The Pennsylvania State University

The Graduate School

College of Education

FROM THE PERIPHERY TO PROMINENCE: AN EXAMINATION OF THE PROFILE AND ACADEMIC OUTCOMES OF POSTSECONDARY ONLINE STUDENTS

A Dissertation in

Higher Education

by

Justin C. Ortagus

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

August 2015

The dissertation of Justin C. Ortagus was reviewed and approved* by the following:

John J. Cheslock
Associate Professor of Higher Education
Dissertation Adviser
Chair of Committee

Liang Zhang
Associate Professor of Higher Education

Neal Hutchens
Associate Professor of Higher Education
Program Coordinator of the Higher Education Program

Tim Pollock
Professor of Entrepreneurship

*Signatures are on file in the Graduate School.

ABSTRACT

Online education has shifted from the margins to become an increasingly mainstream mode of instruction, but higher education leaders and policymakers lack generalizable evidence pertaining to the changing profile of online learners and the quality of online offerings (Bowen, 2013). My study examined this growing area of higher education in two parts. For Part One, I addressed which types of students are most engaged in online education, how student patterns of online course-taking vary across institution types, and how both student and institutional characteristics of online learners have changed over time. For Part Two, I provided empirical evidence to examine the impact of online education on the academic outcomes of postsecondary students across institution types.

For Part One, I used cross-sectional data from four different editions of the National Postsecondary Student Aid Study (2000, 2004, 2008, 2012) and employed multinomial logit models for each year to describe the student and institutional characteristics of postsecondary online students. Between 2000 and 2012, these data revealed substantial growth in the proportion of online students in higher education. More specifically, the percentage of postsecondary students enrolled in some online courses increased from 3.35% in 2000 to 19.20% in 2012 while the proportion of postsecondary students enrolled in online-only programs increased from 2.24% to 7.45% during the same time period. For Part Two, I drew longitudinal data from the Beginning Postsecondary Students Longitudinal Study (2004-2009) and ran several regression analyses to examine the impact of online enrollment on three-year credential completion, six-year credential completion, GPA, and community college transfers.

Part One of this study reveals several interesting findings associated with the profile of postsecondary online learners. First, I found that student characteristics associated with the

highest opportunity costs of engaging with residential education—such as being a full-time employee, parent, or married—were more likely to enroll in some online courses and online-only programs. Second, empirical evidence showed that historically underrepresented postsecondary students were typically not more likely to engage with online education. Third, I found that community college students were more likely to enroll in some (but not all) online courses, but my results pertaining to the likelihood of students at for-profit institutions to enroll in online-only programs were conflicted depending on the year being examined. Fourth, my findings suggest high-status colleges and universities appeared to be less likely to offer online courses or online-only programs. Finally, I found that Business and Health majors disproportionately increased their reliance on online education over time. Business majors were more likely to enroll in some online courses and online-only degree programs relative to their peers ($p < .001$), but Health majors were only more likely to engage with some online courses ($p < .001$).

In general, empirical evidence from Part Two suggests a positive relationship between enrolling in some (but not all) online courses and sub-baccalaureate credential completion. For instance, community college students who enrolled in some online courses appeared to be more likely to earn an Associate's degree within three years and six years relative to community college students who only enrolled in face-to-face courses.

TABLE OF CONTENTS

LIST OF FIGURE

LIST OF TABLES

ACKOWLEDGEMENTS

First, I am happy to thank Dr. John Cheslock for his mentorship and kindness over the past four years. I thank Dr. Cheslock for being an exemplary adviser, boss, and unofficial life coach whose sense of humor and wisdom have immeasurably improved my experience at Penn State. I also thank Dr. Liang Zhang, Dr. Neal Hutchens, and Dr. Tim Pollock for serving as committee members and offering valuable advice within and beyond the scope of this study.

Although not a member of my committee, I would like to thank Dr. Fred Loomis, who has been a valued mentor and friend over the past few years.

Next, I would also like to thank my friends and colleagues, particularly Mark Umbricht, within Penn State's Higher Education program for their support and motivation during this process.

Finally, I thank my mother and siblings, none of whom will read this dissertation, for their unconditional love and support throughout my educational journey.

CHAPTER 1: INTRODUCTION

Although colleges and universities are typically slow to adopt change in any form, many higher education institutions today face immense pressure to incorporate online education into their institutional plans. By serving as a more convenient alternative to face-to-face instruction, online education has provided new and improved ways for students to gain access to previously unavailable educational opportunities. Online education represents the main source of enrollment growth in American higher education as it has transformed from a niche offering to an increasingly mainstream mode of instruction (Sener, 2012). Specifically, the percentage of postsecondary students who completed at least one online course has increased from 9.6 percent in 2002 to 33.5 percent in 2012 (Allen & Seaman, 2014).

Given the rapid growth of online education, higher education leaders have called for concrete evidence to examine various student populations and institution types when studying the merits of online learning (Bowen, 2013). Because a variety of background characteristics can influence students' academic achievement in online courses, online learners cannot be studied as a homogenous group. In addition, student patterns of online enrollment across different institution types may have changed over time as the purpose of online education has expanded beyond solely providing outreach for nontraditional students, such as working adults and individuals from rural populations (Altbach, Gumpert, & Berdahl, 2011; Dabbagh, 2007).

By disaggregating student and institutional characteristics of online learners, higher education policymakers would be able to gain insight into how to implement online education across institution types. For instance, a recent study of community college students suggests online courses could widen achievement gaps among underrepresented demographic groups (Xu & Jaggars, 2013). Online education could therefore be considered a problematic medium of instruction to increase access for underrepresented students at community colleges as these

learners have been found to struggle more in online courses than traditional offerings. Surprisingly, past research examining online learners has failed to adequately address which types of students are most engaged in online education, how student patterns of online course-taking vary across institution types, and how both student and institutional characteristics of online learners have changed over time.

In addition, critics have accused the growth of online education of being detrimental to the educational quality and traditional values of higher education. A recent survey found the level of concern about the effectiveness of online education is far greater for faculty members than higher education administrators (Allen, Seaman, Lederman, & Jaschik, 2012). Despite widespread disagreement between factions of the higher education community, many colleges and universities continue to embrace online learning as central to their commitment to provide access to new constituencies and necessary for financial viability in the future. As the presence of online education in higher education has expanded rapidly over the past decade, the need for rigorous empirical research pertaining to the effectiveness of online offerings has never been greater (Lack, 2013).

Due to the increasing importance of online education, this study will analyze online enrollment trends and the effectiveness of online education across all types of higher education institutions. Although online education has the potential to increase revenue and enact significant change throughout higher education, the vast majority of research pertaining to online education is not generalizable beyond individual programs and community colleges and fails to differentiate the residential student taking one online course with the non-traditional learner enrolled in an online-only program. As a result, the current state of research on online education has limited value for administrators and policymakers at most colleges and universities (Lack,

2013). Through an empirical analysis of national data, this study will describe individual characteristics of online students, outline how online enrollment choices vary according to institutional characteristics, and examine the impact of online education on undergraduate students' academic outcomes.

Primary Research Questions

- How do student and institutional characteristics of undergraduate students relate to online course enrollment decisions?
- To what extent does enrollment in online courses influence the academic outcomes of undergraduate students across higher education institution types?
- For both questions, do the results vary according to the level of engagement with online education?

In order to understand the importance of these questions, one must explore the context associated with online education in higher education. To frame the issue, I will explore a number of financial and technological factors to explain the rapid growth of online enrollments and outline several concerns related to the quality of online offerings. After setting the context, I will briefly discuss the organization of this dissertation and provide definitions of several key concepts related to online instruction in higher education.

Setting the Context: Growing Online Enrollments

Colleges and universities are rooted in tradition, but they must remain adaptive to external influences (Cameron, 1984; Zemsky, Wegner, & Massy, 2005). According to Baumol

and Bowen (1966), the "cost disease" suggests that labor-intensive industries, such as higher education, are unlikely to offset wage increases with productivity gains. Unlike manufacturers that assemble cars with only a fraction of the labor that was once required, colleges and universities cannot simply substitute capital for labor (Bowen, 2013). As a result, costs in higher education continue to rise at a faster pace than costs in the overall economy. Despite this trend, public funding for higher education institutions has declined significantly in recent years. More specifically, the state appropriations share of total receipts of public colleges and universities decreased from 44 percent in 1980 to 22 percent in 2009. Due in large part to decreasing public support, net tuition as a percent of total educational revenue in public higher education increased from 23 percent in 1986 to 43 percent in 2011 (State Higher Education Executive Officers, 2011).

Private institutions have faced their own financial issues due to declining enrollment numbers and calls to curb rising tuition prices. From 2010 through 2012, first-year student enrollment at more than a quarter of private four-year colleges declined at least 10 percent (Belkin, 2013). In response to these financial challenges facing both public and private colleges and universities, higher education leaders have felt the pressure to increase their reliance on entrepreneurial activities and alternative streams of revenue, such as online education.

Simply put, many higher education leaders hope that online enrollments will continue to grow to the extent that new revenues exceed new costs and consequently help to subsidize other parts of the institution. Online education has the potential to offer relief to financially strapped institutions, but colleges and universities are reluctant to endanger the legitimacy of their academic courses in exchange for added revenue. Although the cost crisis facing higher education provides a useful context to explain the importance of online education, additional

forces help to explain why colleges and universities continue to increase their commitment to online education.

A variety of improvements in digital technology have allowed for a wider array of options for colleges and universities considering online education. Online courses are no longer merely alternative versions of classroom instruction delivered via the internet. Technological advances allow for online courses to incorporate a variety of media and tools in their delivery, such as learning management systems, video lectures, interactive tutorials, animations, adaptive software, discussion boards, and so forth. In addition, online courses serve as a natural response to higher education students' desire for convenience. Online alternatives to the traditional classroom experience have decoupled learning and student services from time- and geographic-based constraints facing postsecondary students. Online learners can be accommodated in a way that does not force them to align with rigid class times and office hours associated with the traditional experience at brick-and-mortar colleges and universities (LeBlanc, 2013).

The provision of convenient and flexible access to higher learning is a major reason behind the proliferation of online education. By embracing nontraditional students, online education has been able to reach previously underserved learners whose life circumstances, such as work, family obligations, or other obstacles, precluded their pursuit of traditional higher education. Online education also provides a medium for the expansion of lifelong educational opportunities through continuing education, such as postsecondary certificate programs and community college programs for individuals seeking to change careers (Sener, 2012). Despite the potential of online education to increase access through the removal of time and geography barriers, quality concerns related to online instruction continue to persist.

Setting the Context: Quality Concerns for Online Courses

The overarching challenges of assessing "quality" in higher education are not unique to online offerings. Despite an increased emphasis on accountability for colleges and universities over the past few decades, the metrics by which quality is measured have been a point of contention among higher education scholars and policymakers. Given this widespread disagreement pertaining to how to measure quality within the greater higher education landscape, extant research measures educational effectiveness with a variety of criteria, such as student inputs, student learning outcomes, affordability, and degree completion (Brint, 2011; The National Center for Public Policy and Higher Education, 2008). Due in large part to a lack of consensus regarding what constitutes a reliable assessment of teaching effectiveness, quality concerns have been present before and after the current batch of online learning assessments. Professor William J. Baumol observed, "In our teaching activity we proceed without really knowing what we are doing...My state of mind on these matters is like that of 18th century physicians, who used leeches and cupping to treat their patients simply because previous physicians had done so" (Bowen, 2013, p. 47-48).

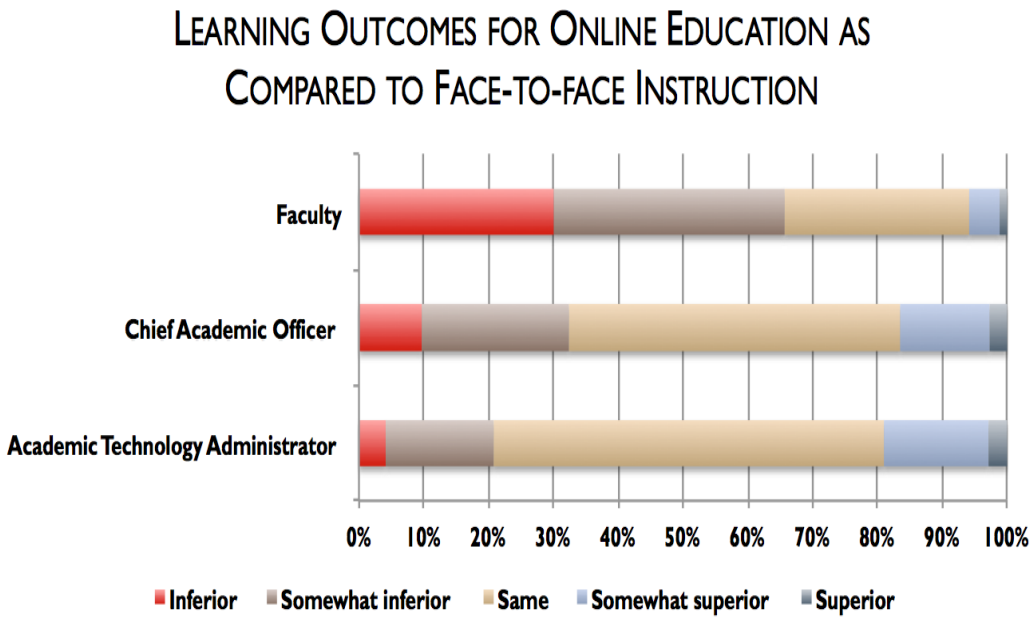
Even though online learning allows students to experience added flexibility and convenience when compared to face-to-face offerings, the quality of online courses has been repeatedly called into question by a variety of higher education stakeholders. Higher education leaders contend that faculty and administration of many colleges and universities will only consider increasing their commitment to online education if more concrete evidence can address whether online students are more likely (or at least as likely) to succeed academically when compared to their peers enrolled in face-to-face courses. Unfortunately, nobody knows the answer to this basic concern regarding the academic performance of postsecondary online

students. Although many studies pertaining to the academic performance of online learners have been completed, the results are inconclusive (Lack, 2013). Claims of both proponents and skeptics of online education are plagued by a variety of serious methodological deficiencies. Specifically, the most common issues in studies of the effectiveness of online education relate to small sample size and the lack of generalizability across institution types (Bowen, 2013).

Despite widespread concerns related to the quality of online education, a lack of empirical national evidence currently exists. Since students' actual learning gains are difficult to quantify, the academic performance of online students has typically been examined by analyzing the effect of online course-taking on students' learning outcomes. Although many researchers have examined the impact of online courses on various learning outcomes, their findings are not generalizable across higher education as they solely examine individual courses or community college students (Summers, Waigandt, & Whittaker, 2005; Reuter, 2009; Shea & Bidjerano, 2014). In addition, previous studies examining the academic performance of online learners in higher education often fail to disaggregate their findings according to student and institutional characteristics when examining the effect of online education on learning outcomes.

Without generalizable evidence pertaining to the academic performance of postsecondary online students, faculty members and higher education administrators are forced to draw upon anecdotal evidence when debating the merits of online instruction in higher education, which can lead to wide variations in perceptions of the quality of online education. For instance, as displayed in Figure 1, roughly two-thirds of faculty members perceive online education as inferior to face-to-face instruction, but about two-thirds of high-level administrators perceive online education as of the same or even superior quality when compared to traditional face-to-face offerings.

Figure 1: Faculty Versus Administrators: Perception of Quality



Source: Allen, E., Seaman, J., Lederman, D., & Jaschik, S. (2012). Conflicted: Faculty and online education. The Babson Survey Research Group and Inside Higher Ed.

Moving beyond perceptions of higher education faculty members and administrators, the effectiveness of any organization is also linked with the public's perception of its quality. Due to the difficulty of ascertaining the true quality of colleges and universities, their institutional status serves as a useful indicator of perceived quality for consumers. Despite the diversity of institution types and their constituencies, most colleges and universities typically share common goals of legitimacy and enhanced prestige (Toma, 2012). As a result, many non-elite higher education institutions behave similarly to more elite institutions in an attempt to "move to the next level" of the prestige hierarchy.

The most important problem facing online education in higher education is the lack of faith in the legitimacy of online courses when compared to residential offerings. Many

prominent higher education leaders have expressed concern over the possibility of "status leakage" or "brand dilution" within the overall institution as a result of the widespread implementation of online education. Given this concern, high-status colleges and universities may be more reluctant to offer more for-credit online courses until more conclusive empirical evidence pertaining to the academic performance of postsecondary online students exists (Bowen, 2013). In order to assuage these concerns, more generalizable empirical evidence is needed to examine the academic performance of online learners throughout higher education.

Organization of Dissertation

The remaining chapters of this study will examine extant literature, present the selected data and methodology, display and interpret the results of the analyses, and consider the implications of my findings. Chapter 2 includes a review of existing scholarship pertaining to the history of the growth of online education in higher education, relevant student characteristics for online learners, the different institution types offering online courses, and the key academic outcomes to be examined within this dissertation. Additionally, I will discuss relevant literature related to the complex challenges of measuring quality, previous studies on the effect of online education, and the importance of status in higher education. Chapter 2 will conclude with a brief description of my conceptual framework and hypotheses to be tested empirically.

Chapter 3 outlines the national data sets used throughout the course of this analysis by describing the variables and samples of students to be used before providing and analyzing key descriptive statistics for the data. In addition, Chapter 3 will also outline the statistical methods and limitations of this study. For Part One of this dissertation, I used cross-sectional data from several iterations of the National Postsecondary Student Aid Study (2000, 2004, 2008, 2012) to

describe the changing profile of online students over time. For Part Two, I used longitudinal data from the Beginning Postsecondary Students Longitudinal Study (2004-2009) to examine the impact of online education on the academic outcomes of online students across institution types. Chapter 4 presents the results of the regression analyses while Chapter 5 provides a discussion that includes connections to my review of relevant literature, implications for higher education leaders, and suggestions for future research.

Key Concepts and Definitions

For the purposes of this study, online courses will be defined as for-credit courses in which the vast majority of course content is delivered online. Due to the widespread use of a few key terms related to online versus traditional learning, the following definitions are intended to ensure clarity for the reader:

Traditional (face-to-face) course: course in which no online technology is used or web-based technology is only used to facilitate what is fundamentally a face-to-face course (e.g., a course management system may only be used to post the syllabus).

Hybrid (blended) course: course that blends online and face-to-face content delivery. A significant amount of the course content is delivered online (typically through the use of online discussion), but hybrid courses often have a reduced number of face-to-face classroom sessions.

Online course: course in which all of the content is delivered online (no face-to-face classroom sessions).

Asynchronous online course: course that does not require students to be online at the same time as the instructor

Synchronous online course: course in which students are required to be online at the same time as the instructor

CHAPTER 2: LITERATURE REVIEW

This review of the literature will offer a brief history of the growth of online education before exploring previous work addressing the importance of student and institutional characteristics in higher education research. After reviewing previous work pertaining to credential completion, grade-point average, and the challenges associated with measuring educational quality in higher education, prior research examining the effectiveness of online education will be included. The vast majority of quantitative studies on postsecondary online education have compared the academic outcomes of online students and face-to-face students, but researchers have yet to reach a consensus regarding whether or not the average online course is comparable to the average face-to-face course offered on campus. While this lack of a consensus would actually appear to be promising news for those seeking validation for the quality of online offerings, the generalizability of these findings has been questioned by several scholars of higher education. In addition, both higher education and management literature will be examined in order to unpack the notion of status, particularly when perceptions of quality are unclear.

A Brief History of the Growth of Online Education

The notion of providing course content from a distance is not necessarily a new development in higher education. Before online education, higher education institutions incorporated distance education to expand geographically far beyond the physical campus. Several universities developed correspondence courses nearly a century ago. Faculty members and administrators attempted to reach audiences from a distance via radio and television, but these efforts generated only limited success. After the rise of computers and eventually the internet, everything changed (Bok, 2013).

Computer systems developed in the 1960s relied upon bulky mainframes and rooms full of equipment used to connect terminals with keyboards. After Intel invented the first microprocessor and personal computer in the 1970s, the use of computer-based instruction increased considerably. By 1989, 15 percent of all households in the United States had a personal computer and nearly half of all children were able to access computers at home or in school. The internet entered the educational realm in 1980 when Duke University students created a system called USENET. Around the same time, Ira Fuchs at the City University of New York (CUNY) and Greydon Freeman at Yale University invented BITNET ("Because It's Time Network"). BITNET became the first major internet connection dedicated solely to education, starting with the first link between CUNY and Yale before expanding to nearly 500 organizations and 3,000 nodes (all educational institutions) by 1991 (Inglis, Ling, & Joosten, 1999; Moore & Kearsley, 2012).

