, 2008a). Since most online students are also nontraditional, these findings can generally be applied to students in online courses.

The increased dropout rate from online courses was also noted by Maki and Maki (2003) in their two-part, 3-year, longitudinal comparison of student learning outcomes and satisfaction in undergraduate psychology courses at Texas Tech University. The drop rate for students enrolled in online sections was 11.7% compared to 6.1% for students enrolled in traditional lecture-based course sections. Overall, the only difference they noted in satisfaction between learners in online sections and learners in traditional sections was that online students who reported enjoying course discussions were less satisfied than the norm.

Nontraditional Students and Online Learning

Several researchers have specifically addressed dropout rates in online courses that are heavily populated by nontraditional learners (Diaz, 2002). McGivney (2004) attributes the high dropout rates for online courses to the range of “external constraints arising from their work, domestic, and financial commitments” (p. 34), but also notes that the limitations of their life commitments may play a role. For example, nontraditional students may be bound by place and therefore unable to select the academic program that best matches their interests and goals. Or their qualifications may be out of date or “some may lack confidence in their ability to succeed in an education or training programme [sic] if there has been a lengthy interval since they last engaged in formal learning” (McGivney, 2004, p. 34).

Diaz (2002) suggests an alternative view of the dropout phenomenon. He notes that most online students are older, have more college credits and have higher grade point averages. They also are more independent learners. He also points to the negative correlation between success in

online courses and the dependent or collaborative learning styles. He concludes that when students with these learning styles drop online courses, they do so because it is the right thing to do. Their maturity helps them conclude they cannot be successful in the online environment because of their learning styles, and they correctly follow the procedures to drop the course. Diaz advises institutions to do more screening for online readiness to increase overall persistence rates.

Ivankova and Stick (2007) also point to readiness for online learning as a key variable to success. They conducted a mixed-methods, sequential explanatory study of doctoral students in a mixed modality, higher-education program at the University of Nebraska-Lincoln to determine factors affecting retention. In the quantitative phase of their study, they surveyed 278 students who had been enrolled prior to 2003. The sample included students who had graduated from the program as well as those still enrolled and those who had dropped the program. They found five factors that correlate with student persistence, among which was comfort learning in an online environment. In other words, students found it acceptable to learn and interact with faculty and fellow students in an asynchronous computer-based environment. Program graduates reported the highest degree of comfort learning in an online environment while those who had withdrawn from the program reported the lowest degree of comfort (Ivankova & Stick, 2007).

In the qualitative portion of their study, Ivankova and Stick (2007) interviewed four students who had been purposefully selected from the larger quantitative sample. “Typical” respondents from the graduated, enrolled and withdrawn segments were identified, based on their responses to the quantitative study. Four were selected as “best informants” through maximal variation strategy and interviewed. Based on these interviews, Ivankova and Stick concluded

that comfort with online learning was an important factor impacting student persistence and readiness in online environments.

In addition to comfort with the online learning environment, Sun et al. (2008) identified six variables that appear to influence student satisfaction in online programs. Based on an empirical study of 475 students enrolled in an online program at two public universities in Taiwan, they identified 13 variables that might influence student satisfaction in online classes. They tested these variables using a survey instrument developed and validated by them. They concluded that seven variables accounted for two-thirds of the variance in student satisfaction. Those variables were: learners' computer anxiety (or phrased in a positive manner, comfort with online learning, as characterized by Ivankova & Stick, 2007), instructor attitude toward online learning, course flexibility, course quality, perceived usefulness of the course content, perceived ease of use, and diversity in the assessment measures used. Computer anxiety was negatively correlated with student satisfaction in the Sun et al. study. Several variables did not appear to influence student satisfaction. They were: learner attitude toward computers; learner confidence in using the Internet; instructor response timeliness; technology quality; Internet quality; and learner perception of interaction with others in the course.

Dupin-Bryant (2004) more specifically linked computer experience and prior completion of online courses to retention in online learning formats through a random sample of 464 students taking online courses in fall 2002 at Utah State University. In addition, through discriminant analysis, she found that GPA and year in college were positively correlated with retention in online courses.

With regard to year in college, Dupin-Bryant's (2004) research supports Maki and Maki's (2003) findings. Through a regression analysis in which year in college was captured

from institutional data, they found more advanced students performed better (as measured by examination scores) in online psychology courses at Texas Tech University than students with fewer earned credit hours. However, the study highlighted the same finding for students enrolled in traditional, lecture-based psychology courses during the same time frame.

An alternative to fully online courses that many suggest as an ideal modality for nontraditional learners is the use of hybrid courses. Hybrid courses use a mixture of face-to-face and online modalities.

Nontraditional Learners and Hybrid Modalities

Researchers have also addressed issues related to hybrid programs. Sometimes referred to as *blended learning*, these programs combine face-to-face and online instruction and involve a reduction in seat time. Garrison and Vaughn (2007) report faculty and students both suggest hybrid learning “is a means to combine the best of face-to-face and online learning” (p. 4). Hybrid classes “have the potential to increase student learning outcomes while lowering attrition rates in comparison with equivalent fully online courses” (Dziuban, Hartman, & Moskal, 2004, p. 5). Dziuban et al. (2004) compared completion rates of face-to-face, fully online, and hybrid courses at the University of Central Florida over seven years and found completion rates and success (as measured by a grade of “A,” “B,” or “C” in the course) in face-to-face and hybrid courses to be equivalent while those for fully online courses were consistently lower.

Ivankova and Stick (2007) linked student satisfaction in a hybrid doctoral program to overall persistence and proposed the following conclusions: the curriculum needs to be relevant; students must have strong writing skills; the instructor should act as a facilitator in the course; strong technical support and a robust online library must be available; the students must be highly motivated to complete the degree; faculty and advisors must respond promptly to

requests; and it may be helpful to build community among the participants. It should be highlighted that this study concerned doctoral students, and the results may or may not be applicable to undergraduate students.

Yudko, Hirokawa, and Chi (2008) reached many of the same conclusions in their study of undergraduate students enrolled in a liberal arts college in Hawaii. They conducted a multivariate analysis of seven factors through a survey of students living in a rural area in Hawaii and taking hybrid classes. The study was conducted to: (a) determine students' general attitudes toward online learning; (b) determine students' beliefs about the value of combining face-to-face and online modalities; and (c) track students' beliefs about missing class sessions. Their research concluded that students like the hybrid format, and they noted the strongest satisfaction with hybrid learning among students with strong computer skills. They also found the hybrid format did not affect class attendance. They had hypothesized that students would avoid the difficult travel conditions inherent in the geography of Hawaii and not attend face-to-face sessions, but this was not the case.

South Texas College compared success rates of students in online, hybrid, traditional, and high-school dual-enrollment courses (courses offered to high school students in which the students receive both high school and college credit). The results were consistent across all five academic units participating in the study. The academic units were allied health, business and technology, liberal arts and social sciences, mathematics and sciences, and bachelor programs. Success rates were based on student grade performance. The study considered 3,426 total courses from spring 2009: 2,340 courses were traditional, 748 courses were dual enrollment, 295 courses were fully online, and 43 courses were hybrid where 50% of content was delivered face-to-face and 50% was delivered online. Overall, dual enrollment students had the highest success

rates. Students enrolled in hybrid courses had statistically better success rates than students in either traditional or fully online courses. The study further noted that students who registered late for their hybrid courses tended to drop their courses more frequently and were generally less successful than students who registered early (South Texas College, 2009).

Nontraditional Students and Cohort Models

Many hybrid programs also use cohort groups, which are defined groups of students who take their courses in a sequence together. Cohort groups are typically used to create a supportive learning environment that encourages persistence (Kasworm, 2001). Adult students in one study described the structure and process of the cohort experience as a “Velcro experience...propelling them to completion” (Kasworm, 2001, p. 9). Spaid and Duff (2009) suggest cohorts offer “stability and continuity that the traditional college format cannot provide” (p. 104). Although likened to learning communities often used with traditional students, the model “requires a deeper level of commitment and cohesiveness” (Spaid & Duff, 2009, p. 105).

Conrad (2005) explored the formation of community in a cohort program by following graduate students in western Canada through a mixed-method, longitudinal approach. Seventeen of 18 students enrolled in a hybrid, cohort-based graduate program participated in the study over a 2-year period. Data were collected through five research tools over two years: three surveys, one set of extended interviews, and one focus group. The program required students to complete two, 3-week residencies and the remainder of the program content was delivered online.

In the initial survey, Conrad (2005) asked students to define the role of *community* in their learning expectations. Most linked community to the online portion of their program indicating that community was necessary for them to work together as a group via technology. They primarily described community in terms of information exchange. Eight months later in

the second survey, students emphasized concepts such as friendship, collaboration, and common purpose in their definitions of community. They placed less emphasis on the exchange of information via technology and more emphasis on connection between group members. By the third and final survey, participants overwhelmingly linked community to mutual support and team experience; some used words such as “family,” “friendships,” and “personal relations” (p. 7) to describe their community experience. Notably, they cited the “sense of community as a slightly stronger source of support” (p. 9) than spouses and significant others and of “paramount importance” (p. 16) to the learning process.

Conrad (2005) drew four conclusions about community from her study: (1) community evolves over time; student interactions were confined to learning tasks initially but gradually grew to include relational interaction that supported the learning process; (2) community cannot be forced; it must grow from within the members; administrators and faculty can facilitate its development but ultimately community “becomes a social fact with a tangible presence that is obvious to its members” (p. 17); (3) bonds between learners survived even when they were dissatisfied with their instructors or the academic program as happened near the end of the academic program she studied; and (4) face-to-face sessions were key to community development. Online sessions were not a substitute for face-to-face interactions through which students bonded on a personal level in a way they did not in the online learning platform.

The value of cohorts for community building was also touted by Wenzlaff and Wieseman (2004) in their emergent study of a master’s program in teacher education. They followed 22 graduate students for 2 years and employed document analysis, field notes, and participant observation to conduct their analysis. In addition to building community, they found the cohort approach “provides a powerful force for change” (p. 115) and “improves students’ abilities to

develop multiple perspectives, do scholarly work and improve academic performance and personal expectations” (p. 115). Twenty-one students completed the program and identified the cohort format as one of the keys to their success in that it created “a collaborative culture” (p. 121). Fullan (as cited in Wenzlaff and Wieseman, 2004) identified the use of cohorts as a best practice in teacher education programs.

Employer Sponsorship

Nontraditional students may also receive support for continuing their education from their employers, often in the form of tuition reimbursement. In 2002, approximately 79% of employers offered tuition reimbursement. Many human resources managers believe tuition benefits play an important role in boosting on-the-job motivation, retention and productivity (Gunsaulley, 2002).

Results from a tuition assistance program at United Parcel Service (UPS) bear out that assumption. In 1998, UPS was facing a severe shortage of qualified workers at its primary hub in Louisville, Kentucky. The shortage stemmed from two problems: population growth was flat in Louisville, and unemployment rates were historically low. The impact of the shortage was compounded by the fact that UPS needed to expand its operations at Louisville at the same time. UPS identified current and potential college students as the ideal target for recruiting new employees (Riggert et al., 2004).

By partnering with three postsecondary institutions and local, county and state officials, UPS developed a unique program called Metropolitan College. Not an actual educational provider, Metropolitan College offered a myriad of support services to help students progress academically while working for UPS at least 20 hours per week, primarily in the middle of the night. Student-employees were actually enrolled in one of three partner institutions: University

of Louisville, Jefferson Community and Technical College, and Jefferson Technical College. Students were required to meet all admission criteria for the selected institution. Services provided to student-employees in Metropolitan College exceeded those typically offered through employee benefit plans:

Beyond typical wages and benefits associated with employment, Metropolitan College students benefited from intensive student services that were specifically designed to meet the unique challenges of their situation. This included specially designed and scheduled social activities, a student council to assist in program planning and services, opportunities for classes and academic advising at the work site in the middle of the night, a peer mentoring program that helped students persist at work and school, career counseling and placement, a comprehensive technology infrastructure, and housing designated for program participants. (Riggert et al., 2004, p. 10)

Student-employees were also eligible for deferred tuition, textbook stipends and bonuses paid by UPS based on academic success.

The partners established four goals for Metropolitan College when it was established: (1) increase student employees at UPS to 1,647 by 2002; in fall 2001, UPS employed 2,223 students who were enrolled in postsecondary education through the Metropolitan College program; (2) attain 35% of total hub workforce enrolled in Metropolitan College; by spring 2001, 59% of hub employees were enrolled in one of the three partner institutions through Metropolitan College; (3) increase employee retention; the Louisville hub boasts the lowest turnover among the 27 top UPS hubs in the nation; (4) reduce work interruptions due to inadequate staffing; UPS-Louisville has operated without a work interruption due to inadequate staffing since 2000 (Riggert et al., 2004). Clearly, all four goals were met and exceeded.

When surveyed, student-employees gave Metropolitan College high marks: 75% identified it as an important influence in their decision to pursue their education. Many indicated they would not have enrolled in college without the program. Program architects attribute the success of Metropolitan College to the culture and values surrounding the program as much as to the program content. The culture includes: “unwavering focus on student welfare, adaptation of the education services to the needs of the student, establishment of incentives for continuing participation, mutual recognition of partner strengths, and broad community focus” (Riggert et al., 2004, p. 16). Metropolitan College was unique in that clear goals were established and tracked for the program. Most companies do not have even the most basic data about return on investment of employer-sponsored educational programs (Robbins, 2008).

The results of Metropolitan College contradict some prior research about the impact of working on persistence. Pascarella, Edison, Nora, Hagedorn, and Terenzini (1998) and Pascarella and Terenzini (2005) found that working off-campus negatively impacts persistence among all student categories while working on-campus positively impacts persistence. Astin (1975) also found that full-time employment (35 or more hours per week) negatively impacted persistence.

Regarding the impact of working during college on cognitive development, there are conflicting studies there as well. Pascarella et al. (1998) followed 3,840 students from 23 institutions (18 4-year and 5 2-year colleges) for 3 years. They controlled for 15 student background characteristics and college experiences and considered both on- and off-campus employment. They found:

Only modest and inconsistent evidence to suggest that either form of work seriously inhibits students’ learning or cognitive development as it was measured in the study.

Indeed, there was at least some evidence in the third year of the study to suggest that reasonable amounts of part-time on- or off-campus work may actually facilitate learning. (p. 87)

They did note, however, that working in excess of 20 hours per week tended to impede cognitive development particularly in science reasoning. They hypothesized “that by absorbing a student’s discretionary time, off-campus work has its greatest negative influence on one’s ability to meet the normative requirements of successful progress through college” (Pascarella et al., 1998, p. 88). It is important to note that this study was completed between 1992 and 1995 before intensive adult programs were common. There is no information in the article to indicate that adult students were enrolled in structured programs designed for the working adult professional or in online courses that may be more convenient to the working students.

Traditional Students and Online Courses

Online courses are not taken exclusively by nontraditional or working adult students. As Stumpf et al. (2005) note, “No longer limited by time and space, technologically-savvy traditional students are increasingly enrolling in online classes in order to increase the flexibility of their lifestyles” (p. 358). Latanich, Nonis, and Hudson (2001) found the age gap between online and traditional learners is narrowing. In their study comparing both groups of learners, the age difference was just over three years while older research noted age differences in excess of seven years on average.

Many researchers predict that traditional-aged students will continue to flock to online learning. These “digital natives” (Prenkysy, 2001, p. 1) have grown up using technology and are comfortable learning and communicating via a distance. In fact, Taylor (2006) indicates they prefer technology to face-to-face interaction:

The relationship of today's young people to technology is fundamentally different than the relationship any other generational cohort has with technology.... Many of their interpersonal relationships exist primarily online, and the lines between the online and the live... are blurred or nonexistent. The explosive growth in enrollment in online courses, even by native and resident students who can take "live" classes, indicates their preference for life online... (p. 49)

Indeed since 2001, online course enrollments have grown more rapidly than overall higher education enrollment among students of all ages. In 2006, nearly 20% of all students were taking at least one online course (Allen & Seaman, 2007). More institutions are embracing online courses as a valuable learning experience for all students as evidenced by the fact that many institutions now require students to complete at least one course online to meet graduation requirements (Dobbs et al., 2009).

Dobbs et al. (2009) included age as a variable in their study of the perceptions of students regarding online criminal justice/criminology courses. They administered a survey to 280 undergraduate students at a large 4-year university in the Southwest. The survey population included both those who had taken online courses and those who had not. In addition to age, independent variables were: number of online courses taken, gender, race/ethnicity, grade classification, major, employment, and computer skill. Age accounted for little difference in perception of the quality and amount of learning that takes place in online courses. The youngest students (18-22) were more confident in their ability to be successful in online courses and reported more disagreement with the notion that the technology required for online courses was too difficult for them. This was true for young students who had previously taken an online course as well as those who had not. The oldest students (30-56) who had not previously

completed online courses reported the most reservations. Specifically, they lacked confidence in their abilities to be successful in an online environment, questioned the amount of interaction possible between faculty and classmates, and felt the quality of online courses would be inferior to traditional courses. However, the oldest students with prior online experience did not have similar concerns. Across all age categories, prior experience with online courses accounted for differences in perceptions about online courses. Those who had previously completed an online course expressed more positive perceptions about the quality, levels of interaction, and learning that takes place in the online environment. They were also more confident of their abilities to be successful online. All groups with prior online experience expressed a desire for their institution to offer more online courses.

Thus the distinction between traditional and nontraditional learners in online learning may be blurring. Paul and Brindley (2008) conclude that even traditional residential students bring more complex expectations and skills to higher education. Online learning and other changes to the way students learn “have transformed both types of institution – the traditional campus-based university and our distance teaching institutions” (p. 436).

Some in higher education hypothesize that online courses may prove to support retention by offering flexibility in degree completion (Aslanian, 2001). Fike and Fike (2008) concluded that online courses support retention in their multivariate logistic analysis of 9,200 first-time freshman at a large, urban community college in Texas. They tracked persistence over a 4-year period and found that students who took at least one online course were more likely to persist in both first-year fall-to-spring enrollment and first-to-second year fall enrollment. Fike and Fike also linked persistence to successful completion of development reading and mathematics

courses, number of enrolled hours, and receipt of financial assistance. They did not find that gender and ethnicity had any impact on persistence, but other studies have.

Gender, Ethnicity and Persistence

For decades, researchers have tracked gender and ethnicity with regard to retention. In the early 60s, Summerskill (1962) found little difference between genders in degree completion. He noted a correlation between ethnic background and dropout from college, specifically that minority students tend to drop out more frequently. But Summerskill attributed this fact to socioeconomic issues rather than to ethnicity itself. Students who have trouble paying for college are more likely to drop out, regardless of ethnicity. Minority students are more likely to come from lower socioeconomic backgrounds and thus have more financial need (DiPrete & Buchmann, 2006; Kirby, White, & Aruguete, 2007; St. John, Paulsen, & Carter 2005).

In his study, Tinto (1993) also found that Blacks and Latinos were less likely to persist to graduation. He attributed half of the discrepancy in graduation rates between minority and White students to two factors: socioeconomic background and measures of tested ability. This is consistent with 2002 research by the College Board. College Board considered factors that might influence persistence across delivery formats and student characteristics. Persistence rates are lower among several categories of students in all delivery formats. First-generation, minority, and students requiring remedial courses are less likely to persist to graduation. Transfer students, part-time students and those whose enrollment is sporadic are also less likely to persist (Camara, 2003).