Distance education existed before the arrival of the World Wide Web, but it received a significant boost when the first web browser appeared in 1993, giving educators a powerful new way to increase access and offer learning at a distance. In 1995, only 9 percent of American adults accessed the internet. By 2010, roughly 77 percent of all Americans had internet access in their homes (Moore & Kearsley, 2012). Due to this increased access to the internet, the audience for higher education has expanded well beyond the confines of college and university campuses.

The for-profit sector has played a significant role in the rapid growth of online education in higher education. The recent growth of for-profit colleges and universities can be explained by The Higher Education Reconciliation Act (HERA). HERA overturned the "50 percent rule" that required higher education institutions to offer no more than 50 percent of courses online in order for their students to qualify for Title IV federal funds. Once online students could receive

equal access to federal student aid, for-profits offered more online courses and the already-burgeoning industry of online education continued to grow at an even faster pace (Mettler, 2014). From 1999 to 2009, the number of associate's degrees conferred by for-profit colleges and universities increased by 125 percent and the number of bachelor's degrees earned by for-profit students increased by over 400 percent. By comparison, the number of associate's and bachelor's degrees conferred by public colleges and universities increased by only 33 and 29 percent, respectively (National Center for Education Statistics, 2011). Several non-profit online universities, such as Western Governors University and Southern New Hampshire University, have also contributed to the growth of online education, but limited data are available pertaining to the history of their growth.

In their survey pertaining to the state of online education in Fall 2002, Allen and Seaman (2014) reported that roughly 1.6 million postsecondary students took at least one online course, which represents 9.6 percent of total enrollment at that time. Since 2002, the number of students taking at least one online course (and the corresponding percentage of online students) has increased every year. In Allen and Seaman's most recent survey, over 7.1 million postsecondary students took at least one online course in Fall 2012, which represents 33.5 percent of total enrollment in higher education. More detailed information pertaining to Allen and Seaman's total enrollment and online enrollment figures over the past decade can be found in Table 1.

Table 1: Total Enrollment and Online Enrollment Over the Past Decade

Year	Total Enrollment	Annual Growth Rate Total Enrollment	Students Taking at Least one Online Course	Annual Growth Rate Online Enrollment	Online Enrollments as a Percent of Total Enrollment
Fall 2002	16,611,710	N/A	1,602,970	N/A	9.6%

Fall 2003	16,911,481	1.8%	1,971,397	23%	11.7%
Fall 2004	17,272,043	2.1%	2,329,783	18.2%	13.5%
Fall 2005	17,487,481	1.2%	3,180,050	36.5%	18.2%
Fall 2006	17,758,872	1.6%	3,488,381	9.7%	19.6%
Fall 2007	18,248,133	2.8%	3,938,111	12.9%	21.9%
Fall 2008	19,102,811	4.7%	4,606,353	16.9%	25.3%
Fall 2009	20,427,711	6.9%	5,579,002	21.1%	28.6%
Fall 2010	21,016,126	2.9%	6,142,280	10.1%	31.3%
Fall 2011	20,994,113	-0.1%	6,714,792	9.3%	32.0%
Fall 2012	21,253,086	1.2%	7,126,549	6.1%	33.5%

Source: Allen, E. & Seaman, J. (2014). Grade change: Tracking online education in the United States. *The Sloan Consortium*.

Student Characteristics

Pascarella and Terenzini (1991) found student characteristics to be significant predictors of postsecondary students' college experiences and learning outcomes. As scholars continue to study online education, distinctions among different types of students should be examined. This section will consider the broader landscape of online education in higher education by disaggregating student characteristics of online learners. Although online education is typically regarded as a pathway to expand postsecondary access by allowing previously unable students to enroll in a college or university, indirect evidence has shown that increases in access through online education may only attract a select group of postsecondary students (Jaggars, 2014). Specifically, Jaggars (2012) previously found that community college students who enrolled in at

least one online course were typically older, more likely to be employed full-time, less likely to be minorities, less likely to be low-income, and less likely to be academically underprepared when compared to those who choose to enroll solely in face-to-face courses. These findings may give credence to the "digital divide" referenced in previous literature, but they can only be attributed to community college students.

Over the past few decades, researchers have found significant gender disparity across several areas of computer technology, particularly online education. Although women represent the majority of students enrolled in online courses, the impact of gender on academic outcomes in online education is an understudied and inconclusive aspect of higher education literature (Kramarae, 2007; Moore, 2007). Arbaugh (2000) found that males view online learning as a medium to provide education to many people more quickly whereas females consider online education to be a medium to develop greater collaboration with their peers. Given these distinctions in how males and females engage in online education, gender is often considered a critical variable to be considered in studies pertaining to online education in higher education.

Age is typically regarded as another important student characteristic in research studies as online education would appear to be very suitable to adult learners. More specifically, the convenience, flexibility, and self-paced workload of online education courses have been referenced as beneficial components to the likelihood of success for older postsecondary online students. Online education has the potential to allow adult learners to continue their educational path without experiencing negative ramifications on their employment or family obligations. Despite a relative consensus pertaining to the importance of age as a student characteristic of interest when examining the academic success of online learners, there are conflicting findings in

regard to the impact of age on the academic outcomes of postsecondary online students (Yukselturk & Bulut, 2007).

Although their study was restricted to first-year and senior college students, Chen, Lambert, and Guidry (2010) found that minority, part-time, and working students are more likely to enroll in an online course. Chen, Lambert, and Guidry's findings appear to be contradictory to Jaggars' (2012) on the likelihood of minorities to enroll in online courses, but these distinctions can likely be attributed to differences among institution types examined in the respective studies. As an increasing number of studies provide conflicting evidence pertaining to the demographic and educational characteristics of postsecondary online learners, more generalizable research, particularly across institution types, is needed.

Beyond identifying which students are more likely to engage in online courses, student characteristics are critical components of the analysis of the effectiveness of online education in higher education. Regarding the general higher education literature, students' enrollment status has been found to be a significant factor in degree completion. For instance, in a study of over 2.3 million first-time students enrolled in two- or four-year undergraduate institutions, Shapiro et al. (2013) found that only 21.9 percent of exclusively part-time students obtained associate's or bachelor's degrees within six years, compared to 77.7 percent of full-time students. Additionally, 67.1 percent of part-time students dropped out completely within those first six years. Although these findings provide a useful context to which online students can be compared, generalizable data related to the persistence of all types of online students are lacking.

Brint, Cantwell, and Saxena (2011) found that future discussions of academic achievement should be framed to account for variation among disciplinary categories and majors. Specifically, Brint et al. showed that study time and academic conscientiousness were

lower among students in social science and humanities majors when compared to students in engineering and science majors. Since more frequent and conscientious study behaviors have been linked to improved student learning outcomes (Arum & Roksa, 2011), it would be problematic to examine academic achievement without accounting for the wide variety of majors among postsecondary students. Chen et al. (2010) also found that first-year college students majoring in business and senior college students majoring in professional fields (e.g., education, nursing, occupational therapy) were more likely to enroll in online courses when compared to their peers.

Given these distinctions among student characteristics in regards to how postsecondary students engage and perform in online education, my study will account for critical demographic and educational characteristics of online learners when examining the profile of online learners and the effectiveness of online education on academic outcomes across a variety of student populations.

Institution Types

Similar to student characteristics, institutional characteristics can also impact the college experiences and learning outcomes of postsecondary students (Pascarella & Terenzini, 1991). This section will review relevant literature pertaining to the motivation and effectiveness of different institution types offering online education. Surprisingly, the vast majority (71.7 percent) of higher education institutions offered online education in some form in 2002. By 2012, the number of institutions offering online courses had grown to 86.5 percent. The motivation and growth of online education varies according to institution type, but a large proportion of the proliferation of online offerings can be explained by institutions moving from

offering the occasional online course to providing complete online-only degree programs to their students. Specifically, the percentage of higher education institutions offering online-only degree programs increased from 34.5 percent in 2002 to 62.4 percent in 2012 (Allen & Seaman, 2014).

Community colleges moved beyond distance education to online coursework in the 1990s (Mullins, 2007). At the beginning of the 21st century, online learning enrollments increased more rapidly at community colleges than four-year institutions. By 2007, over 97 percent of community colleges offered online courses, but only 66 percent of all postsecondary institutions offered online education at that time (Parsad & Lewis, 2008). As open-access institutions, community colleges offer opportunities to a vast array of students who may not be able to afford the cost or time commitment required to attend traditional four-year colleges or universities. When compared to students enrolled at four-year institutions, community college students are more likely to be 25 years of age or older, employed full-time, enrolled as a part-time student, the first in their family to attend college, and classified as academically underprepared (Attewell, Lavin, Domina, & Levey, 2006; Choy, 2001; Pascarella, Pierson, Wolniak, & Terenzini, 2004). In an effort to serve their largely non-traditional student populations, community colleges have been devoted to online education over the past two decades.

Due to the technology revolution and increasing demand for higher education, online education has become an attractive business proposition for several very large for-profit universities. Contrary to many prestige-seeking institutions in the nonprofit sector, for-profit institutions are concerned with resources over quality and prestige. In 2012, a United States Senate committee, led by Senator Tom Harkin, released an extensive report on the for-profit sector of higher education. Harkin and his committee members found that large numbers of

students at for-profit colleges and universities failed to earn credentials. For instance, the report cited a 64 percent dropout rate in for-profit associate degree programs. Harkin's report connects these high drop-out rates to the comparably small amount of money for-profit institutions spend on instruction when compared to their resources devoted to non-education spending (Harkin, 2012; Fain, 2012).

For-profit colleges and universities invest more of their revenue on both marketing and profit distributions than on instruction. In 2009, the 30 for-profit institutions examined in Harkin's report spent $4.1 billion or 22.4 percent of all revenue on marketing, advertising, recruiting and admissions staffing. In addition, profit distributions accounted for $3.6 billion or 19.4 percent of revenue. In comparison, those same for-profit institutions spent $3.2 billion or 17.7 percent on instruction. Despite these criticisms, Harkin and his committee members acknowledge that for-profit institutions will continue to play a substantial role in educating non-traditional and disadvantaged groups of students (Harkin, 2012; Fain, 2012), but their apparent commitment to resources over quality would appear to be a strong indicator that institutional controls should be in place when examining the effectiveness of online education in higher education.

The motivation behind why different institution types have increased their commitment to online education has been largely absent in higher education literature. Although Bowen (2013) has referenced the cost crisis in higher education as a primary motivator for the proliferation of online education, more nuanced explanations are needed. Schiffman, Vignare, and Geith (2007) found several statistically significant differences among various higher education institution types when examining administrators' reasons for engaging with online learning. Most notably, chief academic officers at public colleges and universities were more

likely to implement online education to contribute to extension efforts, but administrators at private colleges and universities were more likely to use online education as a medium to return a surplus to the institution.

Enrollment size represented another statistically significant difference when examining whether chief academic officers at colleges and universities are committed to online education in order to increase student speed to graduation. As expected, administrators at institutions with larger enrollments were found to be more likely to attribute faster graduation time as a motivator for increased online offerings when comparing their responses to their peers at institutions with lower enrollments. These types of distinctions among institution types when examining the motivation behind offering online education provide compelling cases for institutional controls in research examining the effectiveness of online education in higher education.

Academic Outcomes

Previous studies of the quality of online education have used both degree completion (Shea & Bidjerano, 2014) and GPA (Jaggars & Xu, 2013) as dependent variables to examine the effect of online enrollment on students' academic outcomes. Before reviewing studies measuring the quality of online education, the academic outcome variables of interest for Part Two of this dissertation—credential completion and grade-point average—should be grounded in the general higher education literature.

Credential completion

Despite an increased focus by higher education institutions to improve the rate at which students graduate from both two- and four-year colleges and universities (Tinto, 2006), many

postsecondary students are failing to earn their desired credential before entering the job market. Roughly 70 percent of high school graduates enroll in college within two years of graduating, but only about 40 percent of Americans have obtained an associate's or bachelor's degree by their mid-twenties. Only 56 percent of those enrolling in a four-year college attain a bachelor's degree after six years and less than 30 percent of community college students obtain an associate's degree within three years. Completion outcomes are even worse for young minorities. For instance, only 30 percent of African-Americans and less than 20 percent of Latinos have an associate's degree or higher by their mid-twenties (Pathways to Prosperity, 2011).

Degree completion is a critical academic outcome for a variety of reasons. Most notably, previous research suggests that students will receive an earnings "bonus" for completing the bachelor's degree above and beyond the economic return for those students who have equivalent credit hours without earning the bachelor's degree (Arkes, 1999; Belman & Heywood, 1991; Jaeger & Page, 1996). This same type of "credentialing effect" can be attributable to sub-baccalaureate degrees and certificates (Grubb, 1997, 1998). Pascarella and Terenzini (2005) estimate that men with a bachelor's degree earn, on average, roughly 15 percent more than men with four years of college credits but no degree. The corresponding earnings advantage for women with a bachelor's degree is roughly 12 percent more than women who have equivalent credit hours but did not earn their degree. Pascarella and Terenzini found that the same earnings advantage holds for men and women who complete associate's degrees or certificates that signify vocational training when compared to those with equivalent college credits but no degree.

For community college students, credential completion is a convoluted area of study as many community college students transfer to a four-year college or university without obtaining

an Associate's degree. Researchers examining degree completion as an academic outcome face difficulty accounting for the common issue of community college students who never intended to earn an Associate's degree. More specifically, the majority of community college students who obtain a Bachelor's degree did not earn an Associate's degree beforehand (American Federation of Teachers, 2003). Given the inherent complexity involved with examining whether certain types of students have been found to be more susceptible to learner attrition, previous researchers have examined persistence models to explain why some students, particularly non-traditional students, fail to earn their desired credential.

Bean and Metzner (1985) proposed a persistence model to explain attrition of non-traditional students and identified postsecondary students over the age of 24 as a common variable to learner attrition. Older students often work full-time and have family responsibilities that force them to attend college on a part-time basis. These factors, which are often referenced to describe online learners, appear to have a negative influence on students' ability to persist. Rovai (2003) evaluated several persistence models relevant to non-traditional learners and created a composite model to explain persistence of online learners. In addition to factors outlined by Bean and Metzner (1985), Rovai's model includes skills online learners require to successfully navigate the online environment and claims that deficiencies in computer literacy and time management can lead to attrition in online courses. After examining the influence of background variables on student persistence, age, race, finances, hours of employment, family responsibilities, and GPA were identified as factors that impact learners' ability to successfully complete a program of study online (Stavredes & Herder, 2012).

Grade-Point Average

Although no variable has received more attention in relation to degree completion than grade-point average (GPA), it is not a perfect indicator of academic achievement in higher education as the practices and patterns of awarding grades can vary enormously across academic departments and institutions. Critics suggest grades typically reflect a student's performance relative to other students rather than how much has been learned throughout the semester (Astin, 1993). Students' background characteristics and previous experiences also explain a significant proportion of variance in GPAs among postsecondary students. Nevertheless, the substantial attention given to grade performance in higher education is warranted. GPAs are critical to students' continued enrollment, degree completion, admission to graduate and professional schools, and future employment opportunities (Pascarella & Terenzini, 2005).

Despite the limitations outlined previously, postsecondary grades serve as the most effective and consistent predictor of student persistence, degree completion, and graduate school enrollment in nationally representative studies. For example, Adelman (1999) used High School and Beyond survey data and found first-year grades to be a statistically significant and positive predictor of bachelor's degree completion beyond the effects of any other variables, including student background characteristics, the selectivity of the institution attended, financial aid, and hours worked. Additionally, being in the top two quintiles of GPA increased a student's likelihood of degree completion by two to three times over all other students. Several other studies used more recent national samples of students, controlled for students' background characteristics and college experiences, and reported similar findings to Adelman in relation to the effectiveness of GPA as a predictor of student persistence, degree completion, and graduate school enrollment (Heller, 2001; Ishitani & DesJardins, 2002).

In addition, students' first-year GPA has been identified as a positive and statistically significant predictor of degree completion. This finding has been replicated across various samples of students in different institutions in different parts of the country, including a nationally representative study examining 18 higher education institutions (Cabrera, Nora, Terenzini, Pascarella, & Hagedorn, 1999; Pascarella & Terenzini, 2005). Although previous research suggests degree completion and GPA are important indicators of academic achievement, the measurement of the quality of an academic course, program, or institution is a highly complex endeavor for higher education researchers.

Complex Challenges of Measuring Quality

"Quality is relative to the user of the term and the circumstances in which it is involved. It means different things to different people, indeed the same person may adopt different conceptualizations at different moments. This raises the issue of whose quality?"

(Harvey & Green, 1993, p. 10)

The concept of "quality" in higher education is often undefined or inconsistent in operational terms as there is a lack of consensus among scholars and policymakers regarding the purpose of higher education. Colleges and universities face considerable pressure to remain accountable to their constituencies, but the appropriate measures to use when evaluating institutional quality has been the subject of much debate (Miller, 2007; Dunn, McCarthy, Baker, & Halonen, 2011). In addition, opponents of quality assessment in higher education may argue that the educational process is highly complex and students may be influenced in ways that are not necessarily quantifiable (Ellenberg, Stanny, & El-Sheikh, 2011).

Bennett (2001) outlined several core challenges to assessing the quality of a college or university. First, distinct goals across different types of higher education institutions create considerable issues when trying to assess quality. Even within the same institution types, individual colleges and universities are likely to have variations in their institutional missions (and the same can be said within individual departments, majors, or courses). Second, the benefit of enrolling in an individual course or degree program may not reveal itself until years after graduation, which could be a problematic consequence of assessing graduating seniors. Third, a "value-added" assessment approach of measuring student gains before and after enrolling in a particular course or degree program is complex and expensive. Given these challenges, a few other strategies pertaining to measuring quality in higher education should be examined.

The assessment of academic outcomes to measure institutional quality has its own challenges as learning objectives among each individual course, department, and institution may vary due to distinctions in resources, mission, student population, and community setting (Ewell, 2008; Graff & Birkenstein, 2008; Dunn et al., 2011). In addition, the National Center for Public Policy and Higher Education (2008) released a national report card on higher education in which all states received a grade of "incomplete" for student learning due to insufficient data to allow for meaningful state-by-state comparisons. In lieu of assessing actual student learning, many higher education administrators are more concerned about the inputs, outcomes, and reputational measures associated with the perception of their institutional quality as demonstrated by the annual *U.S. News & World Report* college rankings.

Another challenge associated with measuring true quality in higher education is that administrators appear to be motivated by "the pursuit of excellence" and "prestige

maximization" as indicated by college rankings (Clotfelter, 1996; Winston, 1999; James, 1990). Several studies have questioned the effectiveness of college rankings in assessing educational quality (Pike, 2004; Schmitz, 1993; Hunter, 1995; McGuire, 1995). Pascarella and Terenzini (2005) found that traditional measures of institutional quality used by *U.S. News & World Report* (e.g., financial resources and selectivity) do not necessarily foster improvements in students' academic and intellectual development. Educational quality indicators at colleges or universities are rarely based on any evidence that these measures significantly affect student achievement outcomes (Pascarella & Terenzini, 1991), but institutional characteristics continue to be used to rate institutions. Despite empirical evidence against the notion of indicating quality by ranking colleges and universities, *U.S. News & World Report* represents a seemingly impartial evaluator of educational quality that has high legitimacy with the public and a significant influence on institutional behavior (Volkwein & Sweitzer, 2006*;* Griffith & Rask, 2007; Monks & Ehrenberg, 1999; Bowman & Bastedo, 2009; Meredith, 2004).

The Effect of Online Education on Academic Outcomes

Although enrollment in postsecondary online education courses has expanded greatly over the past decade (Allen & Seaman, 2014), extant literature is lacking compelling evidence or generalizable findings pertaining to the quality of online education when compared to face-to-face offerings. Despite significant limitations, previous findings intended to compare online and face-to-face learning will be reviewed. Prior research would have to fulfill each of the following requirements in order to be included in this review: compare online and face-to-face learning; analyze learning outcomes or academic performance (as opposed to the perception of or satisfaction with an online course); involve at least one undergraduate and for-credit

postsecondary course to be offered outside of a continuing education program; and the higher education institution(s) offering the online course is located in the United States.

Before reviewing individual studies related to the quality of online education in higher education, a meta-analysis of empirical literature on the effectiveness of online and blended learning will be examined. Means, Toyama, Murphy, and Baki (2013) evaluated 45 studies and found that, on average, students enrolled in hybrid or blended courses produced modestly better academic outcomes when compared to their peers enrolled in face-to-face courses. The authors found no significant difference between the academic outcomes of students enrolled in purely online courses versus students enrolled in face-to-face courses. While these findings are mildly encouraging for proponents of computer-mediated instruction, a few problems related to this meta-analysis persist.

First, the majority of the studies included in this meta-analysis had a sample size of fewer than 100 students. The inclusion of a large proportion of small-sample (and poorly designed) studies in a meta-analysis may give undue weight to spurious effects. Second, only half of the learners included within this meta-analysis were taking the course for credit or as an academic requirement. Additionally, only seven studies in the meta-analysis conducted by Means et al. (2013) involve postsecondary students enrolled in semester-long online courses (the authors of the meta-analysis combine K-12, undergraduate, and graduate students in their analysis). Third, most of the courses examined were in fields of medicine or health care and did not have relevance to large public universities or community colleges. As a result, the meta-analysis contains little data relevant to the question of the effectiveness of online courses in typical college and university settings. Although Means and her co-authors provided an important

contribution pertaining to the question of the effectiveness of hybrid and online offerings, more research is needed to provide evidence applicable to the general higher education population.

Bowen (2013) noted small sample sizes, the inability to control for self-selection bias through randomized selection, and the lack of generalizability of findings as the primary issues of studies related to the quality of online education. Mentzer, Cryan, and Teclehaimanot (2007) found no significant difference in exam performance between online and face-to-face students, but online students were found to be less likely to submit their assignments, which caused them to earn significantly lower course grades. Poirier and Feldman (2004) indicated that online students performed roughly the same as face-to-face students when comparing their class papers, but online students performed significantly better on exams. Olson and Wisher (2002) found no significant difference between the academic performance of online and face-to-face students. Although these researchers randomly assigned students to an online or face-to-face format, each study has an extremely small sample size of fewer than 40 participants.

Four recent studies included more than 1,000 participants in order to examine the quality of online versus face-to-face courses, but their findings were restricted to community college students. Xu and Jaggars (2011) found that online community college students were more likely to withdraw from a course and receive a lower grade than those students in face-to-face courses. Another study examined more than 1,000 community college students and found that students had higher grades in face-to-face sections of select community college science courses but not in other community college science courses. Using data from technical and community colleges in Washington, Xu and Jaggars (2013) also reported that all types of online students performed worse than their peers, particularly in social science and English. Shea and Bidjerano (2014) found the opposite and claimed that online students from their study had a better chance of

earning a community college credential than their peers enrolled in face-to-face courses. Additionally, when a subgroup of the community college participants transferred to four-year, public higher education institutions, no significant difference in the students' grades in science courses at those institutions was found (Colorado Department of Higher Education, 2012). Although these recent large-scale studies have directly addressed the call for larger sample sizes in research examining the quality of online education, these studies solely examine community college students (Shea & Bidjerano, 2014; Jaggars & Xu, 2010; 2013; Xu & Jaggars, 2011). Online students at four-year colleges and universities are not included in their samples.

Several studies appeared to be strictly observational due to relatively small sample sizes and few (or a lack of) attempts to control for students' background characteristics. Lewis and Harrison (2012) found no significant difference among the academic outcomes online and face-to-face students in their study. Numerous studies showed similar findings when comparing the quality of online and residential courses (Enriquez, 2010; Summers et al., 2005). Plumb and LaMeres (2011) found that online students performed better than face-to-face students on select measures of academic achievement, face-to-face students performed better than online students on other measures, and no significant difference was found on the remaining measures. Some studies showed differences only for select subgroups of students. For instance, Wagner, Garippo, and Lovaas (2011) found no significant difference in course grades when examining all students, but males performed significantly worse than females in online offerings. Additionally, Urtel (2008) found no significant difference between online and face-to-face instruction for male, African-American, or Hispanic students, but white and female students outperformed their peers in face-to-face courses.

Among those studies of individual courses that do not incorporate randomization, many control for several student background characteristics and predictor variables. Similar to other types of studies comparing the academic performance of online and face-to-face students, several studies showed either mixed results or no significant difference between the offerings. After controlling for background characteristics, Ary and Brune (2011) found that the percentage change in scores for pre- and post-tests was significantly higher for face-to-face students, but course averages among online and face-to-face students were found to have no significant difference between the formats. Bennett et al. (2007) showed that students in a face-to-face offering of one economics course received higher averages than online students enrolled in that same course, but the opposite was true in the other economics course from the study. Additionally, Friday et al. (2006) found no significant differences in grades in two courses when results are aggregated, but men performed worse in online offerings in one of the two courses examined in the study. Several researchers, who controlled for background characteristics, found no significant difference between the academic performance of online and face-to-face student (Driscoll et al., 2012; Weber & Lennon, 2007; Wilson & Allen, 2011; Daymount & Blau, 2008).

These studies related to the quality of online education in higher education reveal a lack of conclusive evidence that online instruction is inferior (or superior) to face-to-face instruction, but each study examined contains methodological deficiencies that prevent its findings from being considered generalizable across institution types. With unclear findings related to the quality of online offerings across institution types, the status of the college or university becomes increasingly important.

Status in Higher Education

Despite the vast differences across institution types, many colleges and universities share a similar vision of increasing their status. Through enhanced status, higher education institutions would gain access to greater opportunities and resources as high-status colleges and universities often accrue more privileges and wealth than their peers (Toma, 2008). The concept of status has been defined as "an effective claim to social esteem in terms of positive or negative privilege" (Weber, 1956, 305) and "a socially constructed, intersubjectively agreed-upon and accepted ordering or ranking of individuals, groups, organizations, or activities in a social system" (Washington & Zajac, 2005, 284).

These definitions imply that the "privilege" or "ranking" associated with high status may not be merited as one's position in the social hierarchy is not necessarily derived from differences in actual quality. Previous findings across disciplines have supported this claim by finding the correlation between status and quality to be far from perfect. For instance, researchers working in the sociology of science found that prestige afforded to scientists is often associated with factors other than scholarly merit, such as the prestige of their academic mentors or academic affiliations (Reskin, 1979; Hargens & Hagstrom, 1982; Merton, 1968).

Podolny (1993) claimed the linkage between the quality of a product and the producer's status is distorted by the fact that quality is often uncertain and unobservable, which creates significant challenges when attempting to detect distinctions in quality. The social construction of status can "generate privilege or discrimination" (Washington & Zajac, 2005, 283) and be used to signal quality when uncertainty pertaining to performance-based quality is high (Lynn, & Tao, 2009). As a result, the notion of prestige or high status in higher education can be ascribed by outsiders based on their perception that a college or university is affiliated with other high-

status actors, practices, and organizations (Gould, 2002; Pollock, Lee, Jin, & Lashley, 2015), particularly when one considers that "quality is often more difficult to observe than connections" (Sauder, Lynn, & Podolny, 2012, 269).

Organizational research suggests that an organization's status is influenced by the status of the entities with which the organization affiliates because organizations with connections to high-status affiliates are viewed more positively than their peers. In contrast, organizations tied to low-status affiliates are penalized through a lowering of their own status (Blau, 1964; Elias & Scotson, 1965; Sauder, et al., 2012). Status is typically used as a signal of desirable characteristics and perceived quality despite unclear information related to the actual performance-based quality of one's practices. The evaluation of quality in higher education is a challenging and complex endeavor, but high-status colleges and universities are often able to reduce risk and simplify choices for consumers.

The notion of "brand affiliation" between residential and online offerings allows online courses to capitalize on the status of the institutional brand established through high quality scholarship and traditional course offerings. Despite the potential benefits of brand affiliation for the purpose of generating credibility in an online program, unfavorable academic outcomes for online students may dilute the previously established status of higher education institutions (Dooley, 2013). Since online courses would benefit from the immediate recognition and positive evaluation from potential students, the quality of the online course is expected to be equivalent to that of traditional courses offered on campus. Brand affiliation in higher education could serve to attract students to online courses in the short term, but the implementation of an inferior product would potentially harm the perceived quality and status of the institution (James, 2005; Hadjicharalambous, 2010).

Similar to other organizations in a competitive environment, the status of a higher education institution is inextricably linked to the public's perception of its quality. Given that over 69 percent of higher education leaders have labeled online learning as critical to their long-term strategy (Allen & Seaman, 2014), critics have questioned whether this increased emphasis on online education would serve to dilute the perceived quality of colleges or universities. In order to answer these questions, this study will aim to fill the gap in extant research by answering the call to provide hard evidence of the quality of online education by conducting longitudinal analysis that examines the influence of online education on students' academic outcomes.

Conceptual Framework and Hypotheses

The following conceptual framework will provide a logical narrative to explain the rationale behind the inclusion of various hypotheses within this study. For Part One of this dissertation, which examines the influence of a range of student and institutional characteristics on the decision to enroll in online courses, the conceptual framework is guided in part by the concept of opportunity costs. This microeconomic theory highlights the cost of foregone alternatives as the cost of doing one thing is all of the other things you won't be able to do as a result (Mankiw, 1998). For some postsecondary students, residential education has high opportunity costs. The time and geographic demands associated with face-to-face instruction would likely force these students to forego employment, caregiving, or other important responsibilities. Online education, particularly asynchronous online education, would then carry a significantly lower opportunity cost relative to residential education. The concept of opportunity cost helps to inform my first hypothesis.

Hypothesis 1: Student characteristics associated with time or geographic constraints will be positively related to online enrollment.

This hypothesis relates to a wide variety of the independent variables to be included in my empirical analysis. Students who hold a full-time job may have to resign their position and accept a lower-paid, part-time position if they were to enroll in a residential education program. Parents and married individuals may have family responsibilities not amenable to the rigid class schedule of traditional higher education. Despite considerable progress toward equality over the years, between 53 to 68 percent of caregivers are female (American Psychological Association, 2015). As a result, female students may be more amenable to the convenience and flexibility of online education when compared to their male peers. Older students would also appear to be more likely to have work or family obligations relative to their younger peers. Finally, veteran students may need to engage in prohibitive travel or be stationed away from their home institutions while rural students may not live within a convenient travel distance from their target institution. To summarize, Hypothesis 1 suggests that online education will be positively correlated with the following variables: full-time employment, parent, married, female, age, veteran, and rural location.

In addition to time and geographic considerations, status-based considerations can help to frame the decision to enroll in online courses or online-only programs. Organizational research suggests that status constrains the behavior of actors as one's status position will limit the opportunities and choices made available. Low-status actors, such as postsecondary students who have been historically underrepresented, may be excluded from certain opportunities due to

their position, but high-status actors also face limited options because engaging with lower-status affiliates may jeopardize their own position (Sauder et al., 2012; Podolny, 1993).

Hypothesis 2: Student characteristics associated with historical underrepresentation in higher education will be positively related to online enrollment.

Postsecondary students who have been historically underrepresented in higher education would appear to have limited options and be more likely to engage with online education, which is widely considered to be a low-status medium of instruction. According to Engle and Tinto (2008), students from disadvantaged backgrounds, such as minorities, low-income students, and first-generation students, have not received equal access to higher education over the years. Hypothesis 2 suggests that online education will be positively correlated with the following variables: minorities, low-income, and first-generation.

Although many higher education institutions are status-seeking entities, certain institution types, such as community colleges or for-profit institutions, are more motivated by increasing access or generating revenue than improving status. For those colleges and universities already associated with high status, concerns related to the possibility of brand dilution or status leakage are paramount. As mentioned previously, high-status institutions may avoid low-status affiliates, such as online education, to avoid the lowering of their own status (Blau, 1964; Elias & Scotson, 1965; Sauder et al., 2012).

Hypothesis 3: Institutional characteristics associated with missions more focused on access provision or revenue generation than status improvement will be positively related to online enrollment.

Hypothesis 4: Institutional characteristics associated high status within the U.S. higher education system will be negatively related to online enrollment.

As open access institutions, the missions of community colleges and for-profit institutions do not align with the pursuit of status improvement. More specifically, community colleges typically engage the surrounding area to serve as an access point into higher education while for-profit institutions seek to optimize their revenue in order to optimize the net profit accrued for their owners (Mullins, 2007; Kinser, 2007), both of which can be conducive to the implementation of online education.

High-status colleges and universities are less likely to engage with lower-status entities as their network of affiliates is a crucial determinant of status. Because high-status institutions will likely avoid engaging with lower-status affiliates, such as online education, the mere association with a low-status medium of instruction may jeopardize their status position (Sauder et al., 2012; Podolny, 1993). For selective and private (not-for-profit) institutions, the scarcity of their admitted students and degrees granted also represent valuable currencies associated with the perception of their high status. The provision of online programs would appear to be antithetical to the high-status behaviors related to fewer students and credentials than their lower-status peers. To summarize, Hypothesis 3 suggests that online education will be positively correlated with community colleges and for-profit institutions while Hypothesis 4 suggests that online

education will be negatively correlated with selective institutions and private (not-for-profit) four-year institutions.

Although status in higher education is widely considered an indicator of quality, the linkage between status and quality is often loose (Sauder et al., 2012). Empirical findings related to the quality of online education across institution types can provide greater clarity for higher education leaders seeking concrete evidence regarding how to strategically engage online education. For Part Two of this dissertation, which examines the impact of postsecondary online enrollment on various academic outcomes, my conceptual framework is motivated in part by Archibald and Feldman's (2011) claim that technological advances in higher education, such as online education, are most beneficial when used as a complement for existing practices. In other words, online education will not be able to effectively replicate or replace face-to-face instruction, but traditional education coupled with convenient and flexible forms of instruction may be able to generate improved academic outcomes for postsecondary learners.

Hypothesis 5: Students who engage in some levels of online education will experience greater academic outcomes than students who engage in no online education or online-only programs

My final hypothesis suggests that engaging in some (but not all) levels of online education will be positively correlated with three-year credential completion, six-year credential completion, GPA, and community college transfers.

CHAPTER 3: DATA AND METHODS

This chapter addresses the methodology used to examine how student and institutional characteristics relate to online enrollment decisions and the effect of enrollment in online courses on undergraduate students' academic outcomes. The analysis will use cross-sectional data from four different editions of the National Postsecondary Student Aid Study (2000, 2004, 2008, 2012) and longitudinal data from the 2004-09 Beginning Postsecondary Students Longitudinal Study. More detailed information related to NPSAS and BPS surveys will be presented later in this section, including the variables included in each analysis. In addition, the analytic strategies used to answer each of the following research questions will be described in detail.

Primary Research Questions

- How do student and institutional characteristics of undergraduate students relate to online course enrollment decisions?
- To what extent does enrollment in online courses influence the academic outcomes of undergraduate students across higher education institution types?
- For both questions, do the results vary according to the level of engagement with online education?

Data

This dissertation used a variety of nationally representative data sources for student and institutional variables. For the first and third research questions, data used to explain online enrollment patterns over time were drawn from the National Postsecondary Student Aid Study (NPSAS). More specifically, NPSAS data for 2000, 2004, 2008, and 2012 were appended to

create a comprehensive, cross-sectional data set used to describe and examine how different student and institutional characteristics relate to online enrollment patterns. Although NPSAS is best known as a wide-ranging study of financial aid among postsecondary students, it provides extensive data pertaining to student and institutional characteristics. In addition, NPSAS also includes a variety of distance education variables, which can be manipulated to examine online enrollment over time. By examining four NPSAS surveys between 2000 and 2012, I will be able to provide a rich description of how patterns of enrollment in online education changed over this time period.

In order to examine my final two research questions, I used data drawn from the Beginning Postsecondary Students Longitudinal Study for 2004-2009 (BPS:0409). BPS:0409 provides a longitudinal tracking of a large sample of students that initially enrolled at a higher education institution during the 2003-04 academic year. These students participated in three rounds of data collection during their 1st, 3rd, and 6th year after beginning college. The sample of students from BPS:0409 were drawn from the sample of students in the National Postsecondary Student Aid Study (NPSAS: 04), which included all degree levels at roughly 1,600 institutions in the United States.

BPS:0409 represents approximately four million undergraduate students. Student information was collected from interviews and postsecondary transcript data from each higher education institution represented in the study. As a result, BPS:0409 data allows me to examine student characteristics, course-taking patterns (such as online enrollment), and academic outcomes over a six-year period. Given that BPS constitutes the most recent comprehensive national survey of postsecondary students, I will be able to produce nationally generalizable findings that are directly applicable to current educational policies and practices related to online

learning outcomes across a variety of student populations and institution types. Sample weights for all NPSAS and BPS surveys were applied to ensure the national population of undergraduate students was represented appropriately.

Samples

Regarding the NPSAS data used for Part One of my study, the NPSAS:00 sample included all respondents to interviews conducted using a computer-assisted telephone interviewing (CATI) procedure. After adjusting for institution nonresponse, the overall number of eligible sample members was roughly 29,370. This particular distinction is critical as the survey question pertaining to online enrollment was only a component of CATI data collection for NPSAS:00. After cleaning data to account for systematically missing cases, the final number of respondents for NPSAS:00 was 28,677. Similar procedures were carried out pertaining to the NPSAS:04 sample, but imputations increased the total number of undergraduate students included in the sample from 53,490 to 74,556. After imputing missing values from student and institutional data, NPSAS:08 increased from 95,360 undergraduate students to 108,848 undergraduate students to be examined in my NPSAS:08 sample. NPSAS:12 originally consisted of roughly 94,200 undergraduate students. After cleaning key variables to be included in my analysis, my final NPSAS:12 sample included 90,277 respondents.

Part Two of my study uses BPS data drawn from 2004-2009. The original sample included roughly 16,680 undergraduate students. After cleaning missing data pertaining to independent variables of interest, my final BPS:0409 sample included 16,638 respondents. In order to investigate the effect of online enrollment on specific institution types, I created BPS:0409 sub-samples for each institution type. My subset analysis of less-than-two-year institutions, two-year institutions, and four-year institutions will examine the effect of online

education on the likelihood of undergraduate students to obtain the terminal undergraduate degree at each institution type. The BPS:0409 sample includes 1,553 observations from less-than-two-year institutions, which typically offer occupational and vocational programs below the baccalaureate level. The sample also includes 6,430 observations from two-year institutions and 8,655 observations from four-year institutions offering at least a bachelor's degree.

Variables

Measure of Online Enrollment

Online enrollment is typically operationalized as a dichotomous variable indicating whether a student enrolled in no online courses or at least one online course. Unfortunately, this particular strategy confounds residential students who may take only one online course with students who enroll in online-only programs. In order to address this problematic confound, I manipulated the dichotomous course-taking variables to differentiate among respondents who took no distance education courses, some distance education courses, and all distance education courses. After making that adjustment for both NPSAS and BPS data, I selected the course-taking variable that captured whether the distance education course used the internet. This distinction is also important as previous studies have conflated students enrolled in distance education courses and those enrolled in online education courses, which is particularly problematic for earlier years of online offerings as computer-mediated instruction comprised a lower proportion of distance education courses (Allen & Seaman, 2014).

Dependent Variables

The dependent variable for Part One of this dissertation will capture whether the undergraduate student engaged in online courses in 2000, 2004, 2008, and 2012. In order to measure online course-taking over time, I will create a variable ('newonline') from NPSAS data that indicates whether a student enrolled in no online courses, some online courses, or all online courses. NPSAS:00 and NPSAS:04 surveys contain dichotomous variables to specify whether the student engaged in distance education using the internet ('dewww') and whether the student took all courses via distance education ('distall'), which allows me to create my dependent variable. NPSAS:08 contains similar distance education variables, but the NPSAS:08 survey does not offer a specific variable indicating whether the postsecondary student used the internet when enrolled at a distance (this particular limitation will be addressed in detail in my "Limitations" section within Chapter Four). NPSAS:12 contains a course-taking variable that indicates whether the postsecondary student enrolled in no, some, or all online courses ('altonln').

For Part Two of this dissertation, the dependent variables will be a variety of academic outcome variables drawn from the BPS:0409 study. First, the "credential completion" variables will cover a period of three years and six years, respectively. Specifically, the three-year credential completion variable ('3ydeg') will capture whether the undergraduate student has earned a professional certificate or associate's degree by 2006. The six-year credential completion variable ('6ydeg') will identify whether the student obtained a professional certificate, associate's degree, or bachelor's degree by 2009. In order to capture an alternative form of persistence for community college students, I recoded the transfer status variable to indicate whether a given student transferred within three years ('tftype3y') or six years

('tftype6y'). This particular specification only examined the subsample of community college students included within BPS:0409. Undergraduate students' GPA will be the final outcome variable ('gpa') of interest. My review of the literature suggests each of these academic outcome variables are critical metrics for assessing the effectiveness of an academic course or degree program.