Kezar and Eckel (2007) note the troubling discrepancy between dropout rates of Black (30.1%) and Latino (29.2%) students and those of White (18.8%) and Asian (14.9%) students. They interviewed 30 presidents at a variety of colleges and universities to discuss how to

increase minority retention rates. They found many institutions try a variety of “fragmented” (p. 20) efforts that are “compartmentalized” (p. 20) and create “little synergy” (p. 20). For example, some majors within institutions may have special diversity initiatives such as scholarships or clubs for students of color, while the residence halls may offer other initiatives such as culturally based housing, but the efforts are not coordinated and therefore tend to have limited impact. Further, Kezar and Eckel found that data are lacking about student demographics, and institutions rarely or inconsistently ask minority students for feedback about diversity initiatives. Having appropriate quantitative and qualitative information could help institutions identify and fund the resources most likely to impact persistence among minority students. Research by Noel-Levitz (2009) indicates that most institutions have begun to capture a range of quantitative and qualitative data pertinent to retention, but they “struggle with putting the data to use” (p. 6).

Angiello (2002) specifically looked at Latino (called *Hispanic* in her study) success in online courses in her archival study of 113,860 student enrollments at Bergen, New Jersey, Community College in 2000-2001. She defined success as completion of an online course, regardless of grade performance. She found that students of all races dropped online courses more frequently than they did traditional courses, but Latino students dropped them more frequently. In fact, Latino students were 24.8% less successful in online courses versus traditional courses. She suggested two possible factors may cause this discrepancy: (1) the so-called “digital divide,” or the fact that students of color have only recently acquired computers in their homes while Whites have owned them for many years and therefore have superior technology competencies; and (2) cultural differences or language barriers may account for the difference. She did not explore those differences in her study.

The digital divide was also listed as a possible explanation for ethnic discrepancies noted by Lu, Yu and Liu (2002) in their empirical study of 96 graduate students enrolled in online Management Information System (MIS) courses in 2001. They were exploring the impact of learning styles and many of the same factors used in this study on course achievement as measured by test performance. The factors considered in the study were age, gender, ethnicity, job status, academic major, year of admission, number of online courses taken, and number of MIS courses taken. The only factor that impacted achievement was membership in a minority ethnic group.

Regardless of the reason, data clearly show that minority students persist in higher education at lower rates than Whites. On average, 4-year institutions have a 10-percentage point gap between graduation rates of White and Blacks. Fewer than 30% of all Blacks graduate at 4-year colleges and universities. Similarly, the graduation rate of Latino students is 7 percentage points lower than that of Whites (Carey, 2004). Carey notes that many minority students drop out of college “burdened with large student loans that must be repaid, but without the benefit of the wages that a college degree provides” (p. 5).

Robinson (1990) characterizes the need to retain as a “formidable challenge” to minority students (p. 207). She conducted a longitudinal, quantitative study of archival data on 386 African-American freshmen entering a historically Black university in fall 1981. She followed the cohort for 5 years. While the study is now nearly 30 years old, it considers several of the same student variables as the current study and thus may offer relevant insights. Her study considered pre-entry characteristics intended to predict college readiness (high school GPA, and standardized test scores) and post-entry characteristics such as college GPA, placement in developmental coursework, and college participation in occupationally-related clubs and

organizations. A total of 135 students had attained a bachelor degree by 1986 while 248 had not. Robinson found that the students most likely to graduate had higher GPAs, particularly in their freshman year. They were more likely to participate in pre-career programs (i.e., Future Business Leaders of America, Future Teachers of America, etc.), and more likely to enroll in developmental course in reading, English and mathematics. In fact, only 18% of those who graduated did not participate in developmental coursework. Robinson regarded developmental participation as a key factor among students who persisted, suggesting developmental courses “should not be viewed as being reserved solely for academically inferior students” (p. 216) and highlighting them “as a means of empowering students with the knowledge base they need for success in a competitive world” (p. 216). More will be said about developmental courses in the next section.

Minorities continue to struggle with college persistence while women have made substantial progress in both college-going and college-graduating rates. In fact, females “now generally outperform males on several key educational benchmarks” (DiPrete & Buchmann, 2006). This includes college-going rates, enrollment persistence, graduation rates, and admission to graduate programs. Women now represent the majority (56.3%) of undergraduate enrollments, and this is particularly true among nontraditional students and students of color (e.g., Black, Latino, and Native American). Women represent 56.8% of nontraditional students, 63.5% of Black students, 55.6% of Latino students, and 60.7% of Native Americans. In terms of economic level, women comprise 60.2% of the college enrollments at the lowest income level (Peter & Horn, 2006). In terms of employment after college, however, women are more likely to work part-time than men. They also earn less than men even when controlling for undergraduate field of study (Peter & Horn, 2006).

Developmental Coursework, High School Rigor and Persistence

As noted, Robinson (1990) actually found a positive relationship between completion of developmental coursework and American-American student persistence, particularly among those who successfully completed their developmental work as freshmen. This finding is in contrast to other studies, which identify developmental coursework as a sign that the student may not be fully academically ready for college. Wirt, Choy, Rooney, Provasnik, Sen, & Tobin, (2004) found a direct link between dropout and the need for any type of remediation:

Despite assistance offered through remediation, students enrolled in remediation are less likely to earn a degree or certificate. Regardless of the combination of remedial coursework, students who completed any remedial courses were less likely to earn a degree or certificate than students who had no remediation. (p. 63)

They also found that Black and Latino students were almost twice as likely to need developmental coursework as White or Asian students.

The need for remediation is often linked to a lack of rigor at the high school level, which is strongly positively correlated to persistence at the college level. In their analysis of first-generation college students, Warburton, Bugarin, and Nunez (2001) found that students of all types fared better in higher education if they had completed a rigorous high school curriculum. Even three years after entering college, students with rigorous high school preparation were more likely to be enrolled than those with weaker high-school preparation:

Students' academic preparation was also related to their enrollment at their initial postsecondary institution 3 years later. As the rigor of students' high school curriculum increased, so did the percentage of students who were still enrolled (or had attained a degree) at their first institution in June 1998—from 62% to 84%. Also, as rigor of the

high school curriculum increased, the percentage of all students who transferred or stopped out or left their initial institution decreased. (p. 31)

Kirby et al. (2007) used archival data to study college readiness by ethnicity at a private women's college. The purpose of their study was "to identify academic and socioeconomic variables that are reliably associated with college success for White and non-White students" (p. 460). They studied 299 former students who had matriculated between 1994 and 1999. They combined all minorities (Black, Latino, and Native American/Alaskan Natives) into one minority group that comprised 17% of the study population while the remaining 83% were White. Their independent variables were gender, ethnicity, high school class rank, entrance test (ACT/SAT) performance, high school GPA, and college credit hours completed. They also calculated a factor to measure socio-economic status by measuring parents' occupation, need for financial assistance, and parental marital status. This was also used as an independent variable. They used college GPA as the dependent variable.

Kirby et al. (2007) found significant differences by ethnicity. Among White students, high school GPA, high school rank, entrance test results, and college credits completed all significantly predicted college GPA. Among minority students, however, only high school GPA and class rank predicted college GPA. The authors cautioned against using standardized tests as predictors of minority success in college. They found a relationship between expressed need for financial assistance and GPA. That is, students who indicated they needed financial help had higher college GPAs. The researchers suggested the need for aid may have been a motivator in itself since students must maintain GPA standards to maintain eligibility. They recommended further study about socio-economic status focus on the number of hours a student needs to work

due to financial constraints. Kirby et al. hypothesized that the students who worked the most hours would have statistically lower college GPAs due to limited time for study.

GPA and Persistence

College GPA, especially first-year college GPA, has been consistently linked to persistence in higher education among students of all ethnic backgrounds and both genders. Summerskill (1962) noted that entering (i.e., high school) GPA tends to predict persistence and said “it is clear that a significant relationship does exist” (p. 636) between college grades and persistence. Other researchers agree (Astin, 1975; Cabrera, Nora, & Castaneda, 1993; Pascarella & Terenzini, 2005). Robinson (1990) specifically found college GPA to be a better predictor of persistence among Blacks than pre-entry characteristics. Kuh (2003) noted that minority students get poorer grades in college than do White students but does not conjecture as to why. He also does not specifically link Black grade performance to dropout behavior.

St. John et al. (2005) considered GPA in their study of dropout behavior in both Blacks and Whites. With regard to grades, they found that Blacks who reported having grades below “C” average, those reporting “A” averages and those not reporting grades at all were all more likely to persist than those reporting “B” grades. They found the same with White students and concluded “the relationship between college achievement and grades does not have a linear association with persistence” (p. 563).

Financial Assistance and Persistence

As previously discussed, there appear to be connections between socioeconomic status and college persistence (Summerskill, 1962; Kirby et al., 2007; Walburton et al., 2001), although the connections are not necessarily clear. What is clear is that students in the lowest socioeconomic levels rely heavily on financial factors when selecting a college. Specifically, the

availability of grants and institutional aid strongly influence their enrollment decisions while the availability of loans and work-study programs do not (Terenzini, Cabrera, & Bernal, 2001). In fact, Terenzini et al. (2001) found that low-income students are more sensitive to availability of grants than they are to tuition increases:

A \$1,000 increase in grants was found to boost enrollment rates among low-income college students about 9 percentage points; an equivalent increase in tuition would depress enrollment among low-income students about 3.4 percentage points. (p. 12)

Thus the availability of need-based aid impacts college choice among low-income students, but how does it impact persistence? Results are mixed. Tinto (1993) concluded it was only one of many factors that may influence persistence for most students. He did acknowledge it may have a more significant impact on students with financial need. Other researchers (Kirby et al., 2007; Terenzini et al., 2001) have linked financial assistance to persistence or factors that tend to support persistence (i.e., GPA and fewer hours spent working).

The impact of socio-economic status and amount of financial assistance received on college choice and persistence by race was the focus of a study by St. John et al. (2005). Their study considered students enrolled in 1986-87 as captured through the National Postsecondary Student Aid Survey of 1987. The researchers' sequential logistic regression analysis considered six types of factors that may influence college choice and retention: (1) background characteristics such as age, gender, marital status, high school graduation status, and SES classification; (2) the importance of financial assistance and college cost in the decision about which college to attend as reported by the student; (3) variables describing the college experience such as GPA, living on- or off-campus, year in college and type of college selected (e.g., 2-year or 4-year); (4) degree goal; (5) amount of aid received versus tuition charged by the institution;

and (6) a variable factoring the relative cost of food and housing at the institution or in the marketplace of the institution. They found that Blacks “were highly sensitive to finances in their college choices and in their persistence decisions” (p. 564). Specifically, tuition charges impacted their college choice decisions while the amount and type of aid received impacted their persistence decisions. White students were positively influenced by student loans and work-study opportunities, but Black students were impacted by low tuition charges and offers of grants. St. John et al. (2005) concluded that the move by the federal government away from grants toward more loan-based financial assistance “accentuates the privileges of Whites and increases inequities between Whites and African Americans” (p. 565). They urge a return to more need-based aid as part of an overall policy to encourage college persistence among students of color.

Understanding what impacts the likelihood of persistence among all students is important to many institutions of higher education, which are under increased pressure to retain students to degree completion. Retention is a much-studied topic in higher education, and most studies cite Tinto’s longitudinal model of student persistence as a theoretical framework. Tinto’s work is the conceptual framework for this study, too, along with Bean and Metzner’s (1985) application of it to nontraditional students and Kember’s (1989) adaptation of it to distance education.

Conceptual Framework

Tinto’s (1993) Longitudinal Model of Institutional Departure described several elements applicable to this study. First, it assumed that a student possesses a certain set of pre-entry characteristics that influence the decision to stay or depart from school. These pre-entry characteristics are influenced by the student’s goals and intentions in pursuing education. Next, the model addressed how the student’s institutional experiences impact retention or departure.

These experiences include academic performance, faculty interactions, and informal interactions with peers and the institution at large. The student's social and academic integration into the institution also impact his/her goals and motivations for education. These experiences influence the third stage or outcome, the ultimate decision to continue or withdrawal. These three basic elements – pre-entry characteristics, experience in the academic system, and outcome – are key stages in this study.

Bean and Metzner (1985) hypothesized that Tinto's model over-stated the impact of socialization on nontraditional students. They highlighted three primary characteristics of nontraditional students: living off-campus, often with dependent family members; age of 24 or older; and part-time enrollment status. These three factors diminish the importance of social interactions with both other students and faculty for the nontraditional student. Their model emphasized environmental factors such as finances, occupational goals, and external encouragement from family, friends and employers as directly impacting retention. Equally important are academic variables such as study habits, academic advising, and availability of courses.

Kember's (1989) adaptation of Tinto's model specifically addressed distance learners. Like Bean and Metzner's (1985) model, it accounted for the nontraditional nature of many distance learners. Unlike Bean and Metzner, Kember minimized the importance of academic preparedness. Instead he emphasized family and work characteristics as pre-entry characteristics. Kember also restricted goal commitment to the pre-enrollment phase and added a cost/benefit analysis as a final stage in the decision to drop or continue in the course. In other words, students weigh the requirements for the course against the potential benefits to be gained

by completing it. He also simplified the academic experience into the academic environment and academic integration. All three models are explored in more detail below.

Tinto's Longitudinal Model of Student Departure. The first premise of Tinto's (1993) model is that students come to higher education with a variety of pre-entry characteristics, including academic preparation, gender, family background, and race/ethnicity. They also come with specific levels of commitment, both to the institution and to the goal of degree completion. Upon enrollment, they become part of the educational community where they may participate in a variety of academic and social experiences that may or may not lead to their social and/or academic integration into the institution. The level of integration further influences the student's commitment to the institution and goal attainment, which in turn influences the decision to persist or withdraw from college (Tinto, 1993).

Tinto's (1993) theory "seeks to explain how interactions among different individuals within the academic and social systems of the institution and the communities which comprise them lead individuals of different characteristics to withdraw from that institution prior to degree completion" (p. 113). Involvement in both formal and informal social and academic systems "can enhance individual integration" (p. 119) in the institution, but he holds that students must connect with at least one social or academic community to persist.

Integration applies "to the individual and to the particular subcommunity [sic] of which he or she is a member" (Tinto, 1993, p. 124). Students can be connected to a sub-group without being connected to the entire institution. This connection can be either social or academic. Tinto states that students who are connected intellectually but not socially are just as likely to depart as students who are connected socially but not intellectually.

Tinto distinguished between four types of departure. The first is immediate transfer to another institution. The second is system departure or complete withdrawal from higher education. The third is delayed transfer, in which students ultimately return to college at another institution. The fourth is institutional stop-out, in which the student ultimately returns to the original institution. Tinto notes that institutions do not adequately track among types. He also distinguished between involuntary departure (being forced to leave an institution, typically due to poor academic performance) and voluntary departure. His model addresses only voluntary departure.

There are two roots of voluntary departure: intention and commitment. Individual intentions can change and are not always clear even to the individual. Commitment takes two forms: goal commitment (commitment to personal goals, usually occupational in nature) and institutional commitment (commitment to the specific institution). Tinto (1993) found the higher the level of occupational goals, the greater the likelihood of completing a degree. Goal commitment “becomes a motivating force” (p. 38) even for students who are marginally academically prepared. In fact, he found that students with high academic preparation but weak goal commitment are less likely to persist than students with weak academic ability and strong goal commitment.

While Tinto (1993) is primarily concerned with what goes on inside the institution, he acknowledges the impact of the external community (i.e., family members, external peer groups and work communities) on persistence. The model argues that “when external communities are strong... their action may serve to condition if not counter events within the college” (p. 116). He also notes that students with strong goal commitment – particularly commitment to occupational goals -- are more likely to persist. This is particularly true for adult and minority

students, two sets of student populations that may experience difficulty connecting to the social system of the institution, especially in traditional residential settings.

Theoretically, Tinto's model was derived from Van Gennep's theories of the rites of passage of tribal communities (Tinto, 1993). There are three distinct rites of passage. The first is separation, which "requires individuals to disassociate themselves, in varying degrees, from membership in the communities of the past, most typically those associated with the family, the local high school, and local areas of residence" (Tinto, 1993, p. 95). Virtually all students experience some level of stress and isolation during this stage, even commuter students. While commuters may not feel a sense of loss from the separation from the prior community, they may also not experience the full sense of reward of integration into the higher education community.

The second stage of separation is transition. Again, virtually all students experience stress in making the transition to college. Tinto (1993) states:

The scope of the transition stage, that is, the degree of change it entails, depends on a number of factors, among them degree of difference between the norms and patterns of behavior associated with membership in past communities and those required for integration in to the life of the college. (p. 97)

Upon successfully negotiating transition, students enter the third stage, incorporation or integration. At this stage, students have moved beyond the "norms and patterns of past associations" (Tinto, 1993, p. 98) and are ready to adopt new behaviors. College rituals and ceremonies can help students make the transition, as can the formal and informal networks and communications within the institution and its sub-communities.

Tinto's (1993) longitudinal theory of student persistence is the most widely referenced retention model in higher education. Researchers have tested it against a wide variety of

populations and institution types, and it has been consistently validated since it was first introduced in 1973. But it is not the only model of student persistence nor is it universally accepted. Astin (1993), Bean (1980), and Spady (1970; 1971) among others proposed other widely cited models. Nora (2001), Tierney (1999), and Cabrera, Nora, and Castaneda (1993) have questioned the applicability of Tinto's theory to all student populations, noting that since it was based on research at traditional residential campuses, minority and nontraditional students may not be fully represented by the model. Specifically, critics suggest Tinto under-emphasized the role of significant others and the extended community in the decision-making of minority, nontraditional, and/or commuter students (Cabrera et al., 1993; Nora, 2001; Tierney, 1999). Cabrera et al. (1993) proposed an alternative retention model that synthesized Tinto's emphasis on interactions within the academic institution with Bean and Metzner's (1985) emphasis on the external environment. Bean and Metzner's model is described next.

Bean and Metzner's Conceptual Model of Nontraditional Student Attrition. Bean and Metzner (1985) note the difficulty of precisely distinguishing between traditional and nontraditional students. Considering all possible defining factors, they used the following definition in the development of their model:

A nontraditional student is older than 24, or does not live in a campus residence (e.g., is a commuter), or is a part-time student, or some combination of these three factors; is not greatly influenced by the social environment of the institution; and is chiefly concerned with the institution's academic offerings (especially courses, certification, and degrees).
(p. 489)

In other words, nontraditional students tend to be older, live at home, attend college part time, and attend college to complete a degree or employment-related education. They are not

primarily interested in socializing within the institution nor are they likely to participate in informal interactions with faculty and staff.

Their model distinguishes between variables expected to have direct impact on dropout and those that indirectly influence dropout. It predicts four variables will have the most influential impact on the decision to drop out. The first is prior academic performance. Students who performed poorly in prior academic settings including high school are likely to drop out. The second is intent to leave, which is strongly influenced by psychological factors such as goal commitment, stress, and satisfaction with the academic program, and by academic factors such as study habits, academic advising, and course availability. This category does include students who intend to transfer to another institution. The third category, background and defining goals, again highlight the significance of prior academic performance and the importance of the educational goal to the student. The fourth is environmental factors and includes number of hours worked, outside encouragement, finances, family responsibilities and opportunities to transfer the credit hours earned.