Independent Variables

For Part One of this dissertation, independent variables include student and institutional characteristics that covary with online enrollment between the years of 2000 and 2012. This section provides detailed information pertaining to each of the independent variables included as covariates within the analyses.

Student characteristics. For Part One, the following student characteristics serve as predictors of online enrollment in 2000, 2004, 2008, and 2012: gender, race, age, major, class level, part-time enrollment, full-time employment, income, and target institution distance from student's home.

The student's gender ('gender') is represented by a dichotomous variable indicating whether the respondent identified as a male or female. The race variable ('race') includes White, Black, Hispanic, Asian, American Indian, Pacific Islander, and Other (which includes those respondents who identify as more than one race). Given the large number of majors available for undergraduate students, the variable indicating the student's major or field of study ('majors') was recoded to include Undeclared, Humanities, Sciences, Math/Engineering, Computer Science, Business/Management, Health, and Vocational/Technical. The variable capturing undergraduate class level ('uglvl1') during the academic year of each survey was categorized as

First-year undergraduate, Second-year undergraduate, Third-year undergraduate, Fourth-year undergraduate, Fifth-year undergraduate, and Unclassified Undergraduate. The student's attendance intensity ('attnptrn') during the academic year was identified as exclusively full-time, exclusively part-time, or mixed full-time and part-time.

The student's intensity of work while enrolled during the academic year ('jobenr'), which excluded work-study programs, was categorized as no job, part-time, or full-time. I created a dichotomous variable to signify whether a student would be categorized as low-income or not low-income ('low-income'). Consistent with previous literature, I classified a low-income student as one whose family earned less than $30,000 for both dependent and independent students (Rankin et al., 2011). In addition, I created a dichotomous variable to signify whether a student would be classified as first-generation or not first-generation ('first-gen'). I recoded the 'pareduc' variable, which indicated the highest level of education achieved by either parent of the student, from each NPSAS survey to generate a variable that defined first-generation students as those respondents whose parents did not earn a Bachelor's degree (Thayer, 2000).

The student's veteran status during the academic year was represented by a dichotomous variable indicating whether the respondent was a veteran or not a veteran ('veteran'). I recoded the student dependency status variable ('depend2') to create a new dichotomous variable indicating whether the student has at least one dependent or no dependent ('withdep'). I also recoded the variable indicating the student's marital status during the academic year ('smarital') to simplify the categorization as married or not married, which combined those students who identified as single, separated, divorced, or widowed. The age variable ('age') is a continuous variable indicating the student's age on the day before the start of the calendar year of each survey. For instance, the NPSAS:00 survey reported the student's age as of 12/31/1999. In

order to serve as a control variable, I included the continuous variable indicating the distance in miles from the student's home to the NPSAS institution ('distance'). More information related to this particular variable will be included within the "Analytic Techniques" section of this chapter.

For Part Two of this dissertation, the following student characteristics serve as predictors of degree completion and student GPA: online enrollment, gender, race, age, major, low-income, first-generation, employment, highest degree expected, distance from target institution, dependency, attendance intensity, and transfer status. Many of the previously mentioned independent variables are coded identically to those covariates outlined in the earlier discussion for Part One, and I will not discuss the identically coded variables again here. The main independent variable for Part Two will be online enrollment. Similar to the dependent variable for Part One, the online enrollment variable ('newonline') will categorize those students who engaged in no online courses, some online courses, or all online courses. The race variable ('race') has now been recoded as a dichotomous variable representing White and Asian students and underrepresented minorities (Black, Hispanic, American Indian, Pacific Islander, and Other Races, which includes those respondents who identify as more than one race) to account for the educational racial gap and allow for clear interpretation of findings.

The variable indicating the student's highest degree expected ('degexp') categorized the highest level of education the respondent expected to reach as no degree or certificate, undergraduate certificate, Associate's degree, Bachelor's degree, and advanced degree or certificate. Transfer status as of 2006 ('tftype3y') was recoded as a dichotomous variable in which the respondent identified as never transferred or transferred. The same strategy was used to indicate transfer status as of 2009 ('tftype6y').

Institutional characteristics. Each of the following institutional variables is identified as a predictor of online enrollment for Part One of this study: institution control, institution level, institutional selectivity, and degree of urbanization. The institution control variable ('aidctrl') is derived from IPEDS (Institution Characteristics) and indicates control of the NPSAS sample institution for the academic year. The four categories are public, private not-for-profit, private for-profit, and attended multiple institutions. Similarly, the institution level variable ('level') is derived from IPEDS (Institution Characteristics) and indicates the level of the NPSAS sample institution for the academic year. The three levels are coded as four-year, two-year, and less-than-two-year.

The selectivity variable ('selectv2') indicates the degree of selectivity of the postsecondary institution the student attended during the given year. This variable was derived from a combination of variables from IPEDS (Institutional Characteristics) and can only be applied to not-for-profit, four-year institutions (public or private). The five categories available for selection are not public or private not-for-profit four-year, open admission, minimally selective, moderately selective, and very selective. The degree of urbanization variable ('locale') was recoded to categorize the degree of urbanization in which the NPSAS institution was located. This 'locale' variable was also derived from IPEDS and was recoded as large city, small/mid-size city, large suburb, small/mid-size suburb, town, rural, and not assigned. This particular variable was recoded to ensure consistency across years as the values and labels available for selection changed over time.

For Part Two of this dissertation, the institutional variables are included primarily to reduce the likelihood of omitted variable bias. The institutional characteristics to be controlled for are institution control, institution level, and institutional selectivity. With the exception of

the omission of the 'locale' variable, all institutional characteristics for Part Two of the study are coded identically to those institutional variables included in Part One of this dissertation.

Methods

Part One of this study has several hypotheses involving a multi-category dependent variable of online enrollment. Due to the structure of my dependent variable, I employed a multinomial logistic regression model, which creates a logistic regression equation for the outcome variable categories minus one for the base outcome of student enrollment in no online courses. Although previous literature employs a dichotomous online enrollment variable (whether or not the student enrolled in at least one online course), this particular measure of online enrollment utilizes a polychotomous variable (more than two categories). This distinction is critical as previous work has confounded the postsecondary student enrolled in one or two online courses with the postsecondary student enrolled in an online-only degree program (Shea & Bidjerano, 2014; Jaggars & Xu, 2013).

Multinomial logistic regression is the most appropriate analytic technique to employ as it allows for the estimation of the pairwise comparisons of nominal or unordered categorical variables. The following general equation will be used in my multinomial logistic regression model to display the log odds of membership in the identified category (enrolled in some or all online course) relative to the reference category (did not enroll in online course):

$$\log\left(\frac{Prob(j)}{Prob(J)}\right) = \alpha + \beta_1 X_i$$

Where *j* is the identified group, *J* is the reference group, and *X* is a vector of the student and institutional characteristics outlined within the "Independent Variables" section in this chapter.

Multinomial logistic regression coefficients (*b*) will be expressed in terms of log odds. A unit change in the independent variable is associated with a *b* unit change in the log of the odds of the identified outcome occurring. In order to simplify interpretation, I report the majority of my findings in terms of odds ratios, which raise *e* to the power of *b*. The odds ratio represents the factor change in the odds of an outcome associated with a one unit change in the independent variable. For continuous independent variables, a one unit change will be one unit on its measurement. For dichotomous independent variables, a one unit change will move the variable from 0 (outside of the group) to 1 (within the group).

Through the use of NPSAS data, I will utilize multinomial logistic regression to describe online course-taking across a variety of student and institutional characteristics in order to outline trends and identify any disproportionate relationships among student characteristics, institution types, and online course-taking. To better understand how student and institutional variables covary with online enrollment decisions, one can incorporate both of these variable types within the same regression equation. As referenced earlier, the combined specification will be estimated using multinomial logistic regression. Regressions will be estimated separately for each NPSAS year. In addition, I will run a pooled model including all years (2000, 2004, 2008, 2012) to include a dummy variable for each year of my study.

Part Two of this dissertation also has several hypotheses related to a multi-category dependent variable, but I will also examine a dichotomous dependent variable (whether or not the community college student transferred) and a continuous dependent variable (GPA). Given the changing structure of my dependent variables, I will employ several methodologies. Although postsecondary credentials (e.g., Certificate, Associate's degree, Bachelor's degree) could be considered ordinally ranked, I found the parallel regression assumption upon which

ordinal logistic regression is based was violated for my dependent variable signifying credential completion (Long & Freese, 2005). In other words, the slope between a given covariate and the multi-category dependent variable for credential completion was not the same for each category of the dependent variable (Agresti, 2007). The order of the postsecondary credentials is irrelevant as my results would be the same no matter how the categories are listed. As a result, I used multinomial logistic regression, which works very similarly to the analytic technique employed in Part One of this dissertation, but online enrollment is no longer the dependent variable and has now become the primary independent variable of interest.

In order to examine the highest undergraduate credential available at each institution type, I ran subsample analyses for (i) less-than-two-year institutions to examine whether students earned a Certificate within three years, for (ii) community colleges to examine whether students earned a Certificate or Associate's degree within three years and six years, and for (iii) four-year institutions to examine whether students earned a Certificate, Associate's degree, or Bachelor's degree within six years. Data for the subsample analysis intended to examine whether students earned a Certificate within six years did not converge and were not included among my analyses. Additionally, I ran a pooled model including all institution types as part of my analysis of the effect of online education on credential completion in higher education.

The following general equation will be used in my multinomial logistic regression model to display the log odds of membership in the identified category (earned certificate, associate's degree, or bachelor's degree) relative to the reference category (did not earn certificate, associate's degree, or bachelor's degree):

$$\log\left(\frac{Prob(j)}{Prob(J)}\right) = \alpha + \beta_1 O_i + \beta_2 X_i$$

Where *j* is the identified group, *J* is the reference group, *O* is the online enrollment variable, and *X* is a vector of the student and institutional characteristics outlined within the Independent Variables section.

For analysis of transfer status, with a dichotomous dependent variable, the appropriate baseline method is logistic regression. The baseline logistic regression for transfer status is given by:

$$Prob(Y_i = 1|O_i, X_i) = \frac{exp(\beta_0 + \beta_1 O_i + \beta_2 X_i)}{1 + exp(\beta_0 + \beta_1 O_i + \beta_2 X_i)}$$

Where Y_i represents transfer status, O_i represents online enrollment, and X_i represents a vector of student and institutional characteristics.

For the continuous dependent variable of GPA, I will use the analytic strategy of ordinary least squares (OLS) regression in order to examine how online enrollment and the relevant characteristics outlined in the literature affect the student's GPA during the year in which he or she was enrolled in no, some, or all online courses.

$$Y_i = \beta_0 + \beta_1 O_i + \beta_2 X_i + \varepsilon_i$$

Where Y_i represents transfer status, O_i represents online enrollment, X_i represents a vector of student and institutional characteristics, and ε_i is the error term.

A major concern regarding studies of the effect of online education on student outcomes is selection bias. If students who enroll in online classes differ from students who do not in ways that influence the outcomes under study, one will have difficulty determining whether differences in outcomes across groups are due to the causal effect of online education or merely the effect of differences across groups. I attempt to address this problem through the inclusion of

control variables at both the student and institutional level. Some of the variables, such as the location of the student relative to the institution, correlate well with online enrollment decisions and could also be a determinant of the examined outcomes. As a result, they should reduce the level of omitted variable bias, but addressing selection issues through the inclusion of control variables is unlikely to fully remove bias, so one must be cautious to not automatically assume that findings describe the causal effect of online education on academic outcomes.

Potential threats to internal validity are likely weaker if one were to employ experimental or quasi-experimental methods, and previous single-institution studies pertaining to the quality of postsecondary online education have employed such methods. Much of the previous research, however, introduces new limitations pertaining to external validity as such studies typically focus on a specific institution or individual class within the higher education institution (Lack, 2013). This study seeks to minimize limitations pertaining to external validity, which is why a nationally representative sample was utilized. The trade-off of such a decision is that experimental or quasi-experimental methods are very difficult to apply to national samples. By combining this study with previous studies that employed experimental or quasi-experimental methods, one should be able to gain a deeper understanding of how online education impacts the academic outcomes of postsecondary online students.

Contributions

Given that Radford (2011) examined undergraduate enrollment in distance education courses and programs using NPSAS data, it's important to outline a few major distinctions and contributions that Part One of this dissertation provides above and beyond Radford's work. Radford provided a first step to identifying the profile of online learners in higher education, but

Part One of my study expands upon this previous line of research in three important ways. First, my study will distinguish between distance education and online education, which is particularly critical when discussing enrollment patterns during 2000 and 2004. The conflation of these two teaching techniques is problematic as the broader category of distance education includes earlier technologies, such as correspondence courses, educational television, and videoconferencing.

Second, my study will provide a more nuanced and advanced analysis to not only describe the changing profile of online learners over time but also to assess the probability of multiple student populations at various institution types enrolling in some (but not all) online courses or online-only programs over time. Although Radford's (2011) study provided a percentage of undergraduates who enrolled in distance education courses in 2000, 2004, and 2008, her work only examined student and institutional characteristics of distance learners in 2008. My dissertation will provide a more nuanced examination of the profile characteristics of postsecondary online learners over time, which is surprisingly lacking in higher education literature. Beyond providing descriptive statistics of the changing profile characteristics of online learners, my study will employ several multinomial logit models to examine the probability of postsecondary students enrolling in some or all online courses according to a variety of student and institutional characteristics.

Third, the landscape of online education has already changed rapidly since Radford's (2011) study using NPSAS data. According to Allen and Seaman (2014), the percentage of students enrolled in at least one course increased from 21.9 percent during the 2007-2008 academic year to 32.0 percent during the 2011-2012 academic year. By incorporating NPSAS:12 data in my study, I will be able to capture those students not examined during a burgeoning period of growth for online education in higher education.

Part Two of this dissertation will change the way online enrollment has been categorized in previous empirical work by differentiating among those students who take no courses online, some courses online, and all courses online. Beyond single-institution studies, previous studies have compared the academic outcomes of community college students who enrolled in face-to-face courses versus those who enrolled in at least one online course, but such studies fail to distinguish between traditional students who enrolled in one course via the internet and those students enrolled in online-only degree programs (Xu & Jaggars, 2011; Shea & Bidjerano, 2014).

For instance, Shea and Bidjerano (2014) classify postsecondary students in their study as those who enrolled in distance education courses and those who did not. Xu and Jaggars (2011) add more nuance by classifying three types of postsecondary courses: face-to-face, hybrid (50% or less of instruction offered online), and online (51% or more of instruction offered online), but the issue of confounding the residential learner taking a few courses online and the online-only student still persists. In addition to providing a more nuanced classification system for online learners, this dissertation will complement previous studies of the effectiveness of online education by providing greater generalizability to its findings by examining the effect of online enrollment on academic outcomes across student populations and all institution types.

Descriptive Statistics

Descriptive statistics for Part One of this dissertation will focus primarily upon the changing student and institutional characteristics of the various NPSAS samples distributed between 2000 and 2012. Although I will describe many interesting trends within this section, the complete tables for each year can be found in Appendix A.

The overall proportion of students taking no, some, or all online courses within these samples affirms previous literature describing the growth of online education over the past decade (Allen & Seaman, 2014). The proportion of students taking some online courses has increased from 3.35% in 2000 to 19.20% in 2012. For students enrolled in online-only programs, the percentage of students taking all courses online grew from 2.24% in 2000 to 7.45% in 2012.

Table 2: Undergraduate Students in No, Some, or All Online Courses Over Time (NPSAS)

Year	Students took no online courses (0%)	Students took some online courses (1-99%)	Students took all online courses (100%)
2000	94.41%	3.35%	2.24%
N	27,083	958	636
2004	86.41%	9.17%	4.42%
N	64,424	6,834	3,298
2008	80.17%	16.46%	3.36%
N	87,265	17,921	3,662
2012	73.35%	19.20%	7.45%
N	66,220	17,330	6,727

Many student and institutional characteristics of online learners have changed disproportionately between 2000 and 2012. The vast majority of postsecondary students enrolled in some (74.63%) or all (72.33%) online courses in 2000 were White, but that proportion decreased over time. By 2012, White students represented 59.07% of students enrolled in some online courses and 61.80% of students in online-only programs. Postsecondary students with certain academic majors appeared to engage more with online courses when compared to their peers. From 2000 to 2012, Business, Health, and Technical/Professional majors engaged with some or all online courses at a greater rate than their peers. For instance,

Health majors comprised 10.65% of undergraduate students enrolled in some online courses in 2000, but that proportion increased to 21.99% in 2012. Surprisingly, Education majors decreased their engagement with online courses relative to their peers. In 2000, Education majors represented 15.76% of students in some online courses and 14.94% of students in online-only programs. By 2012, the percentage of Education majors in some online courses (5.06%) and online-only programs (4.87%) decreased disproportionately.

Postsecondary students without a job represented a larger proportion of students who took some online courses or enrolled in an online-only program over time. Among students who engaged with online education in 2000, 17.99% of students enrolled in some online courses did not have a job and 12.46% of students in online-only programs were not employed. By 2012, 33.95% of students in some online courses did not work and 34.70% of students enrolled in online-only programs did not have a job. From 2008 to 2012, the proportion of 18-22 year-old students enrolled in online courses increased substantially. The percentage of 18-22 year-old students enrolled in online-only programs increased from 18.00% in 2008 to 35.99% in 2012 (those in some online courses increased from 43.09% to 53.66% during that same time period).

Descriptive statistics pertaining to institutional characteristics also provided several noteworthy findings. Regarding the share of online learners enrolled at for-profits, the percentage of postsecondary online students at for-profit institutions increased substantially over the years. Specifically, the proportion of students enrolled in online-only programs at for-profit institutions increased from 3.19% in 2000 to 47.82% in 2012. More recently, the percentage of online students enrolled at high-enrollment institutions also increased considerably. For students enrolled in online-only programs, the percentage of students at institutions with enrollment number greater than 60,000 jumped from 2.14% in 2008 to 21.22% in 2012.

The proportion of students taking some or all online courses at "very selective" or "moderately selective" institutions decreased substantially from 2000 to 2012. In 2000, 44.25% of students who took some online courses and 38.12% of students in online-only programs were enrolled at "moderately selective" institutions. By 2012, only 18.06% of students who took some online courses and 10.23% of students in online-only programs were attending "moderately selective" institutions in 2012. The same pattern holds for "very selective" institutions as 13.77% of students enrolled in some online courses and 8.55% of students enrolled in online-only programs were at "very selective" institutions in 2000. By 2012, the percentages at "very selective" institutions fell to 7.09% for students enrolled in some online courses and 3.37% for students in online-only programs.

In Part Two of this dissertation, I examine the effect of online enrollment on various academic outcomes of undergraduate students. The BPS:0409 Longitudinal Study only asks respondents about online enrollment during the first year of the survey (2004). As a result, I will describe the BPS:0409 sample in relation to online course-taking during the first year of their undergraduate studies. The vast majority of respondents did not enroll in online courses (92.81%), but the proportion students who enrolled in some online courses (4.68%) and online-only programs (2.51%) proved adequate given the size of the overall sample (16,638).

Table 3: Undergraduate Students in No, Some, or All Online Courses in 2004 (BPS)

Year	Students took no online courses (0%)	Students took some online courses (1-99%)	Students took all online courses (100%)
2004	92.81%	4.68%	2.51%
N	15,441	779	418

For three-year credential completion, a larger percentage of postsecondary students who enrolled in no online courses did not receive a certificate or degree (83.10%) when compared to those students who enrolled in some online courses (79.72%) and all online courses (80.38%). Of those students who did not engage with online education, a higher proportion earned a postsecondary certificate (8.41%) when compared to those who took some (6.16%) or all (7.42%) courses online. On the other hand, a larger percentage of students who enrolled in some online courses (12.97%) and online-only programs (10.53%) earned an Associate's degree when compared to student who did not take an online course.

Descriptive statistics for six-year credential completion reveal slightly different patterns. The percentage of non-online students who did not earn a degree or credential after six years (43.06%) was actually lower than their peers who enrolled in some (47.11%) or all online courses (50.48%). Similarly, the proportion of non-online students who earned an Associate's degree (8.75%) was lower than those who enrolled in some (15.28%) or all (11.96%) online courses. The percentage of students who earned a postsecondary certificate (9.82%) or Bachelor's degree (38.37%) was higher for students who did not enroll in online courses when compared to students who enrolled in some online courses (7.70% and 29.91%) or online-only degree programs (9.57% and 27.99%).

For community college students in the BPS:0409 sample (n = 6,430), transferring to another institution is another form of persistence. As such, I ran a variety of specifications examining the transfer status of community college students as an outcome of interest. After three years, the percentage of community college students enrolled in some (26.68%) or all (28.00%) online courses who transferred to another institution was higher when compared to those students who did not engage with online education (24.75%). After six years, the same

pattern holds when comparing the percentage of non-online community college students who transferred (41.79) versus those enrolled in some (45.48%) or all (46.22%) online courses. I ran an additional specification for all institution types to examine the GPA of students in the sample. The average GPA for students who enrolled in no online courses (2.96) was slightly higher than those students who enrolled in some online courses (2.95) or online-only programs (2.94). Appendix B shows the complete breakdown of student and institutional characteristics for all respondents included in the BPS:0409 sample.

CHAPTER 4: RESULTS

My statistical analyses reveal several interesting findings. This chapter will highlight many of the more noteworthy results pertaining to Part One, Part Two, outlined hypotheses, and relevant limitations of this dissertation. Part One will present key findings from each multinomial logistic regression model in order to describe the changing profile of the postsecondary online learner. Results of statistical analyses for Part Two will provide generalizable evidence of the effect of online education on multiple academic outcomes. In addition, I will directly address each listed hypothesis before describing several limitations associated with the results of this dissertation.

Part One

Before describing and interpreting my findings from each multinomial logistic regression model, I will provide the odds ratios associated with the likelihood of various postsecondary student types enrolling in some or all online courses. The following table, Table 4, includes odds ratios for 2000, 2004, 2008, 2012, and the pooled regression model for all years. All tables pertaining to Part One of this dissertation can be found in Appendix A.

Table 4: Odds Ratios of Enrolling in Some or All Online Courses:

	2000 b (se)	2004 b (se)	2008 b (se)	2012 b (se)	Pooled b (se)
No Online					
Some Online					
Female	1.007	1.236***	1.162***	1.257***	1.165***
	(0.070)	(0.040)	(0.020)	(0.030)	(0.010)
Minority	0.899	0.843***	0.813***	0.855***	0.875***
	(0.070)	(0.020)	(0.020)	(0.020)	(0.010)
Humanities	1.835*	1.091	0.987	1.431***	1.340***
	(0.440)	(0.060)	(0.040)	(0.110)	(0.030)

Science	1.318	0.984	0.864***	1.389***	1.184***
	(0.320)	(0.050)	(0.030)	(0.110)	(0.030)
Math	2.033**	1.258***	1.090*	1.380***	1.317***
	(0.490)	(0.070)	(0.040)	(0.110)	(0.030)
Education	2.479***	1.304***	1.062	1.508***	1.344***
	(0.600)	(0.070)	(0.050)	(0.130)	(0.040)
Business/Mgmt.	1.965**	1.285***	1.149***	1.828***	1.509***
	(0.470)	(0.060)	(0.040)	(0.140)	(0.040)
Health	1.754*	1.174***	1.025	1.516***	1.435***
	(0.430)	(0.050)	(0.040)	(0.110)	(0.030)
Vocational/Technical	1.564	1.141**	0.988	1.374***	1.297***
	(0.380)	(0.050)	(0.040)	(0.100)	(0.030)
2nd year undergrad	1.367**	1.475***	1.496***	1.663***	1.420***
	(0.150)	(0.050)	(0.040)	(0.040)	(0.020)
3rd year undergrad	1.501**	1.703***	1.923***	1.842***	1.608***
	(0.190)	(0.080)	(0.060)	(0.060)	(0.030)
4th year undergrad	1.651***	2.095***	2.066***	2.392***	2.011***
	(0.230)	(0.100)	(0.060)	(0.080)	(0.040)
5th year undergrad	2.155*	2.295***	2.134***	2.211***	2.000***
	(0.710)	(0.190)	(0.110)	(0.170)	(0.070)
Unclassified/Other	1.382**	1.167*	1.228***	1.439***	0.718***
	(0.150)	(0.070)	(0.070)	(0.090)	(0.020)
Exclusively part-time	0.748**	0.974	1.095***	1.086***	1.089***
	(0.070)	(0.030)	(0.030)	(0.030)	(0.020)
Mixed full-time and part-time	1.285**	1.077*	1.178***	1.271***	1.234***
	(0.120)	(0.040)	(0.030)	(0.030)	(0.020)
Part-time job	1.138	1.117**	1.140***	1.336***	1.092***
	(0.110)	(0.040)	(0.030)	(0.030)	(0.010)
Full-time job	1.463***	1.442***	1.511***	1.627***	1.356***
	(0.150)	(0.050)	(0.040)	(0.040)	(0.020)
Low-income	1.045	1.047	1.059**	1.090***	1.062***
	(0.080)	(0.030)	(0.020)	(0.020)	(0.010)
First-generation	1.027	1.005	0.995	0.950*	0.972*
	(0.070)	(0.030)	(0.020)	(0.020)	(0.010)
Veteran	1.149	1.210**	1.166***	0.979	1.071*
	(0.180)	(0.090)	(0.050)	(0.050)	(0.030)
With dependent/s	1.522***	1.401***	1.257***	1.184***	1.231***
	(0.140)	(0.050)	(0.030)	(0.030)	(0.020)
Married	1.365***	1.251***	1.349***	1.108***	1.187***
	(0.130)	(0.050)	(0.030)	(0.030)	(0.020)
Age	1.000	1.009***	1.012***	0.999	1.008***

	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Very selective	1.032	0.452***	0.505***	0.321***	0.382***
	(0.200)	(0.030)	(0.020)	(0.020)	(0.010)
Moderately selective	1.272	0.566***	0.662***	0.389***	0.470***
	(0.220)	(0.040)	(0.030)	(0.020)	(0.010)
Minimally selective	1.018	0.701***	0.790***	0.433***	0.535***
	(0.210)	(0.050)	(0.040)	(0.030)	(0.020)
Open admission	1.369	0.883	0.910	0.555***	0.730***
	(0.290)	(0.070)	(0.050)	(0.030)	(0.020)
2-year	1.471*	0.938	1.084*	0.437***	0.688***
	(0.270)	(0.060)	(0.040)	(0.020)	(0.020)
Less than 2-year	0.294***	0.588***	0.424***	0.110***	0.222***
	(0.090)	(0.050)	(0.030)	(0.010)	(0.010)
Attended more than one inst.	1.406**	1.285***	1.472***	0.466***	0.959*
	(0.160)	(0.070)	(0.040)	(0.020)	(0.020)
Private NFP	0.961	0.755***	0.655***	0.450***	0.578***
	(0.080)	(0.030)	(0.020)	(0.020)	(0.010)
Private FP	0.762	0.523***	0.596***	0.328***	0.565***
	(0.150)	(0.030)	(0.020)	(0.010)	(0.010)
Small/Mid-size city	1.115	1.090*	1.077**	1.135***	1.070***
	(0.110)	(0.040)	(0.030)	(0.030)	(0.020)
Large suburb	0.988	1.027	1.013	1.062*	1.020
	(0.110)	(0.040)	(0.030)	(0.030)	(0.020)
Small/Mid-size Suburb	1.382*	1.199**	0.991	1.134**	1.041
	(0.180)	(0.070)	(0.040)	(0.050)	(0.030)
Town	1.150	1.152**	1.145***	1.093**	1.081***
	(0.130)	(0.050)	(0.030)	(0.040)	(0.020)
Rural	0.986	1.184*	1.107**	1.138***	1.307***
	(0.200)	(0.090)	(0.040)	(0.040)	(0.030)
Not assigned	0.936	1.230*	0.935		0.787**
	(0.370)	(0.120)	(0.140)		(0.060)
Year: 2004					3.138***
					(0.12)
Year: 2008					5.440***
					(0.19)
Year: 2012					9.034***
					(o.33)
Constant	0.008***	0.064***	0.113***	0.260***	0.141***
	0.000	(0.010)	(0.010)	(0.020)	0.000
<u>All Online</u>					
Female	1.288**	1.222***	1.133**	1.530***	1.297***

	(0.120)	(0.050)	(0.040)	(0.050)	(0.030)
Minority	1.013	0.808***	0.733***	0.694***	0.741***
	(0.100)	(0.030)	(0.030)	(0.020)	(0.010)
Humanities	0.920	0.864	0.847*	0.902	0.966
	(0.210)	(0.070)	(0.070)	(0.100)	(0.040)
Science	0.954	0.829*	0.785**	1.071	1.037
	(0.210)	(0.070)	(0.070)	(0.120)	(0.050)
Math	0.861	1.044	1.133	0.778*	0.962
	(0.200)	(0.080)	(0.090)	(0.090)	(0.040)
Education	1.470	1.010	1.050	1.207	1.218***
	(0.320)	(0.090)	(0.100)	(0.150)	(0.060)
Business/Mgmt	1.286	1.302***	1.332***	1.468***	1.512***
	(0.270)	(0.080)	(0.100)	(0.160)	(0.060)
Health	1.206	0.969	0.998	0.826	1.021
	(0.270)	(0.060)	(0.070)	(0.090)	(0.040)
Vocational/Technical	1.072	1.009	1.079	0.947	1.110**
	(0.240)	(0.070)	(0.080)	(0.100)	(0.040)
2nd year undergrad	0.905	1.253***	0.898*	0.911*	0.873***
	(0.120)	(0.060)	(0.040)	(0.040)	(0.020)
3rd year undergrad	1.280	1.394***	1.265***	1.443***	1.125***
	(0.190)	(0.090)	(0.080)	(0.070)	(0.040)
4th year undergrad	2.104***	1.434***	1.308***	1.291***	1.104**
	(0.310)	(0.100)	(0.080)	(0.080)	(0.040)
5th year undergrad	1.863	1.470**	1.088	2.724***	1.481***
	(0.710)	(0.180)	(0.130)	(0.280)	(0.090)
Unclassified/Other	1.253	1.272**	0.971	1.002	0.792***
	(0.160)	(0.100)	(0.110)	(0.100)	(0.030)
Exclusively part-time	1.345**	1.369***	1.636***	1.437***	1.408***
	(0.140)	(0.060)	(0.070)	(0.050)	(0.030)
Mixed full-time and part-time	0.988	1.144*	1.179***	1.087*	1.100***
	(0.120)	(0.060)	(0.060)	(0.040)	(0.030)
Part-time job	1.465**	1.124*	0.902	0.985	0.917***
	(0.200)	(0.060)	(0.050)	(0.040)	(0.020)
Full-time job	2.326***	1.635***	1.920***	1.950***	1.675***
	(0.310)	(0.080)	(0.100)	(0.070)	(0.040)
Low-income	1.059	0.966	1.077	1.010	1.026
	(0.090)	(0.040)	(0.040)	(0.030)	(0.020)
First-generation	0.870	0.996	0.960	0.913**	0.939**
	(0.080)	(0.040)	(0.040)	(0.030)	(0.020)
Veteran	1.283	1.079	1.369***	0.956	1.102*
	(0.230)	(0.100)	(0.100)	(0.070)	(0.050)

With dependent/s	1.326**	1.599***	1.969***	1.656***	1.739***
	(0.140)	(0.070)	(0.080)	(0.060)	(0.040)
Married	1.636***	1.358***	1.880***	1.466***	1.510***
	(0.170)	(0.070)	(0.080)	(0.060)	(0.040)
Age	1.000	1.010***	1.030***	1.014***	1.019***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Very selective	0.546**	0.482***	0.329***	0.174***	0.231***
	(0.120)	(0.050)	(0.040)	(0.020)	(0.010)
Moderately selective	0.748	0.631***	0.566***	0.255***	0.332***
	(0.130)	(0.050)	(0.040)	(0.020)	(0.010)
Minimally selective	0.861	0.814*	0.748**	0.264***	0.380***
	(0.180)	(0.080)	(0.070)	(0.030)	(0.020)
Open admission	1.179	0.998	1.481***	0.419***	0.685***
	(0.250)	(0.100)	(0.130)	(0.040)	(0.030)
2-year	1.039	0.793**	0.831**	0.240***	0.397***
	(0.200)	(0.060)	(0.060)	(0.010)	(0.010)
Less than 2-year	0.484*	0.361***	0.167***	0.031***	0.097***
	(0.160)	(0.040)	(0.020)	(0.010)	(0.010)
Attended more than one inst.	2.399***	1.660***	1.796***	0.607***	1.068
	(0.310)	(0.110)	(0.110)	(0.040)	(0.040)
Private NFP	1.001	0.768***	1.171**	0.592***	0.809***
	(0.120)	(0.050)	(0.070)	(0.040)	(0.030)
Private FP	0.429**	1.118	3.161***	0.612***	1.442***
	(0.120)	(0.080)	(0.210)	(0.040)	(0.050)
Small/Mid-size city	1.345*	0.950	0.900*	0.902**	0.851***
	(0.160)	(0.050)	(0.040)	(0.040)	(0.020)
Large suburb	1.110	0.923	1.002	0.777***	0.814***
	(0.150)	(0.050)	(0.050)	(0.030)	(0.020)
Small/Mid-size Suburb	1.459*	1.110	1.033	1.145	1.025
	(0.260)	(0.100)	(0.100)	(0.090)	(0.050)
Town	1.523**	0.995	1.231***	1.298***	1.105**
	(0.200)	(0.060)	(0.080)	(0.070)	(0.030)
Rural	1.248	1.334**	1.173*	1.163**	1.189***
	(0.300)	(0.130)	(0.070)	(0.060)	(0.040)
Not assigned	0.813	1.454**	0.902		1.140
	(0.480)	(0.200)	(0.210)		(0.130)
Year: 2004					2.101***
					(0.10)
Year: 2008					1.603***
					(0.08)
Year: 2012					3.702***

					(0.17)
Constant	0.006***	0.032***	0.016***	0.159***	0.063***
	0.000	0.000	0.000	(0.020)	0.000

* p<0.05, ** p<0.01, *** p<0.001

Reference Groups: Male, White, Undeclared, First Year, Full-time, No job, Not low-income, Not first-generation, Not a veteran, No dependents, Not married, Not public or private NFP, 4-year, Public, Large City

Profile of Postsecondary Online Student in 2000

Some Online Courses

Students from certain academic majors were more likely to engage with online education when compared to their peers who identified as "undeclared" postsecondary students. Those students from Humanities ($p < .05$), Math ($p < .01$), Education ($p < .001$), Business ($p < .01$), and Health ($p < .05$) majors had an increased likelihood to enroll in some online courses. For instance, the estimated odds of enrolling in some online courses were 83.5% higher for Humanities majors when compared to "undeclared" postsecondary students.

When compared to first-year postsecondary students, upperclassmen were found to be more likely to engage with some online courses. Second-year students ($p < .01$), Third-year students ($p < .01$), Fourth-year students ($p < .001$), and Fifth-year students ($p < .05$) were more likely to enroll in some online courses relative to first-year students. For example, the estimated odds of enrolling in some online courses increased by 65.1% ($p < .001$) for fourth-year students when compared to first-year students. Part-time students were not as likely to enroll in some online courses when compared to full-time students. More specifically, when compared to full-time students, the estimated odds of enrolling in some online courses were 74.8% ($p < .01$) higher for part-time students.

Additionally, the estimated odds of enrolling in some online courses were 46.3% ($p < .001$) higher for students working a full-time job when compared to students without a job, 52.2% ($p < .001$) higher for students with dependents when compared to students without dependents, and 36.5% ($p < .001$) higher for those postsecondary students who were married. When compared to students enrolled at four-year institutions, the estimated odds of engaging with some online courses increased by 47.1% ($p < .05$) for students enrolled at two-year institutions and decreased by 70.6% ($p < .001$) for students at less-than-two-year institutions. The estimated odds of enrolling in some online courses were 40.6% ($p < .01$) higher for students who attended more than one institution when compared to students enrolled at four-year institutions.

Online-Only Program

For female students, the estimated odds of enrolling in an online-only program were 28.8% ($p < .01$) higher relative to their male peers. When compared to first-year students, only fourth-year students were significantly more likely to enroll in an online-only program. As expected, students who were employed, whether on a part-time or full-time basis, were more likely to take all of their courses online. More specifically, the estimated odds of enrolling in all online courses were increased by 46.5% ($p < .01$) for students with a part-time job and 132.6% ($p < .001$) for students with a full-time job relative to their peers without a job.

The estimated odds of enrolling in an online-only program were 32.6% ($p < .001$) higher for students with dependents, 63.6% ($p < .001$) higher for those postsecondary students who were married, and 45.4% ($p < .01$) lower for students at “very selective” institutions. When compared to students attending four-year institutions, the estimated odds of taking all online courses decreased by 51.6% ($p < .05$) for students at less-than-two-year institutions, but the

estimated odds of enrolling in an online-only program increased by 139.9% ($p < .001$) for students who attended more than one institution. Surprisingly, the estimated odds of enrolling in an online-only program were 57.1% ($p < .01$) lower for students who attended for-profits when compared to students attending public colleges and universities, but the proportion of students at for-profits from the overall sample was very small in 2000.

Profile of Postsecondary Online Student in 2004

Some Online Courses

Male students and minorities were found to be less likely to enroll in some online courses when compared to their peers. The estimated odds of engaging with some online courses were 23.6% ($p < .001$) higher for female students when compared to their male peers, but the estimated odds of enrolling in some online courses were 15.7% ($p < .001$) lower for minority students relative to White students. Students from a variety of academic majors were also found to have statistically significant differences regarding their likelihood to engage with some online courses. Postsecondary students from Math ($p < .001$), Education ($p < .001$), Business ($p < .001$), Health ($p < .001$), and Vocational or Technical ($p < .01$) majors were found to be more likely to enroll in some online courses relative to "undeclared" students.

Similar to the profile of students in 2000, second-year students ($p < .001$), third-year students ($p < .001$), fourth-year students ($p < .001$), and fifth-year students ($p < .001$) were found to be more likely to enroll in some online courses relative to first-year students. When compared to students without a job, the estimated odds of engaging with some online education were 11.7% ($p < .01$) higher for students with a part-time job and 44.2% ($p < .001$) higher for students who worked full-time. In addition, the estimated odds of enrolling in some online courses were

21.0% ($p < .01$) higher for veterans, 40.1% ($p < .001$) higher for students with dependents, and 25.1% ($p < .001$) higher for students who were married.

When compared to students attending four-year institutions, the estimated odds of enrolling in some online courses decreased by 41.2% ($p < .001$) for students at less-than-two-year institutions and increased by 28.5% ($p < .001$) for students who attended more than one college or university. Students attending both private, not-for-profit ($p < .001$) and for-profit institutions ($p < .001$) were less likely to enroll in some online courses relative to their peers attending public institutions. The locale or degree of urbanization of the college or university also appeared to play a role in the decision to engage with online education. Students who attended higher education institutions located in small or mid-size cities ($p < .05$), small or mid-size suburbs ($p < .01$), towns ($p < .01$), and rural areas ($p < .05$) were more likely to enroll in some online courses when compared to their peers attending an institution located within a large city.

Online-Only Program

Similar to the profile of students who enrolled in some online courses during 2004, both males and minorities were less likely to take all of their courses online. More specifically, the estimated odds of enrolling in an online-only program were 22.2% ($p < .001$) higher for female students, but the estimated odds of enrolling in all online courses were 19.2% ($p < .001$) lower for minority students. When compared to "undeclared" students, the estimated odds of enrolling in an online-only program increased by 30.2% ($p < .001$) for Business students and decreased by 17.1% for Science majors ($p < .05$). First-year students were less likely to enroll in all online courses relative to second-year students ($p < .001$), third-year students ($p < .001$), fourth-year students($p < .01$), and fifth-year students ($p < .01$).

Exclusively full-time students were also less likely to enroll in an online-only program of study. The estimated odds of enrolling in all online courses increased by 36.9% ($p < .001$) for part-time students and 14.4% ($p < .05$) for students who were a mixture of full-time and part-time status. Similar to 2000, the estimated odds of enrolling in an online-only program were 12.4% ($p < .05$) higher for students with a part-time job, 63.5% ($p < .001$) higher for students with a full-time job, 59.9% ($p < .001$) higher for students with dependents, and 35.8% ($p < .001$) higher for students who were married. Students who attended institutions with any degree of selectivity were less likely to enroll in all online courses. More specifically, the estimated odds of enrolling in an online-only program were 51.8% ($p < .001$) lower for postsecondary students who attended a very selective institution, 36.9% ($p < .001$) lower for students at moderately selective institutions, and 18.6% ($p < .05$) lower for students at minimally selective colleges and universities. Finally, the estimated odds of enrolling in all of their courses online were increased by 33.4% ($p < .01$) for those students who attended a college or university located within a Rural area.