The Bean and Metzner model (1985) also highlights factors that may have an indirect impact on retention. Age is one example. In and of itself, age is not a predictor of retention. However, older students may have more non-academic responsibilities and the responsibilities may influence the dropout decision. Thus, it is not age but the responsibilities that tend to accompany age that influence persistence. Bean and Metzner listed social integration within the institution as a variable that may have a limited effect on nontraditional dropout, noting:

Social integration variables should have only minimal effects on retention, partly due to the way nontraditional students were defined and partly because social variables from the outside environment are expected to be of greater importance than college social

integration variables. In addition, other environmental variables, such as family responsibilities, can play a significant role in the attrition process for nontraditional students. (p.530)

Another higher education theorist who questioned the applicability of Tinto's model to nontraditional students was Kember. Kember specifically addressed the application of Tinto's model to distance education. His alternative model is discussed next.

Kember's Longitudinal-Process Model of Dropout from Distance Education. While Kember (1989) used Tinto's model as a starting point in his retention model for distance education, he expressed several reservations about its applicability. Tinto's research was conducted primarily with traditional, residential, full-time students. Online learners, as previously noted, tend to be nontraditional in age, do not typically live on campus, and often are part-time students.

Further, Kember questioned the relevance of prior school performance when working with nontraditional students. Adult students may have completed high school many years prior to college entrance, and their performance in high school may not reflect their capabilities as mature students. High school performance explains little about college performance in adults and "is therefore unlikely to be a direct causal link" (Kember, 1989, p. 287) to persistence in distance courses.

Instead, Kember (1989) placed more emphasis on goal commitment and identified both intrinsic and extrinsic motivation as relevant in goal commitment. Students who are intrinsically motivated are interested in the subject itself. Students who are extrinsically motivated are interested in obtaining a qualification as a result of the course. The higher the future occupational goal associated with the degree pursued, the higher the extrinsic motivation to

persist. However, unrealistic goals lead to more dropout behavior among students. Kember notes that retention data are flawed in that they do not capture student enrollment intention. In other words, students who only intended to take a few courses are counted as dropouts when in fact they had reached their intended goals.

Kember (1989) also questioned Tinto's emphasis on the social interactions with the academic environment as a means of increasing retention since distance learners have limited social interaction and often learn in isolation. While integration with the institution can occur, distance learners are more likely to experience integration at home and work. The effect of the integration with the employer depends on the attitude of the employer to continuing education. A positive employer attitude can reinforce goal commitment as can supportive co-workers.

Because of the multiple demands on the adult learner, Kember (1989) added the cost-benefit analysis. This is a "recycling loop"(p. 295) through which students continually consider whether or not the time spent studying (and therefore away from family and friends) is worth the benefit of the degree to be attained. Kember acknowledged that measuring both the cost-benefit analysis and goal commitment can be difficult and imprecise. He recommended the use of both quantitative and qualitative forms of measurement.

Conclusion

Despite all the published research pertaining to retention, retention remains difficult to predict. This is particularly true for nontraditional students and online programs. The purpose of this study was to expand what is known regarding the factors that relate to successful completion of online, college courses. It addressed 13 factors available through archival data at NKU. It included programmatic membership as the fourteenth factor. The factors were:

1. Age
2. Gender
3. Race
4. State of residency
5. Application for federal financial assistance
6. Receipt of federal financial assistance
7. Placement in developmental reading, writing and/or mathematics course(s)
8. Prior completion of an online course at NKU
9. Prior completion of an introductory computer/information technology course
10. Academic major
11. Year in college
12. Credit hours attempted in fall 2008
13. College grade point average at start of fall 2008
14. Programmatic membership

There were two research questions for this study:

1. Is there a relationship between each of 13 student variables and successful completion of online, credit-bearing, undergraduate courses at NKU?
2. Is there a relationship between membership in one of five programmatic types and successful completion of online, credit-bearing, undergraduate courses at NKU?

The variables and methodology used are explored in more detail in Chapter 3.

CHAPTER 3

Methodology

The purpose of this study was to expand what is known regarding the factors that relate to successful completion of online, college courses. It addressed 13 variables available through archival data at NKU. It included programmatic membership as the fourteenth variable. Each of these factors is defined and discussed in this chapter.

Research Questions

There were two research questions for this study:

1. Is there a relationship between each of 13 student variables and successful completion of online, credit-bearing, undergraduate courses at NKU?
2. Is there a relationship between membership in one of five programmatic types and successful completion of online, credit-bearing, undergraduate courses at NKU?

Data Analysis and Descriptive Statistics

This study considered archival data from all NKU undergraduate students enrolled in fully online courses after the drop-add period in fall 2008 ($N = 1,493$). Descriptive analysis was conducted on the data set for each variable. The use of descriptive statistics was used to summarize the study population and to help simplify the data by collapsing it into meaningful categories. Graphic portrayals of the data are presented to further illuminate the composition of the study population (Gravetter & Wallnau, 2007; McMillan & Schumacher, 2001).

In addition to descriptive statistical analysis, this study applied inferential statistics. The purpose of inferential statistics is to study samples and make generalizations about the population from which they were drawn (Gravetter & Wallnau, 2007). In this case, the sample was all undergraduate students enrolled in fully online courses after the drop-add period at NKU in fall 2008 ($N = 1,493$). Inferential statistics were used to analyze factors describing those students to determine if any of those factors were statistically significant and thus can be confidently generalized to all students who take online undergraduate courses at NKU in future terms. It may be possible that the findings of this study can be applied to undergraduate students taking fully online courses at institutions that are similar to NKU, but this study only addressed findings that may be relevant at NKU. Several inferential statistical approaches were explored in preparation for this study and are discussed below.

Statistical Approaches Considered

Through the literature review, several commonly used statistical approaches to retention research were noted. The value of each approach to this study is considered below. Specifically, the applicability of logistic regression, probit regression, linear and multiple regression, factor analysis, and path analysis are addressed.

Logistic regression is widely used in higher education and specifically in retention studies (Peng, So, Stage, & St. John, 2002; St John et al., 2005). It is “well suited” for retention studies because it uses “categorical outcome variables, such as staying in or dropping out from college” (Peng et al, p. 260). Caison (2006) says that logistic regression is a “superior” (p. 439) approach for use in higher education because of its “ability to describe the relationship between a categorical dependent variable and a number of both interval and categorical independent variables” (p. 439). This study used a categorical dependent variable (i.e., did the student drop

the online course or complete it) and both interval (for example, GPA) and categorical (for example, completion of a prior online course) independent variables.

Closely akin to logistic analysis is probit analysis. Both assume that any relationship that exists between the dependent variable and an independent variable can be expressed as a mathematical equation, but both also assume that the relationship may not be linear. That is, increased values of an independent variable may not produce the same increases in the dependent variables. Dey and Astin (1993) offer the following explanation:

Changes in the independent variable are likely to have more impact on the probability of something occurring at the middle of the probability range than at the end of it... We would expect, for example, that increasing study time from 0 to 1 hours would have a greater impact on the probability of a student passing the exam than increasing study time from 14 to 15 hours. (pp. 571-572)

Thus logistic and probit analyses are non-linear approaches. The starting point for most statistical analyses, however, is a linear model (Dey & Astin, 1993). Linear regression assumes that every increase in an independent variable creates a predictable increase in the dependent variable. This relationship can be illustrated with a straight line. The value of linear models is that they are easy to understand and mathematically simple.

Dey and Astin (1993) tested logistic, probit, and linear models on an actual research problem. They used 1987-89 Cooperative Institutional Research Program (CIRP) data of 947 first-time freshman at 29 community colleges using four dichotomous retention measures as dependent variables: (1) earned an associate degree or vocational certificate; (2) earned an associate degree or completed two years of college; (3) earned an associate degree, completed two years of college, or was enrolled in fall 1989; and (4) enrolled in fall 1989. The independent

variables were student age, gender, high school GPA, level of concern about financing their education, number of hours per week spent engaging in a variety of school-related and non school-related activities, and the motivation for attending college. They then analyzed the data using logistic, probit and linear regression models. They concluded that there was "little practical difference in obtained results" (p. 579). They recommended the linear regression approach:

Regression analysis... is a much more widely used and better understood method than either probit or logistic methods. Regression has also been shown to be robust under widely varying conditions where its classical assumptions (linearity, homoscedasticity, etc.) have been violated. Finally, the computer software available for regression analyses generally has more extensive and sophisticated options than can be found in software designed for running probit analysis or logistic regression. (Dey & Astin, 1993, p. 580)

Linearity means that a linear relationship exists between the independent and dependent variable. It can be tested through a scatter plot of the residuals. *Homoscedasticity*, also known as *homogeneity of variance*, means that two populations being compared have essentially the same variance or error. Homoscedasticity can be tested through an F-max test (Lomax, 2007).

Despite Dey and Astin's (1993) findings, many retention researchers find logistic regression to be an appropriate approach when the dependent variable is dichotomous (Porter, 1991; Willett & Singer, 1991). This study used one dichotomous dependent variable, completion of online course(s) (Table 1). Therefore, for this dependent variable, logistic regression analysis was conducted. The study also employs a continuous dependent variable, percentage of online courses completed (Table 1). A linear regression model was used to test the second dependent variable.

Because this study used 13 independent variables (shown in Table 4) plus the categorical variable of programmatic category, the specific linear regression model that would be appropriate is multiple regression, which is “used whenever researchers are interested in the relationship of several independent variables combined with a dependent variable” (McMillan & Schumacher, 2001, p. 295). However, when a large number of independent variables are considered, as is the case in this study, it may be difficult to determine which variables make the largest impact unless a stepwise approach is used. Ferguson (1981) explains:

In applying this procedure the best predictor is paired with every other predictor in turn and a multiple correlations calculated for each pair of predictors... In using stepwise multiple correlation, tests of significance may be applied to determine whether the addition of one or more variables adds significantly to the multiple correction. (p. 472)

Ferguson further explains that variables can be combined in random or descending order “to ascertain progressively what degree of prediction is lost when additional variables are dropped” (p. 473).

Mutter (1992) used stepwise regression analysis in her retention study of 766 students at a large Midwestern community college. By systematically pairing study variables together, she determined that two variables (importance of graduating from the institution and whether or not the student vacationed with classmates) accounted for 12% of observed variance. No other variable pairs significantly increased the prediction of retention.

In multiple regression analysis, each independent variable is tested. This differs from factor analysis, which combines variables into categories. It is useful when distinction between dependent and independent variables “is not meaningful” (Ferguson, 1981, p. 488). For example, in this study, factor analysis might be used to group all variables classified as

“demographic” variables into one category in order to test the significance of demography on course retention. Determining how to combine the variables into one factor is difficult, however, and does not seem appropriate in this study, given the wide array of variables in each of the three categories.

The value of path analysis is also questionable for this study. The primary purpose of path analysis is to test the appropriateness of a model in predicting that one variable causes a given reaction in another variable. It is concerned more with causation between variables as opposed to relationship between them (Leclair, 1981; McMillan & Schumacher, 2001). Pascarella and Terenzini (1983), for example, used a path analysis to test the validity of Tinto’s model in predicting retention in a sample of first-time freshman at a residential, predominantly White private institution. By reducing each variable to a specific path analysis, they concluded the model “would appear to have considerable utility in helping to understand the dynamics of freshman year persistence/withdrawal decisions” (p. 224). Path analysis enabled them to validate the use of the model in predicting retention outcomes. However, Leclair (1981) cautioned that path analysis is of limited use in determining cause in studies with many variables. Also, it is predicated on testing a specific established theory regarding the causation among variables, which is lacking in this study.

The value of several statistical approaches was considered for this study including logistic and probit analysis; linear, multiple, and stepwise multiple regression; factor analysis; and path analysis. The conclusion reached is that logistic regression was an appropriate model to use with the dichotomous dependent variable: course completion (yes or no). Further, multiple regression analysis was the appropriate inferential statistical methods to be used with the continuous dependent variable: percentage of online courses completed.

Study Design

The study relied on archival data from the 1,493 undergraduate students enrolled in 167 fully online courses in fall 2008 at NKU. This group affords a rich and varied sample of the characteristics chosen for analysis. Most of the data were gathered through standard university reports used to compile annual student profiles. These variables included age, gender, race, state of permanent residence, academic major, year in college (grade classification), hours attempted in fall 2008, and programmatic membership. Some variables were gathered by reviewing each student record. Variables to be gathered in this manner were: prior academic performance as measured by the need for developmental coursework, GPA at the start of fall 2008, prior completion of an online course at NKU, eligibility for need-based financial assistance, and prior completion of an introductory computer course. Further, each student record was reviewed to determine if he/she successfully completed or withdrew from each online course.

Institutional Characteristics

NKU is a regional comprehensive university located in the Greater Cincinnati Standard Metropolitan Service Area (SMSA). NKU's total undergraduate enrollment in fall 2008 was 13,003. The institution is predominantly a commuter campus with 88% of undergraduates commuting. The average age of undergraduate students is 24, and 27% are aged 25 or older. In fall 2008, the student-to-faculty ratio was 17 to 1 (Northern Kentucky University Office of Institutional Research). NKU first began offering fully online courses via the Internet in 2001. The first fully online program (bachelor-degree completion program in Organizational Studies) began in 2002.

Variables

Dependent variables. The dependent variable for this study was completion of online course(s). The study was completed with two different indicators of completion and therefore two dependent variables. The first was a dichotomous variable: completion or non-completion of any online course. Thus a student who enrolled in three online courses and dropped one was classified as a non-completer (completion equals “no”). A student who enrolled in one online course and completed it was classified as a completer (completion equals “yes”). The second dependent variable was “percentage of online courses completed,” a continuous variable calculated for each study participant. Any course for which the student received a passing grade was counted as a completion. A simple mean of the number of online courses completed versus total number of online courses enrolled in was calculated for the total sample and each individual student. The two dependent variables are shown in Table 1.

Table 1

Dependent Variables

Variable	Definition	Type
Course completion	Completion of all online courses	Dichotomous (y/n)
Percentage of courses completed	Percentage of online courses successfully completed	Continuous

Each of the dependent variables was tested separately against the independent variables, 13 of which reflected student characteristics. Dependent variables were also tested against the fourteenth independent variable, programmatic membership. The independent variables in each category are discussed next and found in Table 4. The variables are listed in no particular order.

Independent variables. Demographic variables included age, gender, race, and residency. Four residency definitions are used in this study. They are Kentucky residents, students who live in the metropolitan area of Cincinnati and receive a discounted or “metro” tuition rate, Indiana students covered by a different reciprocity agreement with special tuition rates, and nonresidents not part of the previous three categories. Age and residency were available for all students. Gender was missing for five students. Race is an optional field on the admission application, and data were available for most but not all students. In the statistical model, race was treated as an indicator variable. Indicator variables, also called “dummy variables” can increase model fit for non-quantitative variables (Downing & Clark, 1997). Therefore, the model reflects variables for the races of White, African American, Latino and “Other.” Included in the “other” category were all students who did not list a race as well as all races other than White, African American, and Latino.

Application for and receipt of need-based financial assistance were used to reflect socio-economic status, specifically to identify students with financial need. However, only students who applied for federal funding were identifiable; students who did not apply for federal funding may have had financial need but this information was not available. About half of the study population applied for financial assistance. About 68% of those who applied for financial aid received it. It is important to note that the decision to apply or not apply for aid was not a clear indication of the socio-economic status of the student. Students who chose not to apply may not have understood the application process, may not have known it was available or may not have possessed the ability to complete the application process. They may actually have had financial need, but this study does not capture that information.

Placement into developmental coursework in reading, English and/or mathematics was used to measure student preparation for college. In this current study, the need for developmental coursework is a proxy for college readiness, used in lieu of other standard measures of readiness (namely, high school coursework, high school GPA, and standardized test scores), which were not consistently available in the archival data used in this study. Placement into development coursework was selected because it is consistently identifiable whereas college entrance test scores and entering GPA were not available for all students. College entrance test scores were not always available because NKU does not require test scores on most transfer students. GPA at admission may be either the high school GPA or the transfer GPA, which are incongruent measures of achievement. Therefore, student placement in developmental mathematics, English or reading courses was used to measure college readiness. This placement may have occurred at NKU or a previously attended college or university. Readiness was entered in the statistical model as a dichotomous indicator.

Two variables were selected to measure student readiness for online learning. They are prior completion of an online course at NKU, and prior completion of an introductory computer or information technology course whether at NKU or another college or university. For the purposes of this study, any prior computer or information technology course was included. These two variables are intended to determine if computer competency was a key factor in online course completion at NKU. Several prior studies outlined in Chapter 2 suggested that prior completion of an online course (Dobbs et al., 2009; Lu et al., 2003) and computer competency or comfort with online learning (Dupin-Bryant, 2004; Ivankova & Slick, 2005; Sun et al., 2008; Yudo et al., 2008) were significant factors in online persistence decisions.

Four variables were included to identify academic goals and academic progress as of fall 2008. The first was academic major, which was grouped into nine broad categories. These categories are detailed in Table 2 and are (listed in no particular order): science, technology, engineering and mathematics (STEM) majors, business majors, health and human service majors, social and behavioral sciences majors, education majors, arts and humanities majors, interdisciplinary degree majors, all undeclared majors (including students ineligible to declare

Table 2

Academic Major Classifications

Major category	Majors included
STEM	Biology, chemistry, mathematics, communication studies, electronic media broadcasting, computer information technology, computer science, electrical/mechanical engineering, business informatics, journalism, public relations
Business	Accountancy, business administration, construction management, economics, entrepreneurship, finance, human resource management, management, marketing, sports business, all pre-business majors
Health and human services	Health science, nursing, radiologic technology, respiratory care, social work
Social and behavioral sciences	Anthropology, criminal justice, geography, political science, psychology, sociology
Arts and humanities	Art, English, history, music, philosophy, theatre
Interdisciplinary	Integrative studies, organizational leadership
Undeclared	Including students ineligible to declare a major
Non-degree	Students not intending to complete a degree at NKU

majors due to academic deficiencies), and all non-degree students. These nine categories were entered in the statistical models as indicator variables.

The STEM group included some majors not typically associated with STEM fields. These were communication studies, journalism, media informatics, and public relations, all of which are offered by the Department of Communication Studies. This department is part of NKU's College of Informatics and all majors include a heavy emphasis on digital media, electronic communication and Internet-based technologies. Because of this emphasis on technology, these majors were included in the STEM grouping. A second variable reflecting student academic progress was the student's year in college at the beginning of fall 2008.

A second variable reflecting student academic progress was the student's year in college at the beginning of fall 2008. Five specific classifications were used and are described in Table 3. A mix of students across the five classifications is included in this study. Only students pursuing their first bachelor degree were included in this study. Post-baccalaureate students and graduate students taking undergraduate courses were excluded. Credit hours included transfer work.

Table 3

Year in College

Grade level	Definition
Freshman	A student who successfully completed a total of 29 or fewer semester hours prior to fall 2008
Sophomore	A student who successfully completed a total of 30-59 semester hours prior to fall 2008
Junior	A student who successfully completed a total of 60-89 semester hours prior to fall 2008
Senior	A student who successfully completed more than 90 semester hours prior to fall 2008
Non-degree student	A student who did not intend to complete a degree as indicated on the university application.