Profile of Postsecondary Online Student in 2008

Some Online Courses

The estimated odds of enrolling in some online courses were 16.2% ($p < .001$) higher for female students when compared to their male peers, but the estimated odds of enrolling in some online courses were 18.7% ($p < .001$) lower for minority students when compared to White students. Once again, Business majors were more likely to enroll in some online courses, but Science majors were deemed less likely to engage with online education. Relative to "undeclared" students, the estimated odds of enrolling in some online courses were increased by

14.9% ($p < .001$) for postsecondary students who majored in Business were 14.9% ($p < .001$), but the estimated odds of enrolling in some online courses decreased by 13.6% ($p < .001$) for students who majored in Science.

Similar to previous years, second-year students ($p < .001$), third-year students ($p < .001$), fourth-year students ($p < .001$), and fifth-year students ($p < .001$) were more likely to enroll in some online courses when compared to first-year students. Students with any type of job were more likely to engage with online education. More specifically, when compared to students without a job, the estimated odds of engaging with some online education were 14.0% ($p < .01$) higher for students with a part-time job and 51.1% ($p < .001$) higher for students with a full-time job.

The estimated odds of enrolling in some online courses were 16.6% ($p < .001$) higher for veterans, 25.7% ($p < .001$) higher for students with dependents, and 34.9% ($p < .001$) higher for students who were married. When compared to students at four-year institutions, the estimated odds of engaging with some online education were 8.4% ($p < .05$) higher for students who attended two-year institutions, 57.6% ($p < .001$) lower for students at less-than-two-year institutions, and 47.2% ($p < .001$) higher for students who attended more than one institution. Students at public institutions were also more likely to enroll in some online courses. Relative to students at public colleges and universities, the estimated odds of enrolling in some online courses were decreased by 34.5% ($p < .001$) for postsecondary students at private, not-for-profit institutions and 40.4% ($p < .001$) for students at for-profit institutions.

The likelihood of enrolling in some online courses was also lower for students at selective colleges and universities. The estimated odds of enrolling in some online courses were 49.5% ($p < .001$) lower for students attending very selective institutions, 33.8% ($p < .001$) lower

for students at moderately selective institutions, and 21.0% ($p < .001$) lower for students who were enrolled at minimally selective institutions. Finally, the locale of the institution appeared to have an effect on the likelihood of student to engage with online education. Relative to students attending a college or university located within a large city, students at institutions located within a small or mid-size city, town, or rural area were more likely to enroll in some online courses. For instance, when compared to students at an institution located within a large city the estimated odds of enrolling in some online courses were 10.7% ($p < .01$) higher for students enrolled at institutions located in a rural area.

Online-Only Program

Once again, both males and minorities were less likely to enroll in an online-only program. The estimated odds of enrolling in an online-online program were 13.3% ($p < .001$) higher for female students were 13.3% ($p < .001$), but the estimated odds of enrolling in all online courses were 26.7% ($p < .001$) lower for minority students. When compared to students who did not declare a major, the estimated odds of enrolling in all online courses were increased by 33.2% ($p < .001$) for students who majored in Business, decreased by 15.3% ($p < .05$) for Humanities majors, and decreased by 21.5% ($p < .01$) for students who majored in Science. Relative to first-year students, the estimated odds of enrolling in an online-only program were 10.2% ($p < .05$) lower for second-year students, but the estimated odds of enrolling in all online courses were 26.5% ($p < .001$) higher for third-year students and 30.8% ($p < .001$) greater for fourth-year students.

Exclusively full-time students were less likely to enroll in all online courses. When compared to exclusively full-time students, the estimated odds of enrolling in an online-only program were increased by 63.6% ($p < .001$) for part-time students and 17.9% ($p < .001$) for

students who were a mixture of full-time and part-time status. The estimated odds of enrolling in all online courses were 92.0% ($p < .001$) greater for students with a full-time job relative to their peers without a job. In addition, the estimated odds of enrolling in an online-only program were 36.9% ($p < .001$) higher for veterans, 96.9% ($p < .001$) higher for students with dependents, and 88.0% ($p < .001$) higher for students who were married.

Similar to previous years, students attending institutions with any degree of selectivity were less likely to enroll in all online courses. The estimated odds of enrolling in an online-only program were 67.1% ($p < .001$) lower for postsecondary students at very selective institutions, 43.4% ($p < .001$) lower for students at moderately selective institutions, and 25.2% ($p < .01$) lower for students at minimally selective institutions. In contrast, the estimated odds of enrolling in all online courses were 48.1% ($p < .001$) higher for postsecondary students at open-admission institutions. When compared to students at four-year institutions, the estimated odds of enrolling in an online-only program decreased by 16.9% ($p < .01$) for students at two-year institutions and 83.3% ($p < .001$) for students at less-than-two-year institutions.

Relative to students at institutions located within a large city, the estimated odds of enrolling in all online courses were 10.0% ($p < .001$) lower for students attending institutions within a small or mid-size city, 23.1% ($p < .001$) higher for students at institutions within a town, and 17.3% ($p < .001$) higher for students who were enrolled at institutions located within a rural area. Unlike findings reported in 2000 and 2004, students at public institutions were less likely to enroll in all online courses. More specifically, when compared to students at public colleges and universities, the estimated odds of enrolling in an online-only program increased by 17.1% ($p < .001$) for students at private, not-for-profit institutions and increased by 216.1% ($p < .001$) for students at for-profit institutions.

Profile of Postsecondary Online Student in 2012

Some Online Courses

The estimated odds of enrolling in some online courses were 25.7% ($p < .001$) higher for female students relative to their male peers, but the estimated odds of engaging with some online education were 14.5% ($p < .001$) lower for minority students when compared to White students. "Undeclared" students were found to be less likely to enroll in some online courses. Postsecondary students who majored in Humanities ($p < .001$), Science ($p < .001$), Math ($p < .001$), Education ($p < .001$), Business ($p < .001$), Health ($p < .001$), and Vocational or Technical areas of study ($p < .001$) were more likely to engage with some online education relative to "undeclared" students. First-year students were also less likely to enroll in some online courses when compared to second-year students ($p < .001$), third-year students ($p < .001$), fourth-year students ($p < .001$), and fifth-year students ($p < .001$).

When compared to exclusively full-time students, the estimated odds of enrolling in some online courses were increased by 8.6% ($p < .001$) for part-time students and increased by 27.1% ($p < .001$) for students who were a mixture of part-time and full-time status. Students with a job were also more likely to enroll in some online courses. Relative to student without a job, the estimated odds of engaging with some online education were 33.6% ($p < .001$) greater for postsecondary students with a part-time job and 62.7% ($p < .001$) greater for students with a full-time job. The estimated odds of enrolling in some online courses were 9.0% ($p < .001$) higher for low-income students, 5.0% ($p < .05$) lower for first-generation students, 18.4% ($p < .001$) higher for students with dependents, and 10.8% ($p < .001$) higher for students who were married.

Similar to previous years, students at selective colleges and universities were less likely to enroll in some online courses. The estimated odds of enrolling in some online courses were

67.9% ($p < .001$) lower for students at very selective institutions, 61.1% ($p < .05$) lower for students at moderately selective institutions, and 56.7% ($p < .001$) lower for students at minimally selective institutions. When compared to students at four-year institutions, students at two-year institutions ($p < .001$), students at less-than-two-year institutions ($p < .001$), and students who attended more than one institution ($p < .001$) were less likely to engage with some online courses.

Relative to students at public institutions, the estimated odds of enrolling in some online courses were 55.0% ($p < .001$) lower for students at private, not-for-profit institutions and 67.2% ($p < .001$) lower for students at private, for-profit institutions. Finally, students enrolled at institutions located within a large city were less likely to engage with some online courses when compared to students at institutions located in a small or mid-size city ($p < .001$), large suburb ($p < .05$), small or mid-size suburb ($p < .01$), town ($p < .01$), or rural area ($p < .001$).

Online-Only Program

Similar to 2004 and 2008, both male students and minorities were less likely to enroll in all online courses. The estimated odds of enrolling in an online-only program were 53.0% ($p < .001$) higher for female students and 30.6% ($p < .001$) lower for minority students. Two major areas of study were significantly different when compared to students who did not declare a major. Relative to undeclared students, the estimated odds of enrolling in all online courses were increased by 46.8% ($p < .001$) for Business majors, but the estimated odds of enrolling in all online courses actually decreased by 22.2% ($p < .05$) for Math majors. When compared to first-year students, the estimated odds of enrolling in all online courses were 8.9% ($p < .05$) lower for second-year students, 44.3% ($p < .001$) higher for third-year students, 29.1% ($p < .001$) higher for fourth-year students, and 172.4% ($p < .001$) higher for fifth-year students.

Part-time students and students who were a mixture of part-time and full-time were more likely to enroll in all online courses. The estimated odds of enrolling in an online-only program were 95.0% ($p < .001$) higher for students with a full-time job compared to students without a job. In addition, the estimated odds of enrolling in all online courses were 8.7% ($p < .01$) lower for first-generation students, 65.6% ($p < .001$) higher for students with dependents, and 46.6% ($p < .001$) higher for students who were married. Similar to previous years, students who attended institutions with any degree of selectivity were less likely to take all of their courses online. The estimated odds of enrolling in all online courses were 82.6% ($p < .001$) lower for postsecondary students at very selective institutions, 74.5% ($p < .001$) lower for students at moderately selective institutions, and 73.6% ($p < .001$) lower for students at minimally selective institutions.

Students at four-year institutions were more likely to enroll in an online-only program when compared to their peers. The estimated odds of enrolling in all online courses were 76.0% ($p < .01$) lower for students at two-year institutions, 96.9% ($p < .001$) lower for students at less-than-two-year institutions, and 39.3% ($p < .001$) lower for students who attended more than one institution. Surprisingly, the likelihood of students at for-profits enrolling in all online courses decreased substantially since 2008. When compared to students enrolled at public institutions, the estimated odds of enrolling in all online courses were 38.8% ($p < .001$) lower for students at for-profit institutions. Additionally, the estimated odds of enrolling in all online courses were 40.8% ($p < .001$) lower for students at private, not-for-profit institutions when compared to students enrolled at public institutions. Relative to students attending an institution located within a large city, students at colleges or universities within a small or mid-size city ($p < .01$) and large suburb ($p < .001$) were less likely to enroll in all online courses, but students at

institutions located within a town ($p < .001$) or rural area ($p < .01$) were more likely to enroll in all of their courses online.

Because several of my hypotheses suggest the profile of online learners has changed over time, my results thus far have been reported by each year. In order to provide the profile of online learners throughout the period of time examined in this study, I will also include findings related to a pooled profile of postsecondary online students.

Pooled Profile of Postsecondary Online Student

Some Online Courses

The estimated odds of enrolling in some online courses were increased by 16.5% ($p < .001$) for female students, but the estimated odds of enrolling in some online courses were decreased by 12.5% ($p < .001$) for minority students. Students who had yet to declare a major were less likely to enroll in some online courses when compared to Humanities ($p < .001$), Science ($p < .001$), Math ($p < .001$), Education ($p < .001$), Business ($p < .001$), and Health ($p < .001$) majors. Additionally, first-year students were less likely to engage with some online education when compared to second-year ($p < .001$), third-year ($p < .001$), fourth-year ($p < .001$), and fifth-year students ($p < .001$). Students who were enrolled full-time were also less likely to enroll in some online courses. When compared to exclusively full-time students, the estimated odds of engaging with some online education were 8.9% ($p < .001$) higher for part-time students and 23.4% ($p < .001$) higher for students who were classified as both part-time and full-time students.

As expected, students with a job were more likely to enroll in some online courses. Relative to students without a job, the estimated odds of enrolling some online courses were

increased by 9.2% ($p < .001$) for students with a part-time job were 9.2% ($p < .001$) and increased by 35.6% ($p < .001$) for students with a full-time job. The estimated odds of enrolling in some online courses were 6.2% ($p < .001$) higher for low-income students, 2.8% ($p < .05$) lower for first-generation students, 7.1% ($p < .05$) lower for veterans, 23.1% ($p < .001$) higher for students with dependents, and 18.7% ($p < .001$) higher for students who were married.

Similar to findings for 2004, 2008, and 2012, students at colleges or universities with any degree of selectivity were less likely to enroll in some online courses. The estimated odds of enrolling in some online courses were 61.8% ($p < .001$) lower for students at very selective institutions, 53.0% ($p < .001$) lower for students who attended moderately selective institutions, and 46.5% ($p < .001$) lower for students at minimally selective institutions. Students at four-year institutions and public colleges and universities were also less likely to enroll in some online courses. Relative to students at four-year institutions, the estimated odds of enrolling in some online courses were 31.2% ($p < .001$) lower for students at two-year institutions, 77.8% ($p < .001$) lower for students at less-than-two-year institutions, and 4.1% ($p < .05$) lower for students who attended more than one institution. When compared to students at public colleges and universities, the estimated odds of enrolling in some online courses were 42.2% ($p < .001$) lower for students attending private, not-for-profit institutions and 43.5% ($p < .001$) lower for students at for-profit institutions.

Postsecondary students enrolled at institutions located within a large city were less likely to enroll in some online courses. Relative to students at colleges and universities located within a large city, the estimated odds of enrolling in some online courses were 7.0% ($p < .001$) higher for students at institutions located within a small or mid-size city, 8.1% ($p < .001$) higher for

students at institutions located in a town, and 30.7% ($p < .001$) higher for students at institutions located in a rural area.

Online-Only Program

Once again, male students and minorities were less likely to enroll in all online courses. The estimated odds of enrolling in an online-only program were increased by 29.7% ($p < .001$) for female students and decreased by 25.9% ($p < .001$) for minority students. Relative to undeclared students, the estimated odds of enrolling in all online courses were 21.8% ($p < .001$) higher for Education majors, 51.2% ($p < .001$) higher for students who majored in Business, and 11.0% ($p < .01$) higher for Vocational or Technical majors. When compared to first-year students, second-year students were less likely to enroll in all online courses, but third-year, fourth-year, and fifth-year students were more likely to take all of their courses online. The estimated odds of enrolling in an online program were 12.7% ($p < .001$) lower for second-year students relative to first-year students. In contrast, when compared to first-year students, the estimated odds of enrolling in all online courses were 12.5% ($p < .001$) higher for third-year students were 12.5% ($p < .001$), 10.4% ($p < .001$) higher for fourth-year students, and 48.1% ($p < .001$) higher for fifth-year students.

When compared to exclusively full-time students, the estimated odds of enrolling in an online-only degree program were increased by 40.8% ($p < .001$) for part-time students and increased by 10.0% ($p < .001$) for students who were enrolled as part-time and full-time students during the same academic year. Relative to students without a job, the estimated odds of enrolling in all online courses were 8.3% ($p < .001$) lower for students with a part-time job and 67.5% ($p < .001$) higher for students with a full-time job. In addition, the estimated odds of enrolling in all online courses were 6.1% ($p < .01$) lower for first-generation students, 10.2% (p

< .05) higher for veterans, 73.9% ($p < .001$) higher for students with dependents, and 51.0% ($p < .001$) higher for students who were married. Students at selective institutions were once again less likely to take all of their courses online. The estimated odds of enrolling in an online-only degree program were 76.9% ($p < .001$) lower for postsecondary students at very selective institutions, 66.8% ($p < .001$) lower for students at moderately selective institutions, and 62.0% ($p < .001$) lower for students at minimally selective institutions.

Students at four-year institutions are more likely to enroll in all online courses, but the likelihood of students at public colleges and universities enrolling in an online-only program appeared to depend on whether the comparison group of private institutions is for-profit or not-for-profit. Relative to students at four-year institutions, the estimated odds of enrolling in all online courses were 60.3% ($p < .001$) lower for students at two-year institutions and 90.3% ($p < .001$) lower for students at less-than-two-year institutions. When compared to students at public colleges and universities, the estimated odds of enrolling in all online courses were 19.1% ($p < .001$) lower for students at private, not-for-profit institutions but 44.2% ($p < .001$) higher for students at for-profit institutions. Finally, the locale or degree of urbanization of the institution appeared to be a significant predictor of the likelihood of a student to enroll in all online courses. Postsecondary students at institutions within a small or mid-size city and large suburb were less likely to enroll in all online courses, but students at colleges or universities within a town or rural area were more likely to enroll in an online-only degree program.

Part Two

For Part Two of this section, I will provide empirical findings examining the effect of online enrollment on three-year degree completion, six-year degree completion, GPA across higher

education institution types. I also provide evidence associated with the impact of online enrollment on the estimated odds of community college students transferring to another institution. Additional results related to the impact of a variety of student and institutional characteristics on these academic outcomes will also be reported. All findings should be interpreted as relationships between variables given that all other independent variables in the model, such as online enrollment, are held constant. The complete set of multinomial logistic regression tables, which includes separate tables for the odds ratios of each academic outcome, for Part Two of this dissertation can be found in Appendix B.

Three-Year Credential Completion

Less-Than-Two-Year Institutions

As shown in Table 5, when compared to students at less-than-two year institutions who did not take an online course, the estimated odds of earning a Certificate within three years were 54.2% ($p < .05$) lower for students at less-than-two year institutions who were enrolled in some online courses. Postsecondary students at less-than-two-year institutions who enrolled in all online courses did not show a statistically significant difference regarding the odds of earning a Certificate within three years. Students who majored in Science and Education were less likely to earn their Certificate when compared to "undeclared" students. More specifically, the estimated odds of earning a Certificate within three years were 45.4% ($p < .05$) lower for Science majors and 47.4% ($p < .01$) lower for Education majors relative to their peers who did not select a major. Part-time students at less-than two-year institutions were also less likely to earn a Certificate within three years as the estimated odds of

earning a Certificate within three years decreased by 45.6% ($p < .01$) for part-time students when compared to exclusively full-time students.

Table 5: Odds Ratios of Earning a Credential Within Three Years

Three-Year Credential Completion				
	Two-Year	Four-Year	Less-than-two	Pooled
	b	b	b	b
	(se)	(se)	(se)	(se)
Certificate				
Some online	1.090	2.293	0.458*	0.905
	(0.23)	(1.06)	(0.17)	(0.16)
All online	0.838	1.273	1.180	0.988
	(0.26)	(0.97)	(0.47)	(0.22)
Associate's				
Some online	1.271*	1.420		1.317*
	(0.17)	(0.37)		(0.16)
All online	1.002	2.179*		1.315
	(0.21)	(0.69)		(0.23)

* p<0.05, ** p<0.01, *** p<0.001

Reference category: No online

Community Colleges

Community college students who enrolled in some online courses or an online-only program did not have a statistically significant difference in their likelihood to obtain a Certificate relative to those students who only engage with courses residentially. The academic major of community college students also had a significant impact on the likelihood of obtaining a Certificate within three years. The estimated odds of community college students earning a Certificate within three years were 47.9% ($p < .01$) lower for Science majors, 50.9% ($p < .05$) lower for Math majors, 47.7% ($p < .01$) lower for Education majors, 71.7% ($p < .001$) higher for Business majors, and 38.7% ($p < .05$) higher for Health majors.

In addition, the estimated odds of community college students earning a Certificate within three years were 22.9% ($p < .05$) lower for low-income community college students, but the estimated odds of community college students earning a Certificate within three years were actually 33.3% ($p < .05$) higher for first-generation community college students when compared to their peers. Relative to exclusively full-time community college students, the estimated odds of community college students obtaining a Certificate within three years were decreased by 47.5% ($p < .001$) for part-time community college students.

The estimated odds of earning an Associate's degree within three years were 27.1% ($p < .05$) higher for community college students who enrolled in some online courses when compared to community college students who only enrolled in face-to-face courses, but there was no statistically significant difference in the likelihood to obtain an Associate's degree within three years when comparing face-to-face and online-only community college students. The estimated odds of obtaining an Associate's degree within three years were increased by 35.5% ($p < .001$) for female community college students, but the estimated odds of obtaining an Associate's degree within three years were actually decreased by 42.5% ($p < .001$) for underrepresented minorities. A variety of academic majors were more likely to complete an Associate's degree when compared to "undeclared" students. The estimated odds of community college student earning an Associate's degree within three years were 48.0% ($p < .01$) higher for Humanities majors, 83.4% ($p < .001$) higher for Science majors, 66.3% ($p < .01$) higher for Math majors, 64.7% ($p < .001$) higher for Education majors, and 68.1% ($p < .001$) higher for Health majors.

First-generation community college students ($p < .05$) and community college students ($p < .05$) who transferred were more likely to earn an Associate's degree within three years.

Community college students with a full-time job, with dependents, and part-time enrollment status were less likely to obtain an Associate's degree within three years. More specifically, the estimated odds of earning an Associate's degree within three years were 42.2% ($p < .001$) lower for community college students with a full-time job, 26.8% ($p < .05$) lower for community college students with dependents, 76.1% ($p < .001$) lower for exclusively part-time community college students, and 29.6% ($p < .01$) lower for community college students who were a mixture of part-time and full-time enrollment status.

Four-Year Institutions

Students at four-year institutions who enrolled in some or all online courses did not have a statistically significant difference in their likelihood to earn a Certificate within three years when compared to students who did not engage with online education. Students who attended four-year institutions and transferred to another institution were much more likely ($p < .001$) to obtain a Certificate within three years relative to their peers who did not transfer.

The estimated odds of earning an Associate's degree within three years were 117.9% ($p < .05$) higher for students at four-year institutions who enrolled in an online-only program were 117.9% ($p < .05$) relative to those students who only enrolled in face-to-face courses, but there was no statistically significant difference in the likelihood to obtain an Associate's degree within three years when comparing face-to-face students and students who only enrolled in some online courses. As expected, the estimated odds of obtaining an Associate's degree within three years were 45.4% ($p < .001$) lower for underrepresented minority students at four-year institutions when compared to their White and Asian peers. Both Health majors ($p < .001$) and first-generation students ($p < .001$) at four-year institutions were more likely to earn an Associate's degree relative to "undeclared" students and

non-first-generation students, respectively. In contrast, when compared to exclusively full-time students at four-year institutions, the estimated odds of earning an Associate's degree within three years were 72.4% ($p < .001$) lower for exclusively part-time students and 47.7% ($p < .001$) lower for students who were a mixture of part-time and full-time enrollment status were 47.7% ($p < .001$) less likely to earn an Associate's degree when compared to exclusively full-time students. Finally, students at for-profit institutions ($p < .01$) were more likely to earn an Associate's degree relative to students at not-for-profit institutions, but students at very selective and moderately selective were less likely to earn an Associate's degree within three years.

All Institution Types

When all institution types were included in the pooled analysis, enrolling in some or all online courses did not make a statistically significant difference in the likelihood of postsecondary students to earn a Certificate within three years relative to their peers who did not engage with online education. The estimated odds of students at all institution types earning a Certificate within three years were 42.5% ($p < .01$) lower for Humanities majors, 47.2% ($p < .001$) lower for Science majors, 39.4% ($p < .05$) lower for Math majors, 48.1% ($p < .001$) lower for Education majors, and 36.1% ($p < .01$) higher for Business majors. In addition, the estimated odds of students at all institution types earning a Certificate within three years were increased by 28.9% ($p < .01$) for first-generation students, decreased by 47.3% ($p < .001$) for part-time students, and increased by 37.0% ($p < .001$) for students who transferred.

A variety of institutional characteristics also made a significant difference in the likelihood of postsecondary students to obtain a Certificate within three years. The estimated odds of earning a Certificate within three years were 32.5% ($p < .01$) higher for students at for-profit institutions, 79.2% ($p < .001$) lower for students at very selective institutions, and 69.9%

($p < .001$) lower for students at moderately selective institutions. As one would expect, students at community colleges ($p < .001$) and less-than-two-year institutions ($p < .001$) were more likely to obtain a Certificate within three years relative to students at four-year institutions.

When compared to students across institution types who did not enroll in an online course, the estimated odds of earning an Associate's degree within three years were 31.7% ($p < .05$) higher for postsecondary students who enrolled in some online courses, but there was no statistically significant difference in the likelihood to obtain an Associate's degree within three years when comparing face-to-face and online-only students at all institution types. The estimated odds of obtaining an Associate's degree within three years were increased by 23.7% ($p < .01$) for female students, but the estimated odds of obtaining an Associate's degree within three years were actually decreased by 42.4% ($p < .001$) for underrepresented minority students. Additionally, students who majored in Science ($p < .001$), Math ($p < .05$), Education ($p < .001$), and Health ($p < .001$) were more likely to earn an Associate's degree relative to students who did not declare a major.

First-generation students ($p < .001$) and students who transferred ($p < .001$) were also more likely to obtain an Associate's degree within three years. Similar to community college students, students across institution types with a full-time job, with dependents, and part-time enrollment status were less likely to obtain an Associate's degree within three years. The estimated odds of earning an Associate's degree within three years were 44.1% ($p < .001$) lower for students with a full-time job, 30.4% ($p < .01$) lower for students with dependents, 73.9% ($p < .001$) lower for exclusively part-time community college students, and 30.7% ($p < .001$) lower for students who were a mixture of part-time and full-time enrollment status.

Institutional characteristics for students at all institution types made a significant difference in the likelihood of postsecondary students to earn an Associate's degree within three years. The estimated odds of obtaining an Associate's degree within three years were 62.3% ($p < .001$) higher for students at for-profit institutions, 93.8% ($p < .001$) lower for students at very selective institutions, 88.6% ($p < .001$) lower for students at moderately selective institutions, and 51.1% ($p < .001$) lower for students at minimally selective institutions. As expected, students at community colleges ($p < .001$) were more likely and students at less-than-two-year institutions ($p < .001$) were much less likely to earn an Associate's degree within three years when compared to students at four-year institutions.

Six-Year Credential Completion

Community Colleges

Similar to the outcome when examining three-year credential completion, Table 6 reveals no statistically significant difference in the likelihood of earning a Certificate within six years for community college students who enrolled in some or all online courses when compared to their peers who only enrolled in face-to-face courses. When compared to White and Asian community college students, the estimated odds of obtaining a Certificate within six years were 23.4% ($p < .01$) lower for underrepresented minorities at community colleges. Science majors ($p < .01$), Math majors ($p < .01$), and Education majors ($p < .01$) were less likely to obtain a Certificate within six years, but Business majors ($p < .01$) and Health majors ($p < .05$) were more likely to earn a Certificate relative to "undeclared" students. The estimated odds of earning a Certificate within six years were 19.7% ($p < .05$) lower for low-income community college students, but the estimated odds of earning a Certificate within six years were actually

32.6% ($p < .05$) higher for first-generation community college students. In addition, the estimated odds of earning a Certificate within six years were 51.8% ($p < .001$) higher for community college students who transferred, 27.1% ($p < .05$) higher for community college students with dependents, 28.3% ($p < .01$) lower for exclusively part-time community college students.

Table 6: Odds Ratios of Earning a Credential Within Six Years

Six-Year Credential Completion			
	Two-Year	Four-Year	Pooled
	b	b	b
	(se)	(se)	(se)
Certificate			
Some online	0.950	2.234*	0.927
	(0.19)	(0.79)	(0.15)
All online	1.037	0.900	1.041
	(0.26)	(0.56)	(0.20)
Associate's			
Some online	1.305*	1.468	1.292*
	(0.17)	(0.37)	(0.15)
All online	1.011	1.648	1.149
	(0.20)	(0.53)	(0.19)
Bachelor's			
Some online	1.246	0.999	1.128
	(0.22)	(0.16)	(0.12)
All online	1.234	0.831	1.066
	(0.30)	(0.17)	(0.16)

* p<0.05, ** p<0.01, ***p<0.001

Reference category: No online

When compared to community college students who enrolled in no online courses, the estimated odds of earning an Associate's degree within six years were 30.5% ($p < .05$) higher for community college students who enrolled in some online courses, but there was

no statistically significant difference in the odds of obtaining an Associate's degree within six years when comparing residential students to students who enrolled in all online courses. Female students, students who transferred, and first-generation students were more likely to earn an Associate's degree when compared to their peers. The estimated odds of earning an Associate's degree within six years were 31.4% ($p < .001$) higher for female community college students, 25.4% ($p < .01$) higher for community college students who transferred, and 25.7% ($p < .01$) higher for first-generation community college students. Students who majored in Humanities ($p < .001$), Science ($p < .001$), Math ($p < .05$), Education ($p < .001$), Business ($p < .001$), and Health ($p < .001$) were also more likely to obtain an Associate's degree within six years when compared to "undeclared" students.

In contrast, underrepresented minorities, low-income students, students with a full-time job, and part-time students were less likely to earn an Associate's degree within six years. The estimated odds of obtaining an Associate's degree within six years were 40.9% ($p < .001$) lower for underrepresented minorities, 33.5% ($p < .001$) lower for community college students with a full-time job, 51.4% ($p < .001$) lower for exclusively part-time community college students, and 37.3% ($p < .01$) lower for community college students who were a mixture of part-time and full-time enrollment status.

For community college students, there was no statistically significant difference in the likelihood of obtaining a Bachelor's degree within six years when comparing residential students to students who enrolled in some or all online courses. Female community college students ($p < .05$), Math majors ($p < .05$), Health majors ($p < .05$), and community college students who transferred ($p < .001$) were more likely to earn a Bachelor's degree within six years, but underrepresented minorities ($p < .001$), Business majors ($p < .001$), low-income

community college students ($p < .05$), first-generation community college students ($p < .05$), community college students with a full-time job ($p < .01$), community college students with dependents ($p < .001$), and part-time community college students ($p < .001$) were less likely to earn the credential within the same time frame.

Four-Year Institutions

The estimated odds of students at four-year institutions earning a Certificate within six years were 123.4% ($p < .05$) higher for students who enrolled in some online courses relative to their peers who only enrolled in residential courses, but there was no statistically significant difference regarding the likelihood to obtain a Certificate within six years when comparing residential and online-only students at four-year institutions. Female students ($p < .001$) and students who transferred were much more likely to earn a Certificate within three years when compared to their peers. In addition, Business majors and students with a full-time job were also more likely to obtain a Certificate within six years. The estimated odds of students at four-year institutions earning a Certificate within six years were 132.2% ($p < .01$) higher for Business majors relative to "undeclared" students and 82.1% ($p < .05$) higher for students with a full-time job when compared to their peers without a job.

Once again, there was no statistically significant difference in the likelihood of obtaining an Associate's degree within six years when comparing face-to-face students to students who enrolled in some or all online courses at four-year institutions. When compared to White and Asian students, the estimated odds of earning an Associate's degree within six years were decreased by 42.3% ($p < .001$) for underrepresented minorities. The estimated odds of obtaining an Associate's degree within six years were 39.6% ($p < .01$) lower for Math majors, 65.5% ($p < .05$) higher for Business majors, and 90.2% ($p < .001$) higher for

Health majors. Additionally, students who transferred ($p < .001$), first-generation students ($p < .05$), and students with a part-time job ($p < .05$) were more likely to earn an Associate's degree within the same period of time.

Part-time students at four-year institutions were less likely to earn an Associate's degree within six years when compared to their peers. More specifically, relative to exclusively full-time students at four-year institutions, the estimated odds of earning an Associate's degree within six years were 65.6% ($p < .001$) lower for exclusively part-time students and 36.1% ($p < .05$) lower for students who were a mixture of part-time and full-time status. Finally, students at the most selective four-year institutions were not as likely to obtain an Associate's degree within six years as the estimated odds of earning an Associate's degree during that time frame were 54.5% ($p < .05$) lower for students who attended very selective institutions.

Similar to students at community colleges, there was no statistically significant difference in the likelihood of students at four-year institutions obtaining a Bachelor's degree within six years when comparing face-to-face students to students who enrolled in some or all online courses. Female students and students who attended very selective institutions were more likely to earn a Bachelor's degree within six years when compared to their peers at four-year institutions. The estimated odds of earning a Bachelor's degree within six years were increased by 45.7% ($p < .001$) for female students and increased by 99.6% ($p < .01$) for students at very selective institutions. Although students who transferred from community colleges, as one would expect, were much more likely to obtain a Bachelor's degree, transferring from a four-year institution had a negative effect on the likelihood of students to earn a Bachelor's degree as the estimated odds of earning a Bachelor's degree within six years were 83.1% ($p < .001$) lower for students who transferred.

A variety of student characteristics had a negative impact on the likelihood of students at four-year institutions earning a Bachelor's degree within the same period of time. More specifically, the estimated odds of earning a Bachelor's degree within six years were 45.9% ($p < .001$) lower for underrepresented minorities, 38.3% ($p < .001$) lower for low-income students, 22.4% ($p < .001$) lower for first-generation students, 20.0% ($p < .001$) lower for students with a part-time job, 47.5% ($p < .001$) lower for students with a full-time job, and 36% ($p < .05$) lower for students with dependents. In addition, the estimated odds of earning a Bachelor's degree within six years were 72.0% ($p < .001$) lower for exclusively part-time students, 33.4% ($p < .001$) lower for students who were a mixture of part-time and full-time enrollment status, 52.7% lower for students at open admission institutions, and 62.2% ($p < .001$) lower for students at for-profit institutions.

All Institution Types

When comparing students who took some or all online courses to residential students in the pooled model for all institution types, there was no statistically significant difference in the likelihood of earning a Certificate within six years for students. Female students, first-generation students, and students who transferred were more likely to obtain a Certificate within six years, but low-income students and part-time students were less likely to earn a Certificate within the same timeframe. More specifically, the estimated odds of obtaining a Certificate within six years were 28.2% ($p < .001$) higher for female students, 31.1% ($p < .01$) higher for first-generation students, 27.6% ($p < .001$) higher for students who transferred, 13.8% ($p < .05$) lower for low-income students, and 37.5% ($p < .001$) lower for part-time students relate to exclusively full-time students.

Regarding the impact of academic majors on the likelihood to earn a Certificate within six years, Humanities majors ($p < .01$), Science majors ($p < .001$), Math majors ($p < .001$), and Education majors ($p < .001$) were less likely, but Business majors ($p < .01$) were more likely relative to "undeclared" students. Finally, the level of the institution attended by the student also had a significant effect on the likelihood of obtaining a Certificate within six years as community college students ($p < .001$) were more likely to earn the credential than their peers at four-year institutions.

For students at all institution types, the estimated odds of earning an Associate's degree within six years were 29.2% ($p < .05$) higher for those who enrolled in some online courses relative to students who only enrolled in face-to-face courses, but there was no statistically significant difference in the likelihood of earning an Associate's degree within six years when comparing face-to-face and online-only students. The estimated odds of earning an Associate's degree within six years increased by 26.0% ($p < .001$) more for female students, but the estimated odds of earning an Associate's degree within the same time frame actually decreased by 39.5% ($p < .001$) for underrepresented minority students. A variety of academic majors were more likely to complete an Associate's degree within six years when compared to "undeclared" students. The estimated odds of postsecondary students obtaining an Associate's degree within six years were 36.2% ($p < .05$) higher for Humanities majors, 49.2% ($p < .001$) higher for Science majors, 38.7% ($p < .001$) higher for Education majors, 69.1% ($p < .001$) higher for Business majors, and 71.8% ($p < .001$) higher for Health majors.

Low-income students, students with a full-time job, and part-time students were less likely to earn an Associate's degree within six years. The estimated odds of postsecondary students earning an Associate's degree within six years were 19.0% ($p < .01$) lower for low-

income students, 27.8% ($p < .001$) lower for students with a full-time job, 54.0% ($p < .001$) lower for exclusively part-time students, and 29.6% ($p < .001$) lower for students who were a mixture of part-time and full-time status relative to exclusively full-time students. In contrast, first-generation students ($p < .001$) and students who transferred ($p < .001$) were more likely to obtain an Associate's degree during the same timeframe. Students who attended institutions with any degree of selectivity were less likely to earn an Associate's degree within six years. More specifically, the estimated odds of postsecondary students earning an Associate's degree within six years were decreased by 76.4% ($p < .001$) for students at very selective institutions, decreased by 66.0% ($p < .001$) for students at moderately selective institutions, and decreased by 43.7% ($p < .01$) for students at minimally selective institutions.

As expected given the findings for students at community colleges and four-year institutions, there was no statistically significant difference in the likelihood of obtaining a Bachelor's degree within six years when comparing face-to-face students to students who enrolled in some or all online courses. Female students ($p < .001$) and students who attended moderately selective institutions ($p < .001$) or very selective institutions ($p < .001$) were more likely to earn a Bachelor's degree within six years when compared to their peers. Students included in the pooled model were less likely to obtain a Bachelor's degree after transferring as the estimated odds of earning a Bachelor's degree within six years were decreased by 38.7% ($p < .001$) for students who transferred.

Similar to students at four-year institutions, several student characteristics in the pooled model had a negative influence on the likelihood of earning a Bachelor's degree within six years. More specifically, the estimated odds of earning a Bachelor's degree within six years were 45.3% ($p < .001$) lower for underrepresented minorities, 23.9% ($p < .001$) lower for Business

majors, 37.3% ($p < .001$) lower for low-income students, 29.2% ($p < .001$) lower for first-generation students, 18.9% ($p < .001$) lower for students with a part-time job, 47.0% ($p < .001$) lower for students with a full-time job, and 51.4% ($p < .001$) lower for students with dependents. Additionally, the estimated odds of earning a Bachelor's degree within six years were 72.8% ($p < .001$) lower for exclusively part-time students, 24.0% ($p < .001$) lower for students who were a mixture of part-time and full-time enrollment status, and 60.4% ($p < .001$) lower for students at for-profit institutions.

GPA

As shown in Table 7, there was no statistically significant difference in GPA when comparing residential students at less-than-two-year institutions with their peers who enrolled in some or all online courses. Being a female ($b = .109$; $p < .05$), slightly older ($b = .011$; $p < .001$), or enrolled at for-profit institutions ($b = .111$; $p < .05$) had a slightly positive influence on GPA when compared to their peers at less-than-two-year institutions. In contrast, identifying as an underrepresented minority ($b = -.208$; $p < .001$) and Math major ($b = -.269$; $p < .05$) had a negative impact on GPA relative to their peers at less-than-two-year institutions.

Table 7: The Impact of Online Enrollment on GPA

GPA				
	Two-year	Four-year	Less-than-two	Pooled
	b	b	b	b
	(se)	(se)	(se)	(se)
Some online	0.081	-0.084*	0.075	0.026
	(0.04)	(0.04)	(0.14)	(0.05)
All online	0.047	-0.053	-0.015	-0.012
	(0.06)	(0.06)	(0.16)	(0.07)

* p<0.05, ** p<0.01, *** p<0.001

Reference category: No online

Similar to students at less-than-two-year institutions, there was no statistically significant difference in the GPA of community college students when comparing residential community college students and those who enrolled in some online courses or an online-only program. Being a community college student who was female ($b = .143$; $p < .001$), was slightly older ($b = .020$; $p < .001$), had at least one dependent ($b = .058$; $p < .05$), and transferred ($b = .117$; $p < .001$) had a positive effect on GPA relative to their peers at community colleges, but identifying as an underrepresented minority ($b = -.257$; $p < .001$) and low-income student ($b = -.061$; $p < .01$) had a negative influence on GPA when compared to their peers at community colleges.

Regarding students at four-year institutions, enrolling in some online courses had a slightly negative effect on their GPA ($b = -.084$; $p < .05$) when compared to students who did not enroll in an online course, but there was no statistically significant difference in GPA when comparing residential students and those who enrolled in all online courses. Being a female ($b = .200$; $p < .001$), slightly older ($b = .017$; $p < .001$), Humanities major ($b = .083$; $p < .01$), and Science major ($b = .067$; $p < .01$) had a positive impact on GPA relative to their peers at four-year colleges and universities. Additionally, identifying as an underrepresented minority ($b = -.250$; $p < .001$), low-income student ($b = -.058$; $p < .01$), first-generation student ($b = -.089$; $p < .001$), student with a part-time job ($b = -.046$; $p < .01$) or full-time job ($b = -.078$; $p < .05$), mixture of part-time and full-time enrollment status ($b = -.108$; $p < .001$), transfer student ($b = -.328$; $p < .001$) had a negative influence on the GPA of students at four-year institutions. Several institutional characteristics also had a negative effect on the GPA of students at four-year institutions as attending a moderately selective institution ($b = -.234$; $p < .001$), minimally selective institution ($b = -.176$; $p < .05$), and open admission institution ($b = -$

.241; p < .01) had a negative impact on GPA when compared to their peers at other types of four-year institutions.

For the pooled model of students at all institution types, there was no statistically significant difference in GPA when comparing residential students and those who enrolled in some or all online courses. Being a female (b = .180; p < .001), slightly older, (b = .017; p < .001), Science major (b = .047; p < .05), student at a for-profit institution (b = .226; p < .001), student at less-than-two-year institution (b = .169; p < .001), and student at a very selective institution (b = .117; p < .01) had a positive impact on GPA when compared to their peers. In contrast, identifying as an underrepresented minority (b = -.255; p < .001), low-income student (b = -.064; p < .001), first-generation student (b = -.067; p < .001), student with a part-time job (b = -.047; p < .001), transfer student (b = -.119; p < .001), and a mixture of part-time and full-time enrollment status (b = -.077; p < .001) had a negative influence on GPA when compared to their peers across institutions.