A third variable related to academic progress was semester hours attempted in fall 2008. A range of full- and part-time enrollments was represented in the study population. The fourth variable was college GPA at the start of fall 2008. For most students, GPA was cumulative throughout the academic career and included the grade point average from all institutions attended. For students who transferred to NKU prior to 1997, however, only the resident GPA at NKU was available. This reflected a change in transfer policies at that time. No distinction was made between the two types of GPA in this study. If a student was an entering freshman or entering non-degree student in fall 2008, the field was blank.

Table 4

Independent Variables – Student Characteristics

Variable	Variable type	Indicator variables
Age	Continuous	--
Gender	Indicator (y/n)	Male
	Indicator (y/n)	Female
Race	Indicator (y/n)	White
	Indicator (y/n)	African-American
	Indicator (y/n)	Hispanic
	Indicator (y/n)	Other
Applied for Title IV aid	Dichotomous (y/n)	--
Received Title IV aid	Dichotomous (y/n)	--
Residency	Indicator (y/n)	Kentucky
	Indicator (y/n)	Metro rate
	Indicator (y/n)	Indiana reciprocity
	Indicator (y/n)	Nonresident
Developmental course placement	Dichotomous (y/n)	--
Prior completion of online course	Dichotomous (y/n)	--
Prior completion of introductory computer course	Dichotomous (y/n)	--

Table 4 (continued)

Variable	Variable type	Indicator variables
Academic major	Indicator	STEM Business Education Arts & humanities Social & behavioral sciences Interdisciplinary Undeclared
Year in college	Indicator	Freshman Sophomore Junior Senior Non-degree
Hours attempted-fall 2008	Continuous	--
College GPA–start of fall 2008	Continuous	--

In addition to these 13 independent variables, all students were categorized into one of the five programmatic membership categories, which was treated as a 14th independent variable in the study.

Employer-sponsored students. These students had been selected by their employer to enter an academic program (pending admission by the university), and the employers paid the

students' tuition and fees directly to the university. Often courses were delivered at the employer site or through a combination of onsite and online coursework.

Fully online students. In fall 2008, NKU offered five undergraduate programs fully online (Bachelor of Arts in organizational leadership; Bachelor of Science in construction management for surveyors; Bachelor of Science completion program for registered nurses; Bachelor of Science in Health Science completion program for allied health professionals; and a non-degree certificate in business informatics). Students selecting one of these programs had indicated a desire to complete their entire program in the online format.

The Program for Adult-Centered Education (PACE). PACE is a hybrid program that combines weekly face-to-face with web-enhanced instruction. While PACE is not truly a cohort-based program, the lock-step nature of the course sequencing means that most PACE students took the majority of their courses together, and thus the program functioned largely like a cohort group. Some PACE courses were 100% online and offered as “closed” sections (only open to PACE students).

Interlopers. Students who took available seats offered initially for employer-sponsored, fully online, and PACE students were classified in this study as interlopers.

General student population. NKU offered many sections of fully online courses that were open to the general student population. Any student taking online courses who did not fit in one of the other four groups was identified as part of the general student population.

Statistical Equations

The equation model for the multiple regression analysis of the continuous dependent variable, percentage of online courses completed, is

$$\Psi = \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_i X_i + \varepsilon_i$$

where Ψ is the dependent variable, β is the regression coefficient, X is the independent variable, and ε is the model error. The computer software program SPSS was used to estimate the model coefficients (and made the model calculations). The actual equation, using all indicator variables, was:

$$\begin{aligned} \Psi = & \beta_1 X_{\text{age}} + \beta_2 X_{\text{male}} + \beta_3 X_{\text{Iwhite}} + \beta_3 X_{\text{IWhite}} + \beta_3 X_{\text{IAfrAm}} + \beta_3 X_{\text{IHispanic}} + \beta_3 X_{\text{IRaceother}} + \\ & \beta_3 X_{\text{IKY}} + \beta_3 X_{\text{IOH}} + \beta_3 X_{\text{IIN}} + \beta_3 X_{\text{IResOther}} + \beta_4 X_{\text{FAapply}} + \beta_4 X_{\text{FAaward}} + \beta_5 X_{\text{Reading}} + \beta_5 X_{\text{English}} + \beta_5 X_{\text{Math}} \\ & + \beta_6 X_{\text{PriorOL}} + \beta_7 X_{\text{Computer}} + \beta_8 X_{\text{I STEM}} + \beta_8 X_{\text{IBusiness}} + \beta_8 X_{\text{IEducation}} + \beta_8 X_{\text{IS/BSc}} + \beta_8 X_{\text{IA\&H}} + \beta_8 X_{\text{IInter}} + \\ & \beta_8 X_{\text{IUnd}} + \beta_8 X_{\text{INonDmajor}} + \beta_9 X_{\text{IFresh}} + \beta_9 X_{\text{ISoph}} + \beta_9 X_{\text{Ijr}} + \beta_9 X_{\text{ISr}} + \beta_9 X_{\text{INonDclass}} + \beta_{10} X_{\text{GPA}} + \\ & \beta_{11} X_{\text{Employer}} + \beta_{12} X_{\text{majorOL}} + \beta_{12} X_{\text{PACE}} + \beta_{12} X_{\text{Interloper}} + \beta_{12} X_{\text{Gen}} + \varepsilon_i \end{aligned}$$

With regard to the nonlinear logistical equation, the basic regression model is slightly different:

$$\ln \left(\frac{p}{1-p} \right) = \rho + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_i X_i + \varepsilon_i$$

where p is the probability of an occurrence happening, ρ is the slope of the line, $\beta_1, \beta_2, \beta_3 \dots \beta_i$ are the regression coefficients, and $X_1, X_2, X_3 \dots X_i$ are the independent variables.

Because the average variable was already factored into the basic equation, the most prevalent indicator variables were omitted from the equation. For example, when students in the population were of the White race, that indicator variable was dropped from the equation. The purpose of this adjustment was to avoid over-factoring the most prevalent of each of the indicator factors. This was done when the model was input into SPSS.

Conclusion

The purpose of this study was to expand what is known regarding the factors that relate to successful completion of online, college courses. It relied on archival data from 1,493

undergraduate students enrolled in 167 fully online courses at NKU in fall 2008. It addressed 13 variables available through archival data at NKU. It included programmatic membership as the fourteenth variable.

Analysis of the relationship between the 14 independent variables was conducted using two dependent variables (successful completion of online courses, and percentage completion of online courses) through logistical regression and multiple regression techniques. Descriptive statistics are provided in Chapter 4 to describe the study population in more detail. Inferential statistics were employed to address the two research questions:

1. Is there a relationship between each of 13 student variables and successful completion of online, credit-bearing, undergraduate courses at NKU?
2. Is there a relationship between membership in one of five programmatic types and successful completion of online, credit-bearing, undergraduate courses at NKU?

CHAPTER 4

Findings

The purpose of this study was to expand what is known regarding the factors that relate to successful completion of online, college courses. The study was based on all undergraduate students enrolled in fully online courses at NKU after the drop-add period in fall 2008 ($N = 1,493$). For each student, 13 variables available through archival data were considered. Programmatic membership was the 14th variable. These variables were analyzed through two statistical approaches as described below. The analyses were conducted to address the two research questions for this study:

1. Is there a relationship between each of 13 student variables and successful completion of online, credit-bearing, undergraduate courses at NKU?
2. Is there a relationship between membership in one of five programmatic types and successful completion of online, credit-bearing, undergraduate courses at NKU?

Independent Variables

To begin, descriptive statistics were calculated for each of the independent variables. This was designed to illuminate and understand the composition of the undergraduate students enrolled in online courses at NKU in fall 2008. No attempt to draw conclusions about the possible relevance or impact of the composition of the independent variables is provided as part

of the descriptive statistics section. This section shows that a diverse group of students was represented in the data.

Age. Students ranging in age from 16 to 70 took online courses as seen in the histogram (Figure 1). The mean age was 28.35 years, and the median was 25 years. The standard deviation was 8.91 years. Students aged 24 or older represented 60% of the total students. Therefore, online courses were predominantly taken by adult students (age 24+), but many students (38.8) were aged 18-23 (traditional-aged college students). There were 17 high school students taking online courses as part of a dual enrollment program. The mean age was 28.3, median was 25, range was 16 to 70 years, and standard deviation was 8.9 years.

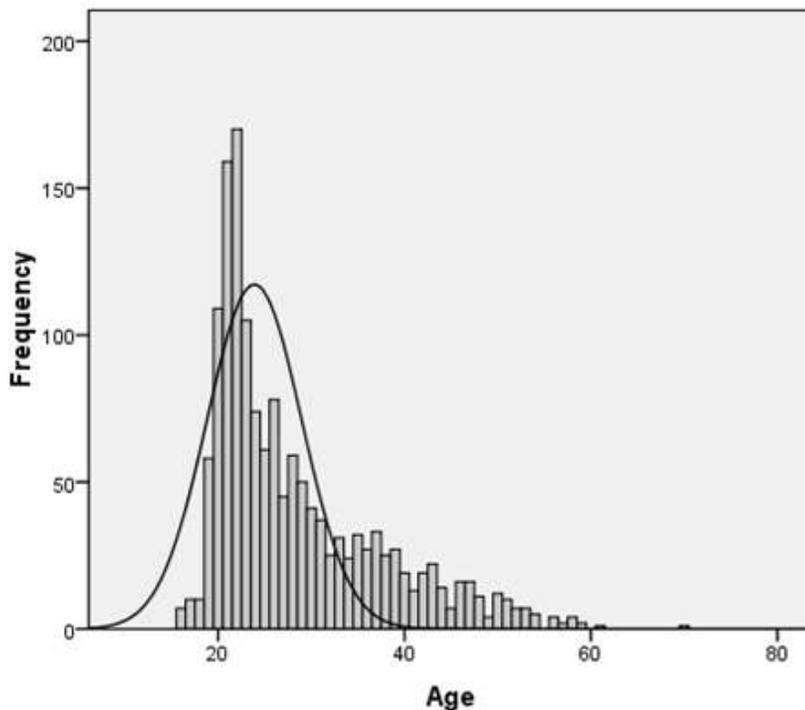


Figure 1. Histogram of age of students enrolled in online courses ($N = 1,493$).

Gender. Of the 1,488 online students reporting gender, 1011 were female and 477 were male. Thus, students enrolled in online courses were disproportionately female (68%). This gender breakdown was different from the total NKU undergraduate student body which was 57% female (Northern Kentucky University Office of Institutional Research).

Race. The racial composition of students enrolled in online courses by number and percentage is shown in Table 5. The table also shows the percentage of the total NKU undergraduate student body by race. The racial composition of students taking online courses was generally consistent with the racial composition of the total NKU undergraduate student body. The racial category labeled “Other” included international students, Asian or Pacific-Island American, American Indians or Alaska natives, and students who did not designate their race. A total of 4.4% of online students did not designate their race compared to 4.1% of all undergraduates (Northern Kentucky University Office of Institutional Research).

Table 5

Racial Composition of Online Students and NKU Undergraduates

Race	Online students (<i>n</i>)	Race as % of all online students	Race of NKU students as % of all undergraduates
White	1,319	88.30%	86.5%
Black	76	5.10%	5.7%
Latino	10	0.07%	1.2%
Other	88	5.90%	6.5%

Residency. Most students enrolled in online courses were Kentucky residents (72.3%). Almost 14% were classified as “metro” students, meaning they lived in Ohio or Indiana within

the counties included in the standard metropolitan service area (SMSA) of Greater Cincinnati. These students were assessed tuition at a rate that is higher than the resident rate but less than non-resident rate. Another 10% lived in Indiana counties covered by a tuition-reciprocity agreement that was different from the metro rate. Like students covered by the metro rate, students under the Indiana reciprocity agreement paid tuition rates that were greater than resident rates but less than non-resident rates. The remaining 53 students (3.5%) were nonresidents. Table 6 shows the number of students taking online courses by residency status. It also gives the percentage of all online students by residency status.

Table 6

Students Enrolled in Online Courses by Residency

Residency	<i>n</i>	% of all online students
Kentucky residents	1,080	72.3%
Metro	206	13.8%
Indiana reciprocity	154	10.3%
Nonresident	53	3.5%

Application for federal financial assistance. In this study, application for federal financial assistant, together with receipt of need-based aid, was used as a proxy to measure socio-economic status (SES). The literature review in Chapter 2 highlighted previous studies that suggested that SES may impact college-choice and persistence decisions (St. John et al., 2007). To fully understand the demographic composition (as defined by age, gender, race, and residency) of online students applying for and receiving financial aid, tables detailing these variables with respect to application for and receipt of financial aid are provided (Tables 7 and

8). No attempt was made to draw conclusions about the composition of the online students within these categories within this descriptive statistics section.

Less than half (44.9%) of the students enrolled in online courses (670 students) completed the Federal Application for Federal Student Aid (FAFSA). This was considerably less than the 64% of total NKU undergraduate student body that applied for aid (Northern Kentucky University Office of Institutional Research). Figure 2 depicts the number and percentage of students who applied for aid by age category. The figure shows the number of students who did not apply for aid, followed by the number who did apply in each age category. The percentages relate to the students who applied for aid within each age category.

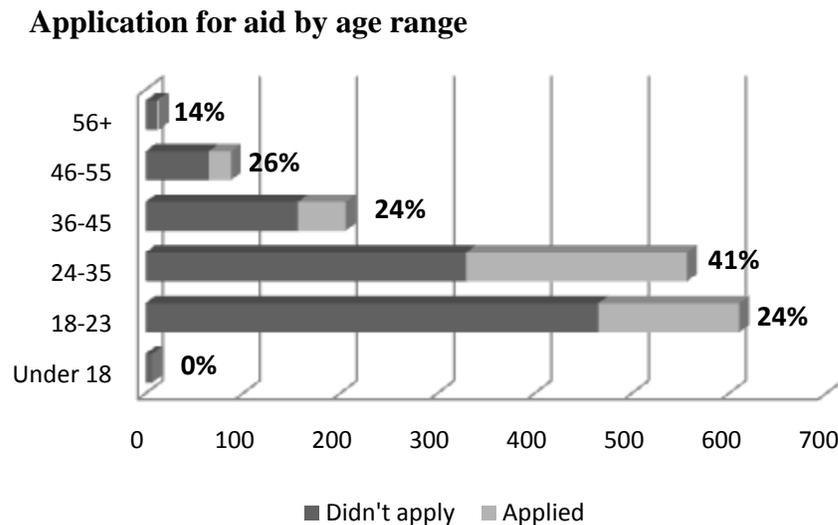


Figure 2. Application for financial assistance by age categories for students enrolled in online courses.

The gender, race, and residency of those who applied for aid are summarized in Table 7.

The table shows the percentage of total students enrolled in online courses in that variable category who applied for aid. The final column (percent of all online students) shows the percentage of all online students who applied for aid by the variable category. The following two examples are provided to illustrate how to read the table. A total of 1,011 females (N) took

Table 7

Gender, Race, and Residency of Students Applying for Federal Financial Assistance

Variable category	N	n	% of students in variable category (n/N)	% of 670 students applying for aid ($n/670$)
Gender*				
Female	1,011	467	46.2%	69.7%
Male	477	202	42.3%	30.1%
Race				
White	1,319	594	45.0%	88.7%
Black	76	33	43.4%	4.9%
Latino	10	5	50.0%	0.0%
Other	88	38	43.2%	5.7%
Residency				
Resident	1,080	520	48%	77.6%
Metro	206	69	33%	10.3%
Reciprocity	154	56	36%	8.3%
Nonresident	53	25	47%	3.7%

*Gender information was missing on 5 students

online courses in fall 2008. Of that number, 467 (n) or 46.2% of them applied for aid. The 467 females who applied for financial aid were 69.7% of the 670 total online students who applied for aid in fall 2008. Similarly, there were 76 Black students (N) who took online courses in fall 2008. Of that number, 33 (n) or 43.4% of them applied for aid. The 33 Black students who

applied for aid were 4.9% of the 670 total online students who applied for financial assistance in fall 2008.

Receipt of federal need-based assistance. Of the 670 students enrolled in online courses who applied for aid, 446 (66.5%) received need-based aid in the form of grants and/or subsidized loans. This was similar to the percentage of the total NKU undergraduate student body that applied for and received need-based aid (62%) (Northern Kentucky University Office of Institutional Research). The gender, race, and residency of online students who received aid are shown in Table 8. The table also shows the percentage receiving aid compared to those who applied for it by variable characteristic. The final column (percent of all online students) shows the percentage of all online students who received aid by the variable category. The following two examples are provided to illustrate how to read Table 8. Of the 1,011 female students in the study, 467 of them applied for aid (46.2%); 312 or 66.8% of them received it. The 312 females receiving need-based aid are 30.9% of total females in the study ($N = 1,011$). Similarly, of the 76 Black students in the study, 33 of them applied for aid (43.4%); 20 or 60.6% of them received it. The 20 Black students receiving need-based aid are 26.3% of all Black students enrolled in online courses.

It is important to reiterate a limitation of this study with regard to application for and receipt of financial assistance. These two variables were used as proxies for socio-economic status (SES) because other measures of SES (such as family income) were not available via archival data. Application for and receipt of financial aid is an imprecise measure of SES and may not accurately portray the fully financial need of students by variable characteristic. This concept is explored in more detail in Chapter 5.

It is also important to note that the process of applying for student loans is the same as the process of applying for need-based aid. It is possible that some of the students who applied for aid did so in order to receive loans, which are not need-based. They may not have had an expectation that they would receive need-based aid.

Table 8

Gender, Race, and Residency of Students Receiving Need-based Financial Assistance

Variable category	<i>N</i>	Applied for aid	% of variable category applying for aid	Received aid (<i>n</i>)	% of those applying who received aid	% of total students receiving aid (<i>n/N</i>)
Gender*						
Female	1,011	467	46.2%	312	66.8%	30.9%
Male	477	202	42.3%	133	65.8%	27.8%
Race						
White	1,319	594	45.0%	391	65.8%	29.6%
Black	76	33	43.4%	20	60.6%	26.3%
Latino	10	5	50.0%	5	100.0%	50.0%
Other	88	38	43.1%	30	78.9%	34.0%
Residency						
Resident	1,080	520	48.1%	354	68.1%	32.7%
Metro	206	69	33.5%	52	75.3%	25.2%
Reciprocity	154	56	36.3%	26	46.4%	16.8%
Nonresident	53	25	47.2%	14	56.0%	26.4%

*Gender information was missing on 5 students.

Placement in developmental reading, English and/or mathematics coursework. Four in 10 students enrolled in online courses had placed into developmental coursework. This variable was included as a measure of college readiness as described in Chapter 3. Figure 3 depicts the number of online students required to complete developmental courses by age

category. Students who were nontraditional on the basis of age (i.e., 24+) were more likely to need developmental coursework than their traditional-aged peers (age 18-23). The gender, race, and residency of the 615 students requiring developmental coursework is found in Table 9. The following two examples are provided to illustrate how to read the table. Of the 615 online students who required developmental coursework, 427 or 69.4% of them were female. The 427 females required to take developmental coursework were 42.2% of the total number of females ($N = 1,011$) who took online courses in fall 2008. Similarly, 44 (7.15%) of the 615 students required to take developmental coursework were Black. The 44 Black students required to take developmental coursework represented 57.8% of the 76 Black students enrolled in online courses in fall 2008. The figure shows the number of students not required to complete developmental coursework, followed by the number required to complete developmental coursework in each age category. The percentages relate to the students required to complete development within each age category.

Students requiring developmental coursework by age

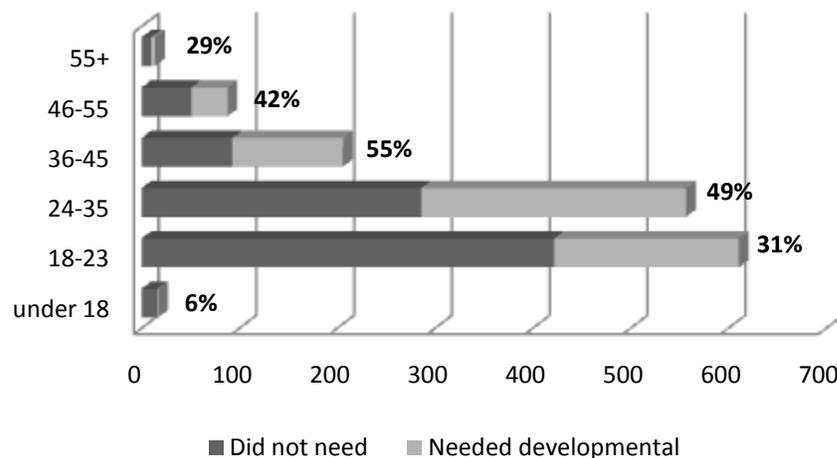


Figure 3. Students requiring development coursework by age categories of students enrolled in online courses.

Table 9

Gender, Race, and Residency of Online Students Requiring Developmental Coursework

Variable category	<i>N</i>	<i>n</i>	% of category requiring developmental (<i>n/N</i>)	Students needing developmental as % of all students (<i>n/1,493</i>)
Gender*				
Female	1,011	427	69.4%	28.7%
Male	477	188	39.4%	12.6%
Race				
White	1,319	526	39.8%	35.2%
Black	76	44	57.1%	2.9%
Latino	10	5	50.0%	0.0%
Other	88	40	45.4%	2.6%
Residency				
Resident	1,080	448	41.5%	30.0%
Metro	206	69	33.5%	4.6%
Reciprocity	154	75	48.7%	5.0%
Nonresident	53	23	43.3%	1.5%

*Gender information was missing on 5 students

Prior completion of an online course at NKU. Almost half (45.5%) or 680 students enrolled in online courses had previously completed an online course at NKU. As illustrated in Figure 4, older students (age 24+) were more likely to have previously completed an online course at NKU than younger students enrolled in online courses. The gender, race, and residency of the 680 students who had previously completed an online course at NKU are summarized in Table 10. The following two examples are provided to illustrate how to read the table. Of the 680 online students who had previously completed an online course at NKU, 427 or 69.4% of them were female. The 427 females required to take developmental coursework were 42.2% of the total number of females ($N = 1,011$) who took online courses in fall 2008.

Similarly, 44 (7.15%) of the 615 students required to take developmental coursework were Black. The 44 Black students required to take developmental coursework represented 57.8% of the 76 Black students enrolled in online courses in fall 2008. The figure shows the number of students who had not completed an online course, followed by the number who had completed an online course in each age category. The percentages relate to the students who had completed an online course within each age category.

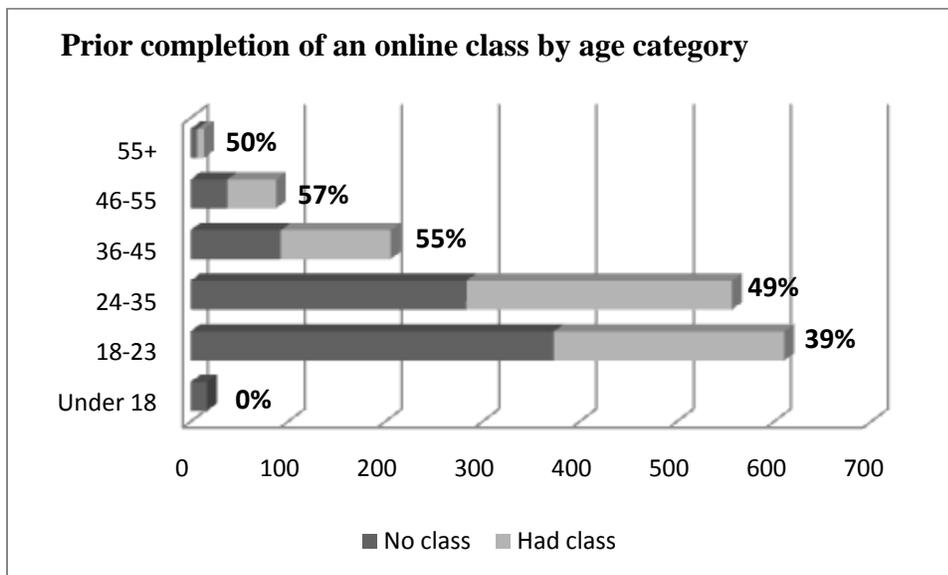


Figure 4. Prior completion of an online course at NKU by age category by students enrolled in online courses.

Table 10

Gender, Race, and Residency of Online Students Previously Completing Online Course(s) at NKU

Variable category	<i>N</i>	<i>n</i>	% of category with prior online course (<i>n/N</i>)	Students with prior online course as % of all students (<i>n/1,493</i>)
Gender*				
Female	1,011	474	46.8%	31.8%
Male	477	204	42.7%	13.75%
Race				
White	1,319	611	46.3%	40.9%
Black	76	28	36.8%	2.0%
Latino	10	3	30.0%	0.0%
Other	88	37	42.0%	2.4%
Residency				
Resident	1,080	492	45.5%	32.9%
Metro	206	89	43.0%	5.9%
Reciprocity	154	78	50.6%	5.2%
Nonresident	53	21	39.6%	1.4%

*Gender information was missing on 5 students.

Prior completion of an introductory computer/information technology course(s).

About half (49.2% or 734 students) of the students enrolled in online courses had completed a computer/information technology course at some point in their academic career. This may have been at NKU or another institution. Composition by age category of those having completed a computer course versus those who had not is depicted in Figure 5; the gender, race, and residency of those who had completed a computer class are found in Table 11. The following two examples explain how to read the table. Of the 734 online students who had previously completed an online course at NKU, 459 or 62.5% of them were female. The 459 females with

prior online experience were 45.4% of the total number of females ($N = 1,011$) who took online courses; they were 30.8% of all students taking online courses ($N = 1,488$) in fall 2008.

Similarly, 34 (7.15%) of the 734 students who had previously taken an online course were Black.

The 34 Black students with prior online experience represented 44.7% of the 76 Black students enrolled in online courses, and 2.3% of all students taking online courses ($N = 1,493$) in fall

2008. The figure shows the number of students who had not completed a computer class,

followed by the number who had completed a computer class within in each age category. The

percentages relate to the students who had completed a computer class within each age category.

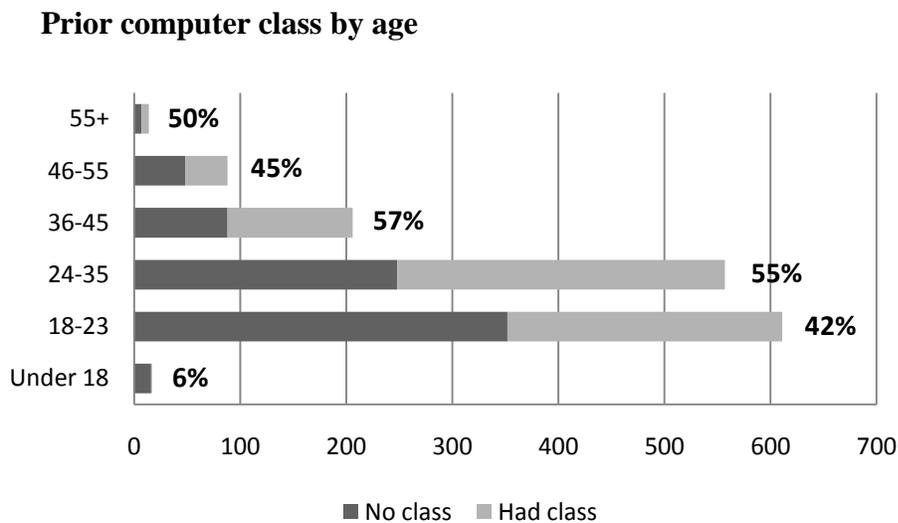


Figure 5. Prior completion of computer/information technology course by age categories for students enrolled in online courses.

Table 11

*Gender, Race, and Residency of Students Completing Computer/information Technology**Course(s)*

Variable category	<i>N</i>	<i>n</i>	% of students in variable category (<i>n/N</i>)	% completing computer course (<i>n/1,493</i>)
Gender*				
Female	1,011	459	45.4%	30.8%
Male	477	272	57.0%	18.3%
Race				
White	1,319	644	48.8%	43.1%
Black	76	34	44.7%	2.3%
Latino	10	4	40.0%	0.0%
Other	88	52	59.0%	3.5%
Residency				
Resident	1,080	502	46.5%	33.6%
Metro	206	101	49.0%	6.7%
Reciprocity	154	100	64.9%	6.7%
Nonresident	53	31	58.5%	2.0%

*Gender information was missing on 5 students.

Academic major. Of the nine categories of academic majors, interdisciplinary studies had the most students enrolled in fully online courses in fall 2008. This likely reflects the fact that the oldest and largest online undergraduate program at NKU is Organizational Leadership, which was classified in this study as an interdisciplinary major. The next most prevalent category was health and human services with 308 or 20.6% of the total online students. This, too, was consistent with the fact that two health-related degree-completion programs were offered in fully online formats: RN to BSN and Bachelor of Science in Health Science. Table 12 shows the number and percentage of majors in each category.

Table 12

Number and Percentage of Online Students by Academic Major

Major category	<i>n</i>	% of all online students
Interdisciplinary programs	406	27.2%
Health/human services	308	20.6%
Business	253	16.9%
STEM	163	10.9%
Social-behavioral sciences	109	7.3%
Liberal arts	88	5.9%
Undeclared major	83	5.6%
Education	61	4.0%
Non-degree student	22	1.5%

Year in college. Half of the students enrolled in online courses were seniors ($n = 750$). Juniors represented 24.6% of all students while sophomores and freshmen accounted for 16.1% and 7.4%, respectively. Only 24 students (1.6%) were classified under non-degree status. Online students by year in college are shown in Table 13.

Table 13

Online Students by Year in College

Year in college	<i>n</i>	As % of online students (<i>N</i> =1,493)
Senior	750	50.2%
Junior	368	24.6%
Sophomore	240	16.1%
Freshman	111	7.4%
Non-degree student	24	1.6%

Credit hours attempted in fall 2008. Almost half (46.3%) of students enrolled in online courses were full-time students enrolled in 12 to 16 hours. One-third (32.3%) were part-time students enrolled in 6 to 11 credit hours. These students were taking enough credits to qualify for application for financial assistance. There were 102 (6.8%) students enrolled in fewer than 6 credit hours, making them ineligible to apply for aid. In addition, almost 10% of the study population was taking 17 or more credit hours in fall 2008. At NKU, any student taking more than 16 credit hours in a semester was assessed a 50% tuition surcharge for every hour above 16. The vast majority of students enrolled in 17 or more hours were seniors, as depicted in Table 14. The possible relevance of this fact is addressed in Chapter 5.

Table 14

Online Students Enrolled in 17+ Hours by Year in College

<u>Year in college</u>	<u><i>n</i></u>	<u>% of total taking 17+ hrs (<i>N</i>=1,493)</u>
Seniors	85	62.0%
Juniors	34	24.8%
Sophomores	13	24.8%
Freshmen	4	9.4%
Non-degree	1	2.9%

College GPA at start of fall 2008. More than half of all students enrolled in online courses had a “B” average (3.0) or better. The mean GPA was just under a “B” average at 2.99. GPA was not available for 28 students who were either entering non-degree students or first-time freshman when the semester began. At NKU, students who graduate with a GPA of 3.5 or higher graduate with honors. At the start of fall 2008, 20% of the students enrolled in online courses were on track to graduate with honors. The distribution of grades is shown in Table 15.

Table 15

*GPA Distribution, Start of Fall 2008**

GPA	<i>n</i>	% of all online students
Below 2.0	42	2.8%
2.0 - 2.499	238	16.0%
2.5 – 2.99	414	28.0%
3.0 – 3.499	478	32.6%
3.5 – 4.0	294	20.0%

*GPA data was not available for 28 students.

Programmatic membership. The most prevalent category in the programmatic membership variable was the general student population. A total of 616 (41.2%) was not affiliated with one of the programmatic groups but enrolled in an online course open to the general student population. In addition, nearly 25% were interlopers or enrolled in a section that had been offered primarily to meet the needs of employer-sponsored, fully online or PACE students. The latter three categories represented 2.3%, 23.2% and 8.3% of the students enrolled in online courses, respectively. The employer-sponsored group with 34 members was considered large enough to include in statistical inferences. Table 16 summarizes the student membership by program type. The average age of students in each membership group differed dramatically, as seen in Table 17. Students belonging to the employer-sponsored group were the oldest students and were on average almost 15 years older than students belonging to the general student population. PACE students had the next highest average age, followed by fully online

students. The greatest variance in age was within the fully online group, which had a standard deviation of 9.28 years.

Table 16

Students Enrolled in Online Courses by Programmatic Membership

Member group	<i>N</i>	% of all online students
General student population	616	41.0%
Interlopers	372	24.9%
Fully online programs	347	23.2%
PACE	124	8.0%
Employer-sponsored program	34	2.2%

Table 17

Age by Programmatic Membership

Member group	<i>M</i>	<i>Mdn</i>	<i>SD</i> (in years)
Employer sponsored	39.24	38.50	8.532
Fully online	33.64	32.00	9.284
PACE	36.44	35.00	8.447
Interloper	25.97	23.00	7.801
General student population	24.98	22.00	6.211

Gender, race, and residency by programmatic membership are summarized in Table 18. It shows that employer-sponsored students are disproportionately female (76%) and more likely to live in one of the non-Kentucky counties covered by the metro tuition rate. This likely reflects the fact that the three employers sponsoring these students are healthcare facilities; two of the three operate in Cincinnati, OH. Another noteworthy distinction shown in Table 18 was that students in the general population are disproportionately female (71%). Otherwise, the gender, race, and residency of each programmatic group are similar to composition of the rest of the students enrolled in online courses.

Table 18

Gender, Race, and Residency Counts by Programmatic Membership Category

Variable	Employer-sponsored	Fully online	PACE	Interlopers	General population
Gender*					
Female	26	243	80	229	433
Male	8	102	44	142	181
Race					
White	31	302	110	330	546
Black	2	22	4	15	33
Latino	0	3	0	3	4
Other	1	20	10	24	33
Residency					
Resident	9	237	100	279	455
Metro	18	47	6	38	59
Reciprocity	5	46	6	38	59
Nonresident	2	17	3	12	19

*Gender information was missing on 5 students

Dependent Variables

This study included two dependent variables. The first was a dichotomous variable (Y/N) based on successful completion of all online courses. This dependent variable was used in the logistic regression analysis. Students who dropped any of their online courses were coded as non-completers. Students who completed their courses with the grade of “F” were also counted as non-completers.

The second dependent variable was a continuous variable based on the percentage of courses successfully completed. As with the first dependent variable, courses completed with a grade of “F” were counted as unsuccessful completions. This dependent variable does not reflect the number of online courses attempted. That is, a student who attempted only one course was given a value of 100% if the course was successfully completed and a value of 0% if it was not. Similarly, a student who attempted four courses was given a value of 100% only if all four were successfully completed, a value of 0% if none was successfully completed, and a percentage between 0% and 100% if some but not all courses were successfully completed.

Initial Statistical Analyses

This section reports on the results of the two data analyses performed to answer the study’s two research questions:

1. Is there a relationship between each of 13 student variables and successful completion of online, credit-bearing, undergraduate courses at NKU?
2. Is there a relationship between membership in one of five programmatic types and successful completion of online, credit-bearing, undergraduate courses at NKU?

There was consistency between the results from the logistic regression analysis and the multiple regression analysis. Both tests pointed to a relationship between several of the 13

student variables and successful completion of online courses (research question 1); neither test pointed to a relationship between programmatic membership and successful completion of online courses (research question 2).

Logistic regression analysis. Logistic regression was conducted on the data using a dichotomous dependent variable. Students who successfully completed all of their online courses were coded as “yes” or “completers.” Students who dropped even one course or finished any course with a grade of “F” were coded a “no” or “non-completers.” All 1,493 students were entered into the model, but the model excluded 34 cases that were missing data on one or more variables. Thus, the model analyzed 1,459 cases, of which 1,130 (77.5%) successfully completed their online courses.

The model was run in a forward, stepwise method. It revealed statistically significant relationships between seven variables and successful completion of all online courses ($R^2 = .067$, $p < .001$). As shown in Table 19, the following variables proved to be statistically significant: (a) applying for federal financial assistance; (b) senior class level; (c) GPA; (d) health and human services major; (e) STEM major; (f) metro residency; and (g) race of Black. Race of Black displayed a negative relationship to successful online course completion ($\beta = -.621$), while the other variables displayed a positive relationship to successful online course completion. These variables are explored more fully in the section of this chapter titled “Secondary Analysis of Significant Variables.”

Multiple regression analysis. Multiple regression analysis was conducted on the independent variables using percentage of courses successfully completed as the dependent variable. Data were run in stepwise fashion. The model revealed statistically significant

relationships between successful completion of online courses and several variables ($R^2 = .087$, $p < .001$).

Table 19

Coefficient Summaries for Significant Variables in Logistic Regression Analysis

Variable	β	S.E.	Wald	df	Sig.	Exp(B)
Race of Black	-.621	.266	5.429	1	.020	0.537
Applied/aid	.763	.136	31.318	1	.000	2.144
Metro residency	.499	.204	5.991	1	.014	1.647
STEM major	.462	.220	4.422	1	.035	1.587
Health/human srv major	.802	.192	17.498	1	.000	2.231
Senior	.558	.133	17.592	1	.000	1.747
GPA	.467	.112	17.208	1	.000	1.594

All 1,493 cases were used in the model. A total of 1,153 students (77.2% completed all courses. About 15% did not successfully complete any of their online courses. The remaining 8% finished some but not all of their online courses as seen in Table 20. Although the dependent variable was technically continuous because an infinite range of values was possible, the resulting percentages represent a discrete (rather than a full) range of values because they were a function of the number of courses attempted. Thus, a student who attempted two courses could have completed 100%, 50% or 0% while a student who attempted three courses could have completed 100%, 66%, 33% or 0%, and so on. This explains why the results are clustered at a few percentage values (i.e., 20%, 25%, 33%, 40%, 50%, etc.).

Table 20

Percentage of Courses Successfully Completed

<u>% of courses completed</u>	<u>Frequency</u>	<u>% of enrolled online students</u>
0.0%	223	14.9
25.0%	8	0.5
33.0%	10	0.7
40.0%	2	0.1
50.0%	72	4.8
60.0%	2	0.1
66.0%	16	1.1
75.0%	4	0.3
80.0%	2	0.1
83.0%	1	0.1
100.0%	1,153	77.2

The following variables demonstrated a statistically significant relationship to online course completion: (a) applying for federal financial assistance; (b) senior class level; (c) GPA; (d) health and human services major; (e) STEM major; (f) metro residency; (g) race of Black; and (h) freshman class level. Two variables had a negative relationship with successful completion of online courses. Students with a race of Black and freshman students were less likely to successfully complete their online courses than other students. Race of Latino was the last significant variable in the model ($B = -.245$, $SE = .118$, $t = -2.084$, $p < 0.037$). It also had a negative relationship with successful online course completion. However, only 10

undergraduate Latino students took online courses in fall 2008. Due to the possibility of errors related to the small sample size (Greenland, Schwartzbaum & Finkle, 2000), no inferential statistical conclusions were drawn about Latino students. Overall, the model accounted for 8.7% of the variance in the successful completion of online courses. The coefficient summaries for each significant variable are found in Table 21.