Transfer Status of Community College Students

Table 8 reveals no statistically significant difference in the likelihood of transferring within three years when comparing community college students who enrolled in no online courses and those who enrolled in some or all online courses. A variety of student characteristics had a negative effect on the likelihood of community college students transferring to another higher education institution. The estimated odds of community college students transferring to another college or university within three years were 20.5% (p < .001) lower for underrepresented minorities, 18.0% (p < .05) lower for Business majors, 21.6% (p < .001) lower for low-income community college students, and 27.2% (p < .001) lower for first-generation

community college students. In addition, the estimated odds of community college students transferring to another higher education institution within three years were 20.6% ($p < .01$) lower for community college students with a full-time job, 23.7% ($p < .05$) lower for community college students with dependents, and 41.2% ($p < .001$) lower for exclusively part-time community college students. Finally, when compared to exclusively full-time community college students, the estimated odds of transferring to another college or university within three years were 20.4% ($p < .001$) higher for community college students who were a mixture of part-time and full-time enrollment status.

Table 8: Odds Ratios of Transferring from Community College

Community College Transfer Status		
	3Y Transfer	6Y Transfer
	b	b
	(se)	(se)
Some online	1.081	1.129
	(0.13)	(0.12)
All online	1.324	1.340*
	(0.21)	(0.20)

* p<0.05, ** p<0.01, *** p<0.001

Reference category: No online

When compared to community college students who enrolled in no online courses, the estimated odds of transferring within six years were 34.0% ($p < .05$) higher for community college students who enrolled in all online courses, but there was no statistically significant difference in the odds of transferring within six years for community college students who enrolled in some online courses relative to their residential-only peers. When compared to male community college students, the estimated odds of transferring within six

years were increased by 18.9% ($p < .01$) for female community college students. Relative to undeclared community college students, the estimated odds of transferring within six years were decreased by for students who majored in Health were 25.0% less likely to transfer to another college or university within the same period of time. Low-income, first-generation, and part-time community college students were also less likely to transfer within six years. More specifically, the estimated odds of transferring within six years were 16.9% ($p < .01$) lower for low-income community college students, 32.5% ($p < .001$) lower for first-generation community college students, and 40.9% ($p < .001$) lower for exclusively part-time community college students relative to exclusively full-time community college students.

Hypotheses

Hypothesis 1: Student characteristics associated with time or geographic constraints will be positively related to online enrollment.

Variables: Full-time employment, parent, married, female, age, veteran, and rural location.

To test Hypothesis 1, I employed multinomial logistic regression models using NPSAS data to examine the relationship between each of the student characteristics and online enrollment. I found evidence in partial support of this hypothesis. As expected, full-time employment, being a parent, and being married were positively correlated with enrolling in some ($p < .001$) or all online courses ($p < .001$) in 2000, 2004, 2008, 2012, and the pooled model. Being a female, older, veteran, or in a rural area also positively correlated with enrolling in some online courses and online-only degree programs, but not every model was statistically significant.

Hypothesis 2: Student characteristics associated with historical underrepresentation in higher education will be positively related to online enrollment.

Variables: Minorities, low-income, and first-generation.

Surprisingly, evidence from these multinomial logit models using NPSAS data did not support Hypothesis 2 in relation to the correlation between online enrollment and minorities or first-generation students. Although the proportion of minorities engaging with online education increased over time, the estimated odds of enrolling in some online courses as minority students were 15.7% ($p < .001$) lower in 2004, 18.7% ($p < .001$) lower in 2008, 14.5% ($p < .001$) lower in 2012, and 12.5% ($p < .001$) lower in the pooled model. For minority students, the estimated odds of enrolling in all online courses were 19.2% ($p < .001$) lower in 2004, 26.7% ($p < .001$) lower in 2008, 30.6% ($p < .001$) lower in 2012, and 25.9% ($p < .001$) lower in the pooled model. First-generation students also had a negative correlation with enrolling in some ($p < .05$) and all online courses ($p < .01$) in 2012 and the pooled model. Hypothesis 2 in relation to low-income students was partially support as enrolling in some online courses was positively correlated with low-income students in 2008 ($p < .01$), 2012 ($p < .01$), and the pooled model ($p < .01$).

Hypothesis 3: Institutional characteristics associated with missions more focused on access provision or revenue generation than status improvement will be positively related to online enrollment.

Variables: Community colleges and for-profit institutions.

For Hypothesis 3, I ran multinomial logistic regression models using NPSAS data to examine the relationships of interest. Hypothesis 3 was partially supported as students at community colleges were more likely to enroll in some online courses in 2000 ($p < .05$) and 2008 ($p < .05$), but community college students were actually less likely to enroll in some online courses in 2012 ($p < .001$) and the pooled model ($p < .001$). For the community college students within the pooled model, the estimated odds of enrolling in some online courses were 31.2% ($p < .001$) lower relative to students at four-year institutions. Contrary to expectations, community college students were actually less likely to enroll in online-only programs in 2004, 2008, 2012, and the pooled model. The estimated odds of students at community colleges enrolling in all online courses were 60.3% ($p < .001$) lower when compared to students at four-year institutions within the pooled model.

To test Hypothesis 3 in relation to for-profit institutions, I recoded the institutional control variable to compare for-profit institutions to a combination of public institutions and private, not-for-profit institutions. After making this adjustment, I ran several multinomial logistic regression models using NPSAS data. Once again, the hypothesis was only partially supported as students at for-profit institutions were less likely to enroll in some online courses in 2004 ($p < .001$), 2008 ($p < .001$), 2012 ($p < .001$), and the pooled model ($p < .001$), but students at for-profit institutions were more likely to enroll in online-only programs during certain years. As expected, the estimated odds of students at for-profit institutions enrolling in all online courses were higher in 2008 ($p < .001$) and the pooled model ($p < .001$) relative to students at not-for-profit institutions. Students at for-profit institutions were less likely to enroll in all online courses in 2000 ($p < .01$) and 2012 ($p < .001$), which is not congruent with my descriptive

findings that indicated steady growth in the proportion of online-only students at for-profits throughout the period of the study.

Hypothesis 4: Institutional characteristics associated high status within the U.S. higher education system will be negatively related to online enrollment.

Variables: Very selective institutions, moderately selective institutions, and private (not-for-profit) four-year institutions.

For the purpose of addressing Hypothesis 4, I identified "very selective" and "moderately selective" colleges and universities as "high-status institutions." After I ran a multinomial logistic regression models using NPSAS data, evidence from my findings partially supported Hypothesis 4.

Relative to their peers, the estimated odds of students at moderately selective or very selective institutions enrolling in some online courses were lower in 2004 ($p < .001$), 2008 ($p < .001$), 2012 ($p < .001$), and the pooled model ($p < .001$). Additionally, students at moderately selective institutions were less likely to enroll in all online courses in 2004 ($p < .001$), 2008 ($p < .001$), 2012 ($p < .001$), and the pooled model ($p < .001$), but students at very selective institutions were less likely to enroll in all online courses ($p < .001$) for every year of available NPSAS data.

Hypothesis 5: Students who engage in some levels of online education will experience greater academic outcomes than students who engage in no online education or online-only programs

My final hypothesis suggests that online education will be positively correlated with three-year credential completion, six-year credential completion, GPA, and community college transfers by engaging in some (but not all) levels of online education.

To test Hypothesis 5, I ran several multinomial logistic regression models using BPS data. Hypothesis 5 was only partially supported by my findings as results varied according to the type of credential obtained, length of time to earn the credential (three years or six years), and the type of institution attended by the students within the sample. After three years, engaging with some online education had a negative effect on the likelihood of students at less-than-two-year institutions to earn a Certificate ($p < .05$), but enrolling in some online courses had a positive effect on the likelihood of community college students to obtain an Associate's degree ($p < .05$) and the likelihood of students within the pooled model to earn an Associate's degree ($p < .05$). After six years, enrolling in some online courses had a positive effect on the likelihood of students at four-year institutions to earn a Certificate ($p < .05$), the likelihood of community college students earn an Associate's degree ($p < .05$), and the likelihood of students within the pooled model to obtain an Associate's degree ($p < .05$). Surprisingly, enrolling in some online courses actually had a slightly negative effect on the GPA of students at four-year institutions ($p < .05$). For community college students who enrolled in some online courses, there was no statistically significant difference in the likelihood of transferring relative to community college students who enrolled in no online courses. Finally, there was no statistically significant difference in the likelihood to obtain a Bachelor's degree for postsecondary students who enrolled in some or all online courses.

Limitations

Although this study provides several contributions to existing research, these results are subject to numerous limitations. First, online education has changed substantially since the data used in Part Two of this study were collected. More specifically, respondents were only asked about online and distance education course-taking patterns during the first year (2004) of the BPS Longitudinal Survey. Because more recent national data were not available, this study would not account for advances in the delivery and the growth in the popularity of online education since 2004. Additionally, these data do not reveal whether students continue to enroll in online courses after their first year of higher education, which is problematic given my findings in Part One of this dissertation that suggest postsecondary students are more likely to engage with online education as they advance beyond their first year of study. More recent national data pertaining to online enrollment beyond the first year of study are required to examine this medium of instruction more effectively.

Second, in relation to Part One of this dissertation, respondents from NPSAS:08 were not asked about the way in which distance education courses were taught in 2008 (unlike NPSAS data from 2000, 2004, and 2012). As a result, online students were not differentiated from distance learners who may be engaging solely with correspondence courses, educational television, or videoconferencing. The conflation between online learners and distance learners was not as problematic in 2008 as it would have been in earlier years because the overwhelming majority of distance education courses in 2008 were offered via online instruction. To use NPSAS:04 as a reference, roughly 87% of the students who took their entire degree program from a distance were enrolled in online only programs. Additionally, roughly 88% of NPSAS:04 respondents who enrolled in some (but not all) distance education courses utilized online

education as their medium of instruction. As the proportion of students enrolled in online education increased from 13.5% in 2004 to 25.3% in 2008 (Allen & Seaman, 2014), one could reasonably expect the percentage of distance education courses delivered online to be substantially higher for NPSAS:08.

Third, the utilization of credential completion as an academic outcome for Part Two of this study could be considered problematic. Although I included transferring from a community college as a dependent variable to address this issue, a few problems still persist. For example, if students take a course or two at a less-than-two-year institution or community college to improve their job skills before leaving, the student would be considered a dropout or failed outcome despite never having the intention to obtain a credential or transfer to a four-year college or university. Again, I attempted to control for this issue by including a variable indicating which credential the student intended to obtain as a covariate, but this limitation should be noted.

Finally, online education has complexities that make large-scale studies of enrollment patterns and effectiveness highly complex. In this study, students who enroll in one or two hybrid courses can be grouped with online learners who took the majority of their courses completely online. Despite manipulating the data to differentiate between postsecondary students who enrolled in some online courses and those who enrolled in an online-only program of study, respondents were only asked whether the distance education course used the internet and further nuance related to student course-taking would require the use of transcript data. In addition, the comparison of a low-enrollment seminar with a high-enrollment introductory course introduces a host of complexities not covered within this dissertation.

CHAPTER 5: DISCUSSION AND CONCLUSIONS

This study sought to produce generalizable evidence of the changing profile of postsecondary online students and the effectiveness of online education in higher education. Despite online education moving from the margins to mainstream over the past decade, little empirical research has examined online education at the national level. Further, current studies of online education fail to examine the profile of postsecondary online students over time, the impact of online education across institution types, or differentiate between the postsecondary student enrolled in an online course or two and those enrolled in an online-only program.

As mentioned earlier in this dissertation, online education represents the main source of enrollment growth in American higher education as the percentage of postsecondary students who completed at least one online course has increased from 9.6 percent in 2002 to 33.5 percent in 2012 (Sener, 2012; Allen & Seaman, 2014). Given the increased reliance on online education in higher education, many questions pertaining to the makeup of online students and the quality of online courses still persist. In order to explore these core issues related to online education, the following research questions were examined:

- How do student and institutional characteristics of undergraduate students relate to online course enrollment decisions?
- To what extent does enrollment in online courses influence the academic outcomes of undergraduate students across higher education institution types?
- For both questions, do the results vary according to the level of engagement with online education?

Discussion and Conclusions: Part One

Before delving into specific characteristics and trends in relation to postsecondary online students, Part One of this dissertation aimed to describe the proportion of postsecondary online learners in the aggregate. My findings pertaining to online enrollment serve to add a degree of nuance to the classification of the online learner by distinguishing between postsecondary students who enrolled in no online courses, some online courses, or all online courses. Once again, Table 9 provides those nationally representative results.

Table 9: Online Enrollment of Undergraduate Students:

Year	Students took no online courses (0%)	Students took some online courses (1-99%)	Students took all online courses (100%)
2000	94.41%	3.35%	2.24%
N	27,083	958	636
2004	86.41%	9.17%	4.42%
N	64,424	6,834	3,298
2008	80.17%	16.46%	3.36%
N	87,265	17,921	3,662
2012	73.35%	19.20%	7.45%
N	66,220	17,330	6,727

A major theme drawn from Part One of this dissertation is that online instruction is no longer solely intended to reach nontraditional learners who would have been unable to engage with coursework residentially. Because colleges and universities have now positioned online education as more than a niche offering, many of the student and institutional characteristics of postsecondary online students have changed over the years. Each individual characteristic that covaries with online enrollment can be found in Appendix A, but I will outline and discuss some of the major findings from Part One of this dissertation. More specifically, my discussion of

student characteristics will include shifting trends associated with online enrollment patterns for minority students, low-income students, traditionally aged students, working students, and major field of study. My discussion will also include several institutional characteristics as online enrollment patterns for students at both for-profit institutions and high-status colleges and universities will be considered.

Student Characteristics

Perhaps the most frequently referenced benefit of online education is its potential to reach previously underserved learners whose life circumstances precluded their pursuit of higher education (Sener, 2012). In a speech given a few years ago, Arne Duncan (2012), U.S. Secretary of Education, claimed that "technology can level the playing field instead of tilting it against low-income, minority...students." Previous studies reported conflicting evidence pertaining to the profile of online learners with respect to race (Chen et al., 2010; Jaggars, 2012). Although my study shows that the majority of postsecondary students who engaged with some or all online courses were typically White, the percentage of minority students who enrolled in some or all online courses was particularly interesting as it increased substantially over time. More specifically, minority students represented 26.06% of postsecondary students enrolled in some online courses in 2000, but that proportion increased to 40.93% in 2012. Among students who enrolled in online-only programs, the proportion of minority students increased from 28.26% in 2000 to 38.20% in 2012.

Regarding the likelihood of low-income students engaging with online education, Jaggars (2012) found that community college students who enrolled in at least one online course were less likely to be low-income. My findings pertaining to online students across institution types

contradict this claim as low-income students were actually more likely to engage with some online courses in 2008 ($p < .01$) and 2012 ($p < .001$). In addition, among postsecondary students who enrolled in some online courses or an online-only program, the proportion of low-income students increased over time. The proportion of low-income students enrolled in some online courses or an online-only program in 2000 was roughly 39%, increasing to 50.8% for students in some online courses and 54.02% for low-income students in online-online programs by 2012.

For higher education institutions implementing online-only programs with the intent to increase access (and enrollment), one question appears to be critical to the sustainability of the program: Will younger, first-time-in-college students go to college without actually going to campus? The age demographic of online learners is a critical issue for higher education administrators who have plans to launch or have recently launched an online-only program. For instance, W. Andrew McCollough, associate provost for teaching and technology at the University of Florida (UF), recently expressed concern over the relatively low enrollment numbers of first-time-in-college students at UF Online—the institution's degree-granting, online-only program for undergraduate students (Straumsheim, 2014).

According to my findings, the national outlook is promising for those higher education administrators seeking to capture the important "18-22" age demographic within their online-only programs. Among postsecondary students enrolled in online-only programs, the proportion of 18-22 year-old students increased from 18.00% in 2008 to 35.99% in 2012. The postsecondary online learner no longer appears to be confined to niche characteristics, such as older, working students, who require the convenient and flexible benefits of online instruction to be able to gain access to higher education.

To further illustrate this point, I will briefly discuss online enrollment patterns of students who did not have a job. Postsecondary students without a job represented only 17.99% of students who enrolled in some online courses and 12.46% of students enrolled in all online courses in 2000. By 2012, 33.95% of students in some online courses did not work and 34.70% of students in online-only programs did not have a job. Despite this growing trend, my regression findings reveal students with a full-time job are still more likely to engage with online-only programs ($p < .001$) and students with a part-time job are more likely to enroll in some online courses ($p < .001$) and an online-only program ($p < .001$) relative to students without a job.

As Chen et al. (2010) noted, students who major in certain academic disciplines may be more apt to engage with online education when compared to their peers. My findings suggest some major areas of study, such as Health majors, have increased their reliance on online education while others have decreased their proportion of students taking online courses over time. For instance, the proportion of postsecondary students enrolled in some online courses who were Health majors increased from 10.65% in 2000 to 21.99% in 2012. The same pattern holds for students enrolled in all online courses as the proportion of Health majors within online-only programs of study increased from 12.89% in 2000 to 19.62% in 2012. In contrast, the proportion of Education majors in some or all online courses grew at a slower rate relative to their peers. In 2000, Education majors represented 15.76% of students in some online courses and 14.94% of students in online-only programs. By 2012, the percentage of Education majors in some online courses (5.06%) and online-only programs (4.87%) decreased substantially.

Institutional Characteristics

Students at for-profit institutions have increased their reliance on online education over time, but students at high-status colleges and universities have not appeared to embrace online education to the same extent as their peers at lower-status institutions.

The Rise of For-Profits

The proportion of online students who attend for-profit institutions has grown exponentially since 2000. More specifically, 3.19% of students in online-only programs attended for-profit institutions in 2000, increasing to 47.82% by 2012. The growth numbers pertaining to online-only students at for-profits are staggering, but a closer look at the makeup of institutions with extremely high enrollments (60,000 or more students) reveals that students at for-profits may be situated within a select few institutions as for-profit students comprise 82.27% of all students enrolled at these high-enrollment institutions in 2012.

These data reveal exponential growth associated with for-profit institutions, but national enrollment numbers at for-profit institutions have decreased since 2012 (National Student Clearinghouse Research Center, 2014). In my discussion of the implications of my findings for future research, I will unpack the issue of declining enrollment numbers at for-profit institutions and how it relates directly to notions of status in higher education.

The Importance of Status

As referenced previously, Podolny's (1993) status-based model of organizations suggests that organizational status becomes most critical when true quality is difficult to ascertain. Given the unclear findings related to the quality of online education in higher education (Lack, 2013), high-status colleges and universities may be less likely to offer online courses relative to their peers due the possibility of status leakage or brand dilution. My findings suggest the proportion

of students taking some or all online courses at "very selective" or "moderately selective" institutions decreased substantially from 2000 to 2012. For instance, 38.12% of postsecondary students in online-only programs were enrolled at "moderately selective" institutions in 2000, but only 10.23% of students in online-only programs were attending "moderately selective" institutions by 2012. The same pattern holds for "very selective" institutions examined within my study. In addition, students at "moderately selective" or "very selective" institutions were less likely than their peers to engage in some or all online courses in 2004 ($p < .001$), 2008 ($p < .001$), and 2012 ($p < .001$).

Conclusion

The student and institutional characteristics associated with postsecondary online education revealed a unifying thread connecting non-traditional and historically underserved students with community colleges, for-profit institutions, and other low-status higher education institutions. The types of students disproportionately engaging with online education were doing so largely at low-status colleges and universities. Because status can serve as a signal of quality when actual performance-based quality is unclear (Lynn, & Tao, 2009), a college or university with connections to high-status affiliates would likely be viewed more positively than its peers. Similarly, organizations tied to low-status affiliates are subsequently penalized through a lowering of their own status (Blau, 1964; Elias & Scotson, 1965; Sauder et al., 2012). With uncertainty surrounding the quality of online education, the path to legitimacy would appear to be through high-status affiliations, but elite colleges and universities run the risk of lowering their own status and subsequently diluting their credentials by offering a low-status medium of

instruction. Due to the dynamics of these external forces, greater evidence pertaining to the effectiveness of online education in higher education is needed.

Discussion and Conclusions: Part Two

Given that faculty members and higher education administrators currently lack compelling and generalizable evidence pertaining to the quality of online education, conversations debating the merits of online education are often anecdotal in nature, leaving many intelligent individuals unable to reach a consensus regarding their perceptions of the quality of online instruction. Simply put, the current batch of empirical studies examining the quality of online education in higher education leaves readers with little clarity