Table 21

Coefficient Summaries for Significant Variables in Multiple Regression Analysis

Variable	Unstandardized coefficients		Standardized coefficients	
	β	<i>SE</i>	Beta	<i>t</i>
Applying for aid	.135	.019	.183	7.233*
Senior	.069	.019	.095	3.575*
GPA	.073	.016	.113	4.435*
Health & hum services	.096	.023	.107	4.104*
STEM	.074	.030	.064	2.491***
Metro	.067	.027	.064	2.522**
Black	-.111	.042	-.067	-2.63**
Freshman	-.090	.037	-.064	-2.41***

* $p < .001$ ** $p < .01$ *** $p < .05$

Note: Race of Latino was the last significant variable in the multiple regression analysis ($\beta = -.245$, $SE = .118$, $t = -2.084$, $p < 0.037$). However, the small sample size ($N = 10$) makes statistical conclusions unreliable.

The logistic regression analysis and multiple regression analysis resulted in similar findings which tended to support the validity of this study. Analyzing the data using two

separate tests functioned similarly to a replication of the study using different measures of success, although it is noted that the same sample data would be expected to yield similar results. This tends to suggest the findings were significant and not the result of definitions of success or data anomalies.

Secondary Statistical Analysis

Both statistical approaches revealed similar findings in terms of variables that influence the successful completion of online courses. Further analyses, including cross tabulations, were conducted to identify and illuminate information that may help explain why these variables were significant. The findings are discussed by variable.

Applying for financial assistance. There was a positive correlation between applying for aid and online course completion under both statistical approaches (logistic regression: $\beta = .763, p = .000$; multiple regression: $\beta = .135, p = .000$). Cross tabulations were calculated for all other variables and revealed that freshmen were the most likely to have applied for financial assistance. However, since there was a negative correlation between freshman year in college and online course completion, this did not point to possible explanations for the significance of this variable. Other possible explanations for the relationship between this variable and online course completion and college persistence in general will be explored in Chapter 5.

Senior year in college. There was a positive correlation between senior year in college and online course completion under both statistical approaches (logistic regression: $\beta = .558, p < .001$; multiple regression: $\beta = .069, p < .001$). A significant proportions hypothesis test was run using Minitab 15 Statistical Software. Although all other statistical analyses were done using SPSS Statistical Software (version 17.0), significant proportions hypothesis tests on this variable and others to be reported later were run using Minitab because the test is easily conducted

through that software as opposed to SPSS. The test revealed that seniors are more likely than other students to have previously taken an online class ($z = -11.06, p < .001$). Almost 60% of seniors had previously enrolled in an online course at NKU, compared to 31% for the other grade years. Similarly, more seniors had completed an introductory computer class than their peers (56.4% of seniors compared to 41.8% of other students), although there was not a statistically significant difference between seniors and non-seniors with regard to prior completion of an introductory computer class.

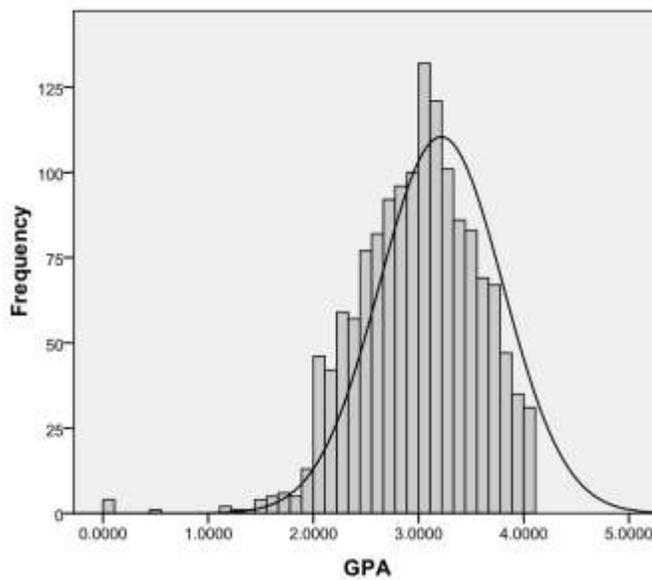
GPA. There was a positive correlation between GPA and online course completion under both statistical approaches (logistic regression: $\beta = .467, p < .001$; multiple regression: $\beta = .073, p < .001$). The mean GPA for several categories of students exceeded the study population mean of 2.99 as seen in Table 22. As previously indicated, these students were eligible to graduate with honors because their GPA's exceeded the 3.0 GPA required by NKU for that designation.

The large size of the study population could have caused the means to cluster and depart from normal distribution. The skewness test produced a negative statistic (-.626), pointing to a longer left tail in the distribution (that is, more values less than the mean). The kurtosis statistic for GPA was 1.561, indicating the means tended to cluster. However, the standard error of .128 in the kurtosis statistic indicated GPA did not have a significantly non-normal distribution. The GPA histogram (Figure 6) supported the general normal distribution of the variable despite the somewhat longer left tail. The few GPA values of 0.00 likely led to the skewness found, yet the infrequent occurrence lacked the strength to indicate a normality violation. The mean GPA was 2.99, and the standard deviation was 0.565. GPA data was available on 1,465 students.

Table 22

Student Categories with Mean GPA's Exceeding 3.0

Student category	<i>M</i>	Mdn	<i>SD</i>
PACE student	3.16	3.2	.526
Reciprocity residency	3.08	3.06	.522
Health/human srvs major	3.052	3.08	.532
STEM major	3.028	3.044	.532
Prior online course	3.02	3.065	.537
Senior year in college	3.02	3.064	.531
Race of White	3.00	3.038	.562
Business major	3.00	3.03	.618

*Figure 6.* GPA frequency distribution of students enrolled in online courses.

Health and human services major. There was a positive correlation between major in the health and human services field and online course completion under both statistical approaches (logistic regression: $\beta = .802, p = .000$; multiple regression: $\beta = .096, p = .000$). Majors in this category were significantly more likely to be female (significant proportions test results: $z = 10.48, p < .001$), to be seniors (significant proportions test results: $z = -6.88, p = .000$) and to be fully online majors (significant proportions test results: $z = -3.45, p = .001$) than other students enrolled in online courses.

They are somewhat older than the rest of the students enrolled in online courses ($m = 29.81$ years compared to $M = 27.97$ years, respectively), and there is a greater variability in their ages compared to the rest of the students enrolled in online courses ($SD = 9.72$ years compared to $SD = 8.721$ years, respectively). The age differences are not statistically significant.

All students in the employer-sponsored programmatic category were health and human services majors. They were considerably older than the rest of the students enrolled in online courses ($m = 39.24$ compared to $M = 28.10$), and more likely to be female (76%) and White (91%) than the rest of the students enrolled in online courses. The small number of students in the employer-sponsored category ($N = 34$) may have accounted for some of the variability. The employer-sponsored category is explored more in Chapter 5 when research question 2 (Is there a relationship between membership in one of five program types and successful completion of online, credit-bearing, undergraduate courses at NKU?) is addressed.

STEM major. There was a positive relationship between major in the STEM field and online course completion under both statistical approaches (logistic regression: $\beta = .462, p = .035$; multiple regression: $\beta = .074, p = .013$). Cross-tabulations between STEM majors and the remaining variables revealed that STEM majors generally mimicked other students enrolled in

online courses with three exceptions. STEM majors were *less* likely to be resident students than other students enrolled in online courses (68% compared to 72.8%). Specifically, they were statistically more likely to be non-residents (significant proportions test: $z = 2.04, p = .011$). They were also statistically *less* likely to have taken a prior online course (significant proportions test: $z = -2.80, p = .008$). They were *more* likely to have completed a computer/information technology course (55% compared to 48%), although this was not a statistically significant difference.

Metro residency. There were some interesting findings within the metro category. While students with a metro residency were predominantly White (83%), they were also statistically more likely to be Black than the study population (significant proportions test results: $z = -2.92, p = .004$). They were less likely to have applied for financial assistance (significant proportions test results: $z = 3.70, p < .001$), less likely to have needed developmental courses (significant proportions test results: $z = 2.50, p = .012$) and more likely to have belonged to the employer-sponsored category (significant proportions test results: $z = -2.92, p = .004$).

With regard to the employer-sponsored group, they were classified as metro students if they live in the corresponding counties, but they were actually charged as resident students. Further, their employers directly paid NKU for their tuition, meaning the students had limited financial obligations to the university. They may, however, have had employment obligations with their employer as the result of participating in the employer-sponsored program. That is, they may have been required to continue to work for the employer for a certain period of time in exchange for the tuition investment made by the employer. Issues related to perceived *value* of education received will be explored in Chapter 5 in terms of their possible relevance to employer-sponsored students and all students with a metro residency.

Race of Black. There was a negative relationship between race of Black and online course completion under both statistical approaches (logistic regression: $\beta = -.621$, $p = .020$; multiple regression: $\beta = -.111$, $p = .009$). Cross tabulations between race of Black and other variables revealed some factors that may illuminate the relationship. When compared to non-Black students enrolled in online courses, they were more likely to have required developmental courses (57.8% for Blacks compared to 40% for non-Blacks). This difference was statistically significant (significant proportions test results: $z = -3.03$, $p < .005$). There was no statistically significant difference between Blacks and non-Blacks in terms of their completion of introductory computer/technology courses. However, as depicted in Table 23, when Blacks did take computer courses, it was more likely to have been as juniors or seniors. As was reported in the literature review, they tend to be less likely than non-Black students to have grown up with computers in their homes (Angiello, 2002). The possible connection between limited computer experience and the likelihood of online course completion will be discussed in Chapter 5.

Table 23

Percentage of Black and Non-Black Students Enrolled in Online Courses With Introductory Computer Classes by Grade Level

Year in college	% of students who completed an introductory computer class	
	Blacks	Non-Blacks
Freshman	0.0%	19.2%
Sophomore	30.7%	40.5%
Junior	54.0%	52.0%
Senior	45.9%	56.9%
Non-degree	<i>ns</i>	8.3%

Freshman year in college. This variable was statistically significant only in the multiple regression analysis, where it demonstrated a negative relationship to online course completion ($\beta = -.090, p = .16$). Like students with a race of Black, freshmen were less likely to have completed a computer or information-technology class (significant proportions test results: $z = 8.31, p < .001$) and to have prior experience in online courses (significant proportions test results: $z = 6.96, p < .001$). They were also more likely to be undeclared majors. In fact, 36.9% of freshmen enrolled in online courses had not declared a major, and freshmen represented half of all the students enrolled in online courses who are undeclared majors. The impact of clear occupational goals on retention as a possible explanation for some of the variance displayed by freshmen is explored in Chapter 5.

Summary of Findings

This chapter focused on the analysis of data to answer the two research questions for this study:

1. Is there a relationship between each of 13 student variables and successful completion of online, credit-bearing, undergraduate courses at NKU?
2. Is there a relationship between membership in one of five programmatic types and successful completion of online, credit-bearing, undergraduate courses at NKU?

The logistic regression analysis and the multiple regression analysis offered similar answers. Both pointed to relationships between seven student variables and successful completion of online courses (research question 1). Those specific variables reflected in Table 24 were application for financial assistance, senior year in college, GPA, majors in health and human services and STEM fields, residency of metro, and race of Black. The multiple regression analysis also showed a significant relationship between freshman year of college and

successful completion of online courses. All but race of Black and freshman year in college had a positive impact on online course completion. Race of Black and freshman year in college had negative correlations with online course completion.

Table 24

Summary of Significant Independent Variables

Variable	Logistic regression analysis (β)	Multiple regression analysis (β)	Relationship to online course completion
Health/human service major	.802	.096	Positive
Applying for aid	.763	.135	Positive
Race of Black	-.621	-.111	Negative
Senior year in college	.558	.069	Positive
Metro residency	.499	.067	Positive
GPA	.467	.073	Positive
STEM major	.462	.074	Positive
Freshman year in college	<i>ns</i>	-.090	Negative

Note: Race of Latino also appeared as the last significant variable in the multiple regression analysis ($\beta = -.245$, $SE = .118$, $t = -2.084$, $p < 0.037$). However, the small sample size ($N = 10$) makes statistical conclusions unreliable.

The logistic regression analysis explained 6.7% of the variance among the data; multiple regression analysis explained 8.7% of the variance among the data. These results were statistically significant but explained only a small percentage of the difference among variables. However, the consistency between the two tests tends to substantiate the results and validate the

findings. Thus the findings may influence practice with regard to student persistence in online undergraduate courses at NKU and possibly at institutions similar to NKU. This idea is explored in more detail in Chapter 5.

Neither test revealed a relationship between programmatic membership and online course completion (research question 2). However, students majoring in health and human services fields were heavily concentrated in fully online programs, and they represented 100% of the employer-sponsored students. Thus programmatic membership is not a significant variable alone; however, it may have influenced persistence among health and human services majors. This is discussed further in Chapter 5.

CHAPTER 5

Discussion

The purpose of this study was to expand what is known regarding the factors that relate to successful completion of online, college courses. Data on the 1,493 students taking fully online undergraduate courses in fall 2008 were used. The study considered 13 student variables available through archival data at NKU. Programmatic membership was the fourteenth variable. These variables were analyzed through logistic regression analysis and multiple regression analysis. The analyses were conducted to address two research questions:

1. Is there a relationship between each of 13 student variables and successful completion of online, credit-bearing, undergraduate courses at NKU?
2. Is there a relationship between membership in one of five programmatic types and successful completion of online, credit-bearing, undergraduate courses at NKU?

The findings described in Chapter 4 indicate a relationship does exist between several of the 13 student variables and online course completion (research question 1). The findings did not reveal any statistically significant relationship between program membership and online course completion (research question 2). However, results suggest that program membership may influence course completion in one specific category of students, that is, health and human services majors.

This final chapter discusses the findings of the research and their implications for practice. It is comprised of six broad sections: (1) summary of the study; (2) findings related to the research questions; (3) implications for practice and policy; (4) study limitations; (5) recommendations for future research; and (6) conclusion.

Summary of the Study

Statement of problem. There was a two-pronged motivation for conducting this study. On the one hand, enrollment in online courses by students of all ages has soared and is predicted to continue to grow well into the future (Allen & Seaman, 2007, 2008). Students cite the convenience of asynchronous learning as a key motivation for taking online courses (Allen & Seaman, 2007, 2008; Aragon & Johnson, 2008). Including online courses in their schedules may impact the persistence to graduation for many of today's time-constrained students (Hagedorn, 2005; Ivankova & Stick, 2007; Kemp, 2002). Further, many institutions have begun to require all students to take at least one online course, recognizing online learning as an important tool in preparing students for the digital requirements of most current and future careers (Prensky, 2001; Taylor, 2006).

On the other hand, numerous studies have found that retention in online courses is lower than in face-to-face courses (Bernard et al., 2004; Carr, 2000; Diaz, 2002, Paul & Brindley, 2008). It is important to increase what is known about the variables associated with successful completion of online courses because this knowledge (a) will help administrators and advisors steer appropriate students toward online learning, and (b) may help identify policies and procedures to increase the likelihood of course completion among those students less likely to successfully complete them. In this study, a course was considered to be successfully completed if the student finished it with a grade of "D" or higher.

Purpose and research questions. To reiterate, the purpose of this study was to expand what is known regarding the factors that relate to successful completion of online, college courses. Archival data on 1,493 students enrolled in fully online courses at a comprehensive university in northern Kentucky (NKU) were analyzed through logistic regression analysis and multiple regression analysis. A total of 14 variables were considered; 13 reflected student characteristics ranging from demographic information to college readiness to in-college performance and fields of study. The 14th variable identified students as belonging to one of five programmatic categories. These were employer-sponsored programs, fully online programs, the Program for Adult-Centered Education (PACE), interlopers, who were students enrolled in courses intended for one of the prior three categories, and the general online student population, which was made up of all students enrolled in online courses who were not members of the other four categories. The study addressed the two research questions:

1. Is there a relationship between each of 13 student variables and successful completion of online, credit-bearing, undergraduate courses at NKU?
2. Is there a relationship between membership in one of five programmatic types and successful completion of online, credit-bearing, undergraduate courses at NKU?

Literature. Teaching students at a distance is not a new venture. Institutions have taught remotely for hundreds of years, initially through correspondence courses, independent studies, and satellite offices, and later through radio, television, and now the Internet (Harting & Erthal, 2005; Home economics, 2009; Keegan, 2002; Land-grant colleges and universities, 2009). Historically, nontraditional students have been the biggest users of distance learning (Draves, 2000; Eduventures, 2009; Knowles et al., 1998; Latanich et al., 2001). *Nontraditional* is an imprecise term typically applied to students who display one or more of these seven

characteristics: (1) delays enrollment after high school; (2) attends part time for at least part of the academic year; (3) works full time (35 hours or more per week) while enrolled; (4) is considered financially independent for purposes of determining eligibility for financial aid; (5) has dependents other than a spouse (usually children, but sometimes others); (6) is a single parent (either not married or married but separated and has dependents); or (7) does not have a high school diploma (completed high school with a GED or other high school completion certificate or did not finish high school). Those who display four or more characteristics are considered highly nontraditional and are typically the target of adult-focused programs (Choy, 2002). Over the past two decades, colleges and universities have begun to “court” nontraditional learners by developing programs geared to them. Proprietary institutions such as the University of Phoenix have largely driven the move toward special delivery methods such as accelerated programs, cohort groups, hybrid delivery (e.g., a mixture of face-to-face and online learning), and fully online programs (Cronin & Bachorz, 2006; Hendry, 2009; Roach, 2002). Community colleges have also embraced online learning as a significant way to achieve their open-access mission (Shannon & Smith, 2006).

These programs have clearly impacted the enrollment patterns of nontraditional students, who now represent approximately 40% of all undergraduate students (UNITED STATES Department of Education, 2008). Yet nontraditional students remain more likely to leave college without a degree than traditional students (Choy, 2002). Researchers have tracked both fully online and hybrid programs and have identified some characteristics that may impact retention among students who participate in these programs. These include year in college, GPA (Dupin-Bryant, 2004), prior experience in online formats (Dobbs et al., 2009; Yudko et al., 2008), a sense of community (Conrad, 2005), comfort with computers (Sun et al., 2008), and more credits

toward degree (i.e., year in college) (Maki & Maki, 2003). Bean and Metzger (1985) listed several factors outside the academic institution that may impact retention for nontraditional students. These are finances, hours of employment, outside encouragement, family responsibilities, and opportunities to transfer to other institutions. Kember (1989) looked specifically at course completion in online environments and added intrinsic and extrinsic motivations for goal completion as key factors. He theorized that online students will persist if the perceived or real benefits of completing their education will outweigh the costs in terms of the financial and personal commitments required to persist.

Retention is not just an issue for online, hybrid or nontraditional students. Traditional students are increasingly more likely to drop out of college than to persist to degree attainment. Lederman (2009) reported that 2007-08 freshman-to-sophomore retention rates sank to their lowest point in 25 years. Researchers have long recognized that retention involves a multitude of academic, social, and behavioral factors that are difficult to define and harder to control (Astin, 1975, 1993; McGivney, 2004; Tinto, 1993, 2006). Tinto (2006) notes that the problem is exacerbated by the fact that these factors change when the needs and expectations of students and institutions change.

Yet researchers generally agree that retention is influenced by a combination of pre-college, in-college and external factors (Astin, 1975, 1993; Bean, 1980; Bean & Metzner, 1985; Kember, 1989; Pascarella & Terenzini, 2005; Spady, 1970; Summerskill, 1962; Tinto, 1993, 2006). Pre-college factors may include gender, race, socio-economic background, and readiness for college (typically measured by high school performance, standardized test scores, and high school rigor) (Astin, 1975, 1993; Spady, 1970; Tierney, 1999; Tinto, 2006). In-college factors may include academic performance (GPA), academic major, year in college, and course load

(Dupin-Bryant, 2004). In-college factors may also include social factors such as interactions with faculty, engagement with the institution, and overall satisfaction with the college choice (Caison, 2005; Fike & Fike, 2008; Kuh, 2003, 2008). These qualitative measures of “fit” within the institution appear to be especially influential among traditional students (Pascarella & Terenzini, 1983). External factors may include support (or lack of support) from family, friends, employers and the learner’s extended community (Nora, 2001). The importance of these external factors may vary by race, gender and age (Angiello, 2002; DiPrete & Buchmann, 2006; Herndon & Hirt, 2004). Occupational influences or the perceived “payoff” for the investment in education may also influence persistence decisions (Bean & Metzner, 1985; DiPrete & Buchmann, 2006; Kember; Winston, 1999).

This study explored a total of 14 pre-college, in-college and external factors to determine if they appeared to be related to successful completion of online, undergraduate courses by 1,493 students at NKU in fall 2008. The study was limited to archival data. It did not address any qualitative factors such as student satisfaction, faculty interaction, engagement with the institution, and course design. These factors may in fact influence successful online course completion, but they are outside the scope of this study.

Summary of Procedures

Data on the 1,493 students enrolled in fully online undergraduate courses were obtained from the student information system at NKU. A total of 14 variables were captured. Nine variables came from system-generated reports. These were age, gender, race, residency, year in college, GPA, current hours attempted, programmatic membership and academic major. Academic majors were grouped into nine broad fields of study (business, education, health and human services, interdisciplinary studies, liberal arts, social and behavioral sciences, non-degree

status, STEM, and undeclared major) by the researcher. The Office of Student Financial Assistance provided a separate report of online students who had applied for and received need-based financial assistance. The financial aid data were merged into the master file. Three variables were gathered from the transcript of each student in the student information system. These variables were placement into developmental course(s), completion of an introductory computer/information technology course, and prior completion of an online course at NKU.

Similarly, the dependent variables reflecting completion or non-completion of each online course were gathered via transcript review. Courses that were dropped and courses completed with grades of “F” were coded as non completions. Two dependent variables were identified. The first was a dichotomous variable assigned on the basis of completion or non-completion of all online courses. Students who successfully completed all online courses were coded “yes.” Students who dropped any or all of their online courses were coded “no.” The second dependent variable was a continuous variable based on the percentage of online courses completed. Although the variable is continuous, the resulting percentages represent a discrete (rather than a full) range of values because they are function of the number of courses attempted, which ranged from one to six.

The data were analyzed using SPSS Statistical Software, 17.0 and Minitab 15 Statistical Software. Both logistic regression analysis and multiple regression analysis were employed. Descriptive statistics, frequencies and cross tabulations of the variables were also calculated using SPSS. One additional statistical test, significant proportions hypothesis test, was conducted on some variables to determine their statistical relevance when compared to the total study population. This test was performed via the Minitab Statistical Software, 15.0. Minitab was used because SPSS does not offer a similar test procedure.

Findings Related to Research Questions

Logistic regression and multiple regression yielded similar statistically significant findings. They highlighted eight student variables that demonstrated a relationship to online course completion. Six relationships were positive. That is, the more likely the student was to display or possess this variable, the more likely he or she was to successfully complete online courses. Or, in the case of GPA, the higher the GPA, the more likely he or she was to successfully complete online courses. These variables were application for financial assistance, senior year in college, GPA, major in the field of health and human services, major in a STEM field, and metro residency.

Two variables were negatively related to successful course completion. That is, students who displayed these variables were less likely to complete online courses. These variables were race of Black and freshman year in college. Freshman year in college was only significant in the multiple regression analysis. The multiple regression analysis also showed a negative relationship between race of Latino and online course completion. However, the small sample size ($N = 10$) suggested this result be discarded due to the likelihood of making a small-sample error (Greenland et al., 2000).

Although they were statistically significant, the data analyses accounted for a small portion of the variation among students. The logistic regression analysis accounted for 6.7% of the variance among students. The multiple regression analysis accounted for 8.7% of the variance among students. Despite the relatively small portion of the variance explained by the models, the results warrant consideration. The consistency between the results of the two tests tends to validate the findings. Several findings supported or confirmed other research. Some

highlight opportunities for policies and procedures that may influence practices at NKU and possibly beyond.

Research question 1. All of the statistically significant variables were contained within the 13 variables posed by research question 1: Is there a relationship between each of 13 student variables and completion of online, credit-bearing, undergraduate courses at NKU? One statistically significant variable was application for financial assistance (logistic regression: $\beta = .763, p < .000$; multiple regression: $\beta = .135, p < .000$). Together with receipt of financial aid, applying for aid was included in the study as a proxy for socio-economic status, as described in Chapter 3. However, receipt of aid did not prove to be significant in this study. Therefore, it would appear that the application for financial aid may not reflect socio-economic status of the students in the data base. There are at least three possible explanations regarding why a student did or did not apply for financial assistance: (1) the student had the financial resources to attend college and did not need assistance; (2) the student perceived that he or she would not be eligible for assistance, which may or may not have been an accurate perception; or (3) the student did not know how or did not invest the time to apply for aid.

As indicated in the literature review, the process of applying for aid may hold important clues about the student's overall readiness for higher education. First, it may indicate that the student (and his or her family) knows that financial resources may be available from federal and state sources. Second, it may demonstrate that the student (and his or her family) possesses a strong understanding about higher education in general, and has included applying for financial assistance as one of many steps to be taken prior to initial admission and ongoing enrollment in college. Third, it could also be a measure of motivation to go to college and ultimately to graduate.

All three scenarios would be positive indicators of the student's readiness for college in terms of the financial commitment it requires. Research shows that families tend to underestimate the cost of higher education; this is especially true of families at the lowest socioeconomic levels (Advisory Committee on Student Financial Assistance, 2009; Horn, Chen, & Chapman, 2003). But even families headed by college-educated parents have struggled to keep track of the exorbitant increases in college costs, which have risen at twice the rate of inflation over the last 20 years (Eckel & King, 2006). Further, many families consider the process of applying for financial assistance to be a tedious and confusing process (Advisory Committee on Student Financial Assistance, 2009; Horn et al., 2003). Horn et al. (2003) also note that students with the greatest financial need may be the least likely to complete it, due to a lack of understanding about the process and to the aforementioned difficulty of the process itself. Thus, the online students who applied for aid may have demonstrated their commitment to completing their education through the act of applying for aid.

Motivation to complete their education may also influence seniors. Seniors were found to be statistically more likely to complete their online courses (logistic regression: $\beta = .558$, $p < .000$; multiple regression: $\beta = 0.069$, $p < .000$). They represented more than half of all students in the study population. Most of them (57%) were enrolled at least full time. They also represented 65% of those students taking more than a full-time course load (17+ credit hours) even though they were required to pay per credit hour for the extra hours. Taken together, these facts may suggest that seniors included online courses in order to complete their degree requirements as quickly as possible. Bean and Metzger (1985) define this as extrinsic motivation to complete their degree. It should also be noted that seniors in general, by having reached senior status, have demonstrated an ability to be successful in higher education, a fact not unique

to online courses. Additional study is needed to determine if motivation to graduate influences successful online course completion among seniors.

In addition to motivation to graduate, seniors may be more likely to complete their online courses because they are comfortable with computers and the online-learning environment. Cross tabulations between variables confirmed that seniors were more likely to have completed an introductory computer/information technology course and to have previously completed an online course at NKU. Prior research linked online success to comfort with computers and familiarity with the online learning environment (Angiello, 2002; Sun et al., 2008, Yudko et al., 2008). Schilke (2003) suggests students with little or no computer experience are “unprepared to learn in an online environment” (p. 84) and expresses concerns about the likelihood of success for students in their first online course due to their “naiveté” (p. 81) about the demands of the online environment. Other studies (Dobbs et al., 2009; Ivankova & Stick, 2007; Kemp, 2002; Maki & Maki, 2003) have also suggested that students initially assume that online courses will be easier than face-to-face courses. Most end up concluding that their online courses were actually harder (Canada, 2000; Maki & Maki; Sapp & Simon, 2005). Thus, prior experience with computers and in the online learning environment may have provided an advantage to seniors in this study. This advantage may have added to their likelihood of successful completion of their online courses.

Prior research also confirms the impact of higher GPAs on persistence in higher education. Grade performance appears to be linked to retention in various student types (i.e., first time freshman, minority students, community college students, adult students, and transfer students) (Cabrera et al., 1993; Camara, 2003; Carey, 2004; Mutter, 1992; Nora, 2001; Pascarella & Terenzini, 2005; Robinson, 1990). Not surprisingly, this study highlighted a similar positive

relationship between a higher GPA and successful completion of online courses (logistic model: $\beta = .467, p < .000$; multiple regression model: $\beta = .073, p < .000$). In online courses as in face-to-face courses, better students perform better.

Students with majors in the field of health and human services displayed slightly better than average GPAs ($m = 3.05$ for health and human services majors compared to $M = 2.99$ for the rest of the online students), and were more likely to successfully complete their online courses (logistic regression: $\beta = .802, p < .001$; multiple regression: $\beta = .096, p < .000$). However, they displayed other characteristics that may have had more influence on their increased likelihood to successfully complete their online courses. For example, 31% of them had chosen a fully-online program, compared to 21% of the rest of the online students. This suggests that nearly one-third of the health and human services majors had demonstrated a willingness to pursue their degrees via the online format. Pascarella and Terenzini (2005) link self-selection into online classes with a propensity to succeed in them. Also, almost 66% of the health and human services majors in the study were seniors, another variable shown to increase the likelihood of successful online course completion.

Health and human services majors were overwhelmingly female (88% compared to 68% of all online students). Gender of female did not show up in this study as a significant variable; however, prior research indicates that females are more likely to persist in higher education (Carey, 2004; DiPrete & Buchmann, 2006; Peter & Horn, 2005). Literature also suggests women may be drawn to online education because they are more likely to have family commitments and to be single parents than male students (DiPrete & Buchmann, 2006). Along with time constraints, they also face child-care issues that are not being met by educational providers (Condelli, Kirshstein, Silver-Pacuilla, Reder, & Wrigley, 2010). The online

environment facilitates college enrollment for students with household commitments. Further study exploring the connection between gender of female, the desire or need to learn in an online environment and success in online courses is warranted.

There may be another factor at work, namely occupational motivations. The health and human services field has a culture of continuing education. Employees are expected to continue their education in both credit-bearing and non-credit classes. Many health-related jobs require continuing education to maintain licensure or certification. Thus, for those students who were already working in the field, the work environment itself may have influenced their commitment to continued education.

Students majoring in the field of health and human services can reasonably expect to gain employment upon degree completion. Job opportunities in the healthcare field have outpaced and are projected to continue to outpace opportunities in other fields through 2018. About 26% of all new jobs will be in healthcare, and 10 of 20 fastest-growing occupations are in healthcare. Increasingly, healthcare providers are seeking bachelor-preparation and beyond (Occupational Outlook Handbook). Thus students completing their degrees in health and human services may be extrinsically motivated by the promise of future employment to complete their degrees (Kember, 1989).

The same may influence STEM majors, who also can expect job opportunities that outpace the norm (Occupational Outlook Handbook, n.d.). In fact, this appears to be the most probable explanation for why they were statistically more likely to complete online courses (logistic regression: $\beta = .462$, $p < .035$; multiple regression: $\beta = .074$, $p < .013$). Their GPAs were slightly above the mean for all online learners (3.028 compared to 2.99), but STEM majors do not show strong correlations to any other significant variable in this study (i.e., application for

financial assistance, senior year in college, race of Black, or freshman year in college). They have selected majors that reflect either competency or interest in technology. They can certainly be assured that future employers in their field will expect them to work in digital environments, thus gaining that experience while in college is crucial to their future employability.

Due to the connection to future employment opportunities, both health and human services and STEM majors may anticipate that their investment in education will “pay off” in terms of future earnings and job openings. While statistics show that every investment in higher education “pays off” in terms of employment and earnings potentials (Baum & Ma, 2007), students and their families must compare the investment made today against the perceived value to be realized in the future. DiPrete and Buchmann (2006) relate this to human capital theory:

Human capital theory argues that education is an investment decision. Positive returns to education provide the incentive to make an educational investment. This theory implies that trends in educational returns should produce trends in educational investments. (p. 2)

Winston (1999), too, equates college-investment decisions to human capital theory, noting that for most students, education is a “one-shot investment expenditure” (p. 15), one that they (and their families) “won’t and can’t know what they have bought until it is far too late to do anything about it” (p. 15). Thus, their perception of the future pay-off for their investment influences enrollment and persistence decisions among all college students. Kember (1989) directly links integration of the degree to career goals as a key factor in the cost-benefit analysis for nontraditional students enrolled in fully online courses.

This theory may also have influenced students who were assessed metro tuition rates. They were statistically more likely to successfully complete their online courses (logistic regression: $\beta = .462$, $p = .035$; multiple regression: $\beta = .067$, $p = .012$). The metro rate is more

than resident tuition but substantially less than the non-resident rate. Thus students paying the metro rate may perceive they are getting their education at a “value.” On the other hand, they are paying more than resident rates, and they could attend a public institution in their home state for less money, so they may perceive they are paying a “premium” to attend NKU. Whether they think they are getting a “bargain” or “making an investment,” students paying the metro rate have thoughtfully selected NKU over other, more- and less-expensive options. This may have explained their commitment to course completion. Further study, including interviews with metro students who have taken online courses, would be required to determine the actual impact of the metro rate on successful online course completion.

In summary, six variables were linked to increased likelihood of course completion have been discussed (application for aid, senior year in college, GPA, health and human services major, STEM major, and metro residency). Two variables were linked to decreased likelihood of course completion, race of Black and freshman year in college. They are explored next.

With regard to race of Black, two findings from the cross tabulation tests stand out as possible explanations for failure to complete all online courses. First, Black students are less likely than the rest of the online students to have taken an introductory computer or information technology course. Research about the “digital divide” suggests that students of color are less likely to have grown up with computers in their home. They enter college with less-honed computer skills than their White counterparts (Angiello, 2002). This could have impacted their comfort in the online learning environment. Second, most Black students who took online courses in fall 2008 did not have prior online experience. Combined, these two factors could have decreased the likelihood of successful online course completion among Black students.

Black students were also more likely to require developmental coursework (57.8% compared to 40% in the rest of the online students; $Z = -3.03, p = .002$). Robinson (1990) and Fike and Fike (2008) found a positive relationship between completion of developmental coursework and student persistence. Robinson (1990) particularly noted the positive impact on those who successfully completed their developmental work as freshmen. But most studies identify developmental coursework as a sign that the student may not be fully academically ready for college. Wirt et al. (2004) found a direct link between dropout and the need for any type of remediation:

Despite assistance offered through remediation, students enrolled in remediation are less likely to earn a degree or certificate. Regardless of the combination of remedial coursework, students who completed any remedial courses were less likely to earn a degree or certificate than students who had no remediation. (p. 63)

They also found that Black and Latino students were almost twice as likely to need developmental coursework as White or Asian students. The need for remediation is often linked to a lack of rigor at the high school level, which is strongly correlated to persistence at the college level.

But there are many factors outside the scope of this research that could impact the likelihood of successful completion of online courses among Black students. Course design, for example, may inhibit Black student performance. While the online learning may be an ideal modality to create a “color blind environment” (Enger, 2006, p. 7), faculty must purposefully build courses that are culturally inclusive and sensitive to the unique learning needs of minority students (Angiello, 2002; Enger, 2006). The assessment measures used may also disadvantage minority students, who do not tend to perform as well on norm-referenced examinations as their

White peers (Noddings, 1999; Zwick, 2007). Online courses that include project-based forms of assessment and group work may provide more appropriate measures of Black student achievement of learning outcomes. Further, Black students tend to need more feedback (Hoffman & Lowitzki, 2005) and a sense of community to achieve both satisfaction and success in higher education (Herndon & Hirt, 2004; Nora, 2001). Given these factors, it is possible that the instructional elements (or lack thereof) within online courses at NKU may have influenced the likelihood of successful completion of online courses among Black students. More research, including interviews with Black students about their satisfaction in online courses, is needed.

The second variable negatively correlated to successful online course complete is freshman year in college. Because many of these students were “digital natives” (Prensky, 2001), faculty may erroneously assume they are equipped for online course success. However, there are other factors that may support the likelihood that freshmen will not successfully complete their online courses. Perhaps the most obvious is their lack of experience in higher education, where learning is more self-directed than in high school. Online courses require even more independent learning and time-management skills than face-to-face courses (Canada, 2000). Students new to higher education may not have mastered these skills. Experience in higher education as measured by cumulative hours earned (i.e., year in college) appears to be related to online course success (Dupin-Bryant, 2003), and freshmen lack this experience. Freshmen also lack several characteristics shared by students in this study who successfully completed their online courses. Namely, they were less likely to have completed an introductory computer/technology course (18.9% of freshman compared to 51.5% for other online learners), and less likely to have prior experience in an online course at NKU (19.8% compared to 47.6% for other online learners). Further, they lacked the occupational motivation hypothesized as

impacting health and human services and STEM majors. More than one-third of freshmen in the study (37%) were undeclared majors, which suggests they were unclear as to their occupational goals. In comparison, only 3% of other online learners were undeclared majors. Taken together, freshmen students in this study were likely ill-prepared for the self-directed learning and types of computer skills required for successful online course completion.

Research question 2. Analysis did not reveal any statistically significant findings regarding research question 2 (Is there a relationship between membership in one of five programmatic types and successful completion of online, credit-bearing, undergraduate courses at NKU?). However, the connection between several statistically significant variables and membership in the employer-sponsored group was already discussed. All of the employer-sponsored students were health and human services majors. A disproportionate percentage of them (52.9%) were metro residents and seniors (70.5%). Their tuition was paid by their employer, thus they were reaping the benefit of an education without making the financial investment. They were, however, required to sign an employment contract with their employer. This contract required them to repay their tuition if they withdrew from the program. Thus, they may have had a significant financial incentive for persisting in their academic programs. Their employment contracts also required a service commitment in exchange for the tuition benefit, which was in some sense “job security” for participants. Further, they were selected by their employers to participate in the program based on their leadership potential. That is, they were being “groomed” for advancement. Considered together, employer-sponsored students had clear occupational incentives for persisting.

In addition to the tuition and advancement incentives, these students were participating in a cohort-based program, which many researchers have linked to increased persistence rates

(Conrad, 2005; Spaid & Duff, 2009; Wenzlaff & Wieseman, 2004). While membership in the employer-sponsored category did not prove statistically significant, it certainly seemed to support the likelihood of success as it related to other statistically significant independent variables.

Health and human services majors were also statistically more likely than the general population to be members of the fully online programmatic category ($Z = 3.45, p = .001$), and this might suggest that the online format was a positive factor in the successful completion of online courses by health and human services major. Other than this possible connection, this study did not indicate that students in fully online programs were any more likely to complete their online courses than other students taking online courses. There may be some typical attributes of learners in fully online programs that help explain this. Students in fully online programs may have selected the online format because of the multiple demands competing for their time and energies. While continuing their education may be important to them, it may not have been the top priority in their lives. That is, they self-selected into fully online programs because only that format was conducive to their hectic schedules, not because they particularly desired to learn via technology. Diaz (2005) suggests that when online learners drop their online courses, they may be making a good decision because they recognize they are not going to be able to successfully complete them. There could be a number of reasons why they reach that decision, including work, family and financial pressures. Additional study at NKU would be warranted to understand the factors that cause fully online students to drop their online courses, including a longitudinal approach to determine whether or not they tend to persist to graduation, and if they do, how long it generally takes.

As to the final three categories of programmatic membership (PACE, interlopers, and the general-student population), students in those categories did not select an online program. They may have included online courses due to convenience or scheduling conflicts. The PACE curriculum includes some online courses, and PACE students may have been enrolled in online courses because they had reached a point in their curriculum that included online courses. But they did not make a long-term commitment to online learning. Once enrolled, they may have found that the online learning environment did not meet their personal learning styles, expectations or need for personal interaction. There may have been course-specific issues that affected their decision to complete or drop their online courses. Further study is needed to identify why students in these membership categories originally enrolled in the online courses. Qualitative studies about their experiences in their online courses could also help isolate factors related to successful completion of online courses by students in these programmatic membership categories.

Implications for Practice and Policy

The findings of this study point to several implications for practice that may help improve successful completion of online courses. Three in four students enrolled in undergraduate online courses in fall 2008 at NKU successfully finished them. Unfortunately, the university does not have comparable data that indicates how this completion rate compares to face-to-face courses. In fact, finding comparable industry-wide statistics was challenging. The 77% successful completion rate of fully online courses reported in this study was comparable to the 78% completion rate reported by Frydenberg (2007) in her 2-year study of online courses at University of California-Irvine. It also compared favorably to South Texas College, which found that 60% of fully online students successfully completed their online courses in fall 2006 (South

Texas College, 2009). Further, the 77% successful completion rate reported in this study compared favorably to the 69.5% successful completion rate from 1999 reported by Nash (2005), and to the 61.9% successful completion rate reported by Aragon and Johnson (2008). But these studies are not directly applicable to the NKU findings. The Frydenberg (2007) study did not consider grades when calculating completion rates. Both the South Texas College (2009) and Nash (2005) studies considered courses completed with grades of “D” as unsuccessful completions while this study counted “D” grades as successes. Both the Aragon and Johnson (2008) and Nash studies were conducted at community colleges. Thus, no direct comparison of successful completion rates was found through the literature review. But the study findings suggest that students enrolled in fully online undergraduate courses at NKU are more likely to successfully complete their online courses than they are to drop or fail them. The study also pointed to opportunities to further improve the completion rate.

Some findings may guide advisors as they help students plan their academic schedules. Some suggest ideas for administrative policy and practices to increase the likelihood of success in online courses overall and among specific student populations.

Implications for advisors. Enrollment in online courses should be purposeful rather than haphazard, and advisors can play a key role in helping students make good enrollment decisions. Simply informing advisors about the findings of this study may increase the likelihood of successful online course completion. Advisors can screen students for several of the characteristics linked to successful online course completion. For example, senior status, high GPA, and completion of a prior online course are all positive indicators that are easily gleaned from the student record. Prior completion of an online course at NKU can also be confirmed from the student record.

The student record does not readily indicate whether or not the student applied for financial assistance, but discussions with students can reveal this. This study suggested that application for financial assistance may be an indicator of a student's commitment to education and general ability to navigate within the oft-complex procedures at work within higher education. Advisors should probe to confirm the student is functioning well within the organization in an effort to support the likelihood of successful online course completion.

Advisors can also discuss occupational goals and motivations with their advisees, Students who are highly motivated by clear occupational goals tend to do well in higher education in general and in online courses, as suggested by this study. Obviously, students with majors in the health and human services field or STEM fields can reasonably be encouraged to include online courses in their schedules, if desired.

Advisors should take extra time with regard to freshman students and Black students. Online courses may be appropriate for both populations. However, it would be prudent for advisors to talk about issues such as comfort with computers, the need for community, and experience with self-directed learning. Students with limited computer experience, those who prefer high levels of instructor feedback and peer interaction, and those who find it difficult to manage their time should be cautioned about the risks associated with taking online courses. This study revealed some attributes that can be identified through the student record or through discussion to help advisors guide students to make good decisions about enrolling in online courses. Publishing the results of this study and providing advisor trainings on the subject of online course success may be appropriate. Continued study on the subject is also warranted and is discussed in more detail in this chapter.

Implications for policy. Both the literature review and the cross tabulations of significant variables point to the need for more and better student preparation for online learning. Specifically, administrators should address computer comfort and skill among those taking online courses. Some institutions have instituted mandatory orientations for new online learners (Frydenberg, 2007; Nash, 2005), but these orientations have had mixed results. Nash found that the students who completed their online courses were enthusiastic about the online orientation while those who dropped their online courses did not find it helpful.

Perhaps a mandatory student orientation is not a “one-size-fits-all” solution. Other options exist. For example, a computer screening exercise could be developed and embedded in all online courses. This exercise could be required in the first week of the course. It could identify students who are ill-prepared for the computer expectations in the course, and they could be automatically referred to online tutorials and possibly even staff intervention. If this is done at the start of the course, students who felt uncomfortable about the computer requirements would have time to drop their online courses and receive a refund or find a face-to-face course that better suits their needs.

Some schools have instituted mandatory computer/information technology courses as part of their general-education requirements, but NKU has consistently rejected this option. Efforts should be taken to address the digital divide that may be preventing minority students from succeeding in general and particularly in online formats. Entrance tests of computer skill may identify those students who need to improve their computer capabilities. Perhaps they would be encouraged to take credit-bearing introductory computer/information technology courses; or perhaps college computer expectations could be tested and addressed within the University 101 (Orientation to College) courses taken by many first-time freshmen students at

NKU. Transfer and adult students may require other interventions, such as a series of noncredit tutorials and trainings that they could be directed to take.

Online programs could require completion of a non-credit orientation class prior to the start of the program. In fact, the College of Health Professions at NKU began requiring such an orientation in fall 2009. The content includes a basic introduction to computer capabilities (such as downloading a file, using search engines, and opening/saving files in specific file formats), an exploration of Blackboard (NKU's course management system), and a discussion of time management principles for online learners. Anecdotal feedback from instructors indicates that students now enter their online courses ready to focus on the course content rather than the delivery format. The success of the College of Health Professions should be shared with other programs at the university and resources should be made available to help other programs duplicate their success.

Implications for faculty. Similarly, faculty should be encouraged to create community within their online courses. As technology has advanced, it has become increasingly easy for students and faculty to literally talk to each other online. NKU has invested in a Blackboard™ enhancement called Wimba™ that makes it much easier for students to see and hear each other in discussion boards. Group assignments are also easily facilitated via Wimba™. But faculty members need training to learn new technologies so they can guide and direct students in the use of these enhancements. Incentives are needed to encourage faculty members to make the time for these trainings. These incentives need not be large (like course release time) to be effective. Small training awards (about \$500), software licenses, computer equipment, and even meals are all examples of incentives that have been offered to faculty to encourage their participation in trainings.

Ultimately, resources for online learning are needed. Online technology changes rapidly, and the changes bring new and exciting opportunities to interact with and engage learners remotely. However, technology is not inexpensive to purchase or implement, and it is rarely widely adopted in the institution without staff resources to help faculty and students use it. A systematic plan for the advancement of online learning in the university must be adapted and funded. A significant portion of this budget must be devoted to instructional design.

The scope of this study did not include discussion of the instructional design of courses. It focused on student attributes rather than course attributes. It also focused on completion rates rather than satisfaction in the online learning environment. However, the literature review illustrated several factors that may influence student satisfaction in online courses. Specifically, courses must appeal to a variety of learning styles (Dobbs et al., 2009) and must be culturally sensitive (Enger, 2006). Black students, for example, need more feedback and a feeling of “belonging” (Herndon & Hirt, 2004).

Howard-Hamilton (2000) described three levels of cultural inclusiveness in courses. At the first level, no consistent effort is devoted to appealing to culturally diverse students. A level-one course often contains a “hidden curriculum” (p. 46) that reinforces gender and cultural stereotypes through its themes, examples and assessment tools. The course is typically controlled by the faculty member and dialogue, if it exists at all, is constrained. As expected, students of color often feel intimidated in the level-one course. At the second level, the faculty member makes an effort to include alternative points of view about the content and to encourage discussion among the members of the class. However, culturally diverse teaching methods do not permeate the pedagogy but are more isolated attempts at inclusion.

To achieve the third level, faculty must “challenge students to think globally about diversity issues” (Howard-Hamilton, 2000, p. 50), and relinquish classroom power in order to adopt a “teaching method that encourages self-evaluation and reflection” (Howard-Hamilton, 2000, p. 50). Howard-Hamilton suggests a number of culturally-responsive pedagogical approaches. She encourages the use of case studies, small-group projects, study teams, and supplemental reading lists as methods that engage students of all cultural backgrounds. She also recommends employing multiple assessment methods, including project-based assignments, in addition to objective and subjective testing. Further, Howard-Hamilton sees the syllabus as an appropriate avenue for the faculty member to outline his or her “educational beliefs and teaching philosophy and the learning process in the classroom. This will set the tone for being respectful when hearing a person’s story and understanding that the learning process is a two-way street; it is not the responsibility of the teacher to deposit information” (p. 52).

Achieving level three in course design may be a daunting challenge for seasoned faculty members who were taught and now teach through traditional didactic styles. Their challenge is compounded by the online environment, where faculty members act more as facilitators than as teachers, a paradigm shift for traditional faculty members. They need assistance from instructional developers and instructional technologists to understand how to facilitate learning via a distance in a culturally responsible manner.

Beyond instructional design issues, it is possible that online students require additional online student support services such as tutoring and library services in their online courses. Like issues related to instructional design, student feedback about their perceptions of the support they received in their online courses was outside the scope of this study. That was a limitation. Other limitations are detailed next.

Study Limitations

There were several limitations to this study. The archival nature of the data was one. Only variables that could be gathered from student records were included in the study. In some cases, not all data were available. For example, some students did not list their race. Gender was missing for five students. In some cases, variables were selected as proxies for unavailable or inconsistent data. For example, application for and award of need-based financial assistance were used in an attempt to measure student socio-economic status because information about family income was not available in the student record. Also unavailable was information about other forms of financial assistance (scholarships, tuition reimbursement from employer, and institutional aid) that may have influenced course completions. Placement into developmental courses was used to measure college readiness. This was necessary because high school GPA and standardized test scores were not available for transfer and non-degree students. Also, while it was possible to determine if a student had previously taken an online course at NKU, it was not possible to determine if he/she had taken an online course at another institution, which may have been relevant information.

Use of archival data also precluded feedback and input from students, faculty and staff that may have impacted online completion. It ignored issues such as learning styles, course difficulty, and course design. The archival nature of this study limited its scope.

The study was limited to undergraduate students enrolled in one semester (fall 2008) at a regional university in the Midwest. It addressed course retention (or completion) rather than program completion or persistence to graduation. The results should not be applied to graduate courses or programs and may not be applicable to other institutions, even institutions similar to NKU. The sample size for students with race of Latino was too small ($n = 10$) to use for

analysis. The sample size for health and human services was also small ($n = 34$) but was large enough to include in the study. Despite the limitations, the study netted results that were statistically significant. It also pointed to many opportunities for future study.

Opportunities for Future Study

This study pointed to several factors that are related to successful online course completion. These factors are applying for financial assistance, senior or freshman year in college, major in the health and human services or STEM fields, GPA, metro residency, and race of Black. Within each of these variables, both quantitative and qualitative studies would add to what is known about why students did or did not successfully complete their online courses. Quantitative studies would be warranted to identify the impact of institutional, in-course, and external factors on the online course retention. External factors may include family and employer support for degree attainment. Qualitative study would be warranted to understand how students feel about institutional, in-course and external factors. Specifically, a case study approach involving students from both genders, a mix of races, several programmatic membership categories, and a variety of academic disciplines would identify the emotional and personal factors that influence decisions to complete online courses. A key component of this suggested study should address what motivates students to take online courses or programs of study. Understanding their motivations may help administrators identify program components that would impact persistence. Also, understanding motivations could influence program development since it would help administrators identify majors or programs of study of most interest.

A longitudinal study to track students for several years would move this study beyond the confines of course retention into a study of how online learning impacts persistence to

graduation. Again, a mix of students representing a variety of characteristics should be included in the study population. This study could identify patterns of enrollment and stop-out that would help the institution better anticipate the needs of online students.

As alluded to in the previous section, more study is needed to understand issues related to online pedagogy. What engages students? What causes them to enjoy their online courses? Are there disciplines that lend themselves more to effective online delivery? These are all questions that could be answered through a combination of quantitative and quality study.

Finally, a study comparing online students to face-to-face students would be valuable. Little was known about the course completion of face-to-face students at NKU, which prevented direct comparisons between online course completion and face-to-face course completion. This study could further illuminate opportunities for policy and practice at NKU.

This study was a first step toward understanding the relationship between 14 factors and successful completion of fully online undergraduate courses at NKU. It identified several factors related to course completion. It isolated cross-tabulations and relationships between variables that help illuminate why some factors proved to be statistically significant. It did not, however, answer any questions related to why students did or did not complete their online classes. Additional study, as described above, is warranted.

Summary

The purpose of this study was to add to what is known about completion of online, undergraduate courses. It addressed 13 student characteristics. These were:

1. Age
2. Gender
3. Race

4. Residency
5. Application for federal financial assistance
6. Receipt of federal financial assistance
7. Placement in developmental reading, writing or mathematics course(s)
8. Prior completion of an online course at NKU
9. Prior completion of an introductory computer/information technology course
10. Academic major
11. Year in college
12. Credit hours attempted in fall 2008
13. College grade point average at start of fall 2008

It added programmatic membership in one of five categories as the 14th variable. The five categories were: (1) employer-sponsored programs; (2) fully online programs; (3) the Program for Adult-Centered Education; (4) interlopers in one of the former three categories; and (5) the general student population.

The study was based on archival data for the 1,493 students who were enrolled in fully online undergraduate courses at NKU in fall 2008. These students were still enrolled in their online courses on the fifth day of the semester, that is, after the university's drop-add period. Data were collected through a combination of reports available through the student information system and a review of each student's academic file.

Both logistic regression analysis and multiple regression analysis were employed. For the logistic regression analysis, the dependent variable was dichotomous and measured whether or not the student successfully finished all online courses. A student who successfully finished all online courses was coded as a "yes," and a student who dropped any or all online courses was

coded as a “no.” With the multiple regression analysis, a continuous dependent variable was used, that being the percentage of online courses successfully completed. In both models, successful completion was defined as finishing the course with a grade of “D” or higher. The analyses addressed two research questions:

1. Is there a relationship between each of 13 student variables and successful completion of online, credit-bearing, undergraduate courses at NKU?
2. Is there a relationship between membership in one of five programmatic types and successful completion of online, credit-bearing, undergraduate courses at NKU?

Both models identified statistically significant relationships for a subset of the 13 student variables in question 1. Specifically, applying for financial assistance, senior year in college, GPA, major of health and human services, major in a STEM field, and metro residency were found to have a positive relationship to successful course completion. Race of Black was found to have a negative relationship to successful course completion. In the multiple regression analysis (but not the logistic regression analysis), freshman year in college was also found to have a negative relationship to successful course completion. The multiple regression analysis also indicated a negative relationship between race of Latino and course completion, but the sample size ($n = 10$) was too small to use the results for fear of making a small-sample size error. Neither model identified a relationship between programmatic membership and course completion (research question 2).

The models accounted for approximately the same amount of variance within the independent variables (logistic regression analysis: $R^2 = .067$, $p < .001$; multiple regression analysis: $R^2 = .087$, $F(9, 1449) = 15.286$, $p < .001$). In essence, the tests validated each other and confirmed the relationships between these variables in this study were statistically significant.

Further analysis of relationships between significant variables and the remaining variables in the study suggested several possible explanations for the data results. Seniors and STEM majors were more likely than the rest of the online students to have completed a computer or information technology course; freshmen and Black students were less likely to have done so. Seniors and health and human services majors were more likely to have previously completed an online course at NKU. Health and human services and STEM majors both displayed GPAs that slightly exceeded the mean for all online students. The potential occupational benefits available for degree completion within the health and human services and STEM fields were also explored as possible explanations for their better-than-average completion rates.

Health and human services and Black students were more likely to be metro residents, which was one of the variables positively associated with the likelihood of course completion. This may appear as a contradiction of results since health and human services majors had a positive relationship with successful online course completion while Black students had a negative relationship with successful online course completion. Further analysis revealed that many of the metro residents in the health and human services field were also members of the employer-sponsored and fully online programmatic categories. While they were residents of the counties covered by the metro tuition rate, in reality they were receiving a tuition break, either because their employer was paying NKU directly (i.e., the employer-sponsored group) or because tuition was assessed at the resident rate with a small surcharge (i.e., the fully online majors). However, the conflicting results of this study make it difficult to draw conclusions about why some metro residents completed their online courses successfully while others did not. Additional study of Black metro residents addressing issues of value and investment in their education is needed.

The study highlighted other opportunities for further study. Students should be asked their opinions about their online courses to determine what elements add to their satisfaction and likelihood to persist and which elements detract from their satisfaction and make them more likely to withdraw. This information can be gleaned through a combination of quantitative and qualitative measures. A longitudinal study of students taking online courses may identify factors impacting persistence to graduation. A case study of students may highlight issues within the institution, within specific courses, and outside the institution that influence online course completion. A variety of student demographic characteristics (age, gender, race, year in college) should be included for the case-study participants.

This study did suggest implications for practice. Academic advisors can use the data to help guide student choices regarding inclusion of online courses in their schedules. Students with higher GPAs, prior online experience, and computer experience may be advised to take online courses. Advisors can also discuss issues of occupational motivation and the importance of community as possible indicators of the likelihood of success in the online environment. Administrators can address the role of computer training and comfort in online programs and courses. More can be done to prepare students for the computer-learning environment, either through embedded tutorials or online orientation programs. Administrators can also invest time, money, and resources in helping faculty members understand and improve their pedagogical approaches within online courses. Online courses must be culturally inclusive to the full range of students taking online courses at NKU. Professional assistance from instructional designers and instructional technologists within the institution is warranted.

Overall, the study indicated that the majority of students who take online undergraduate courses at NKU successfully complete them. The results of this study led to several

recommendations that may further support successful online course completion. It would appear that continued development of online courses and programs of study has a place in the overall strategies to increase undergraduate student persistence and retention to graduation among undergraduate students at NKU.

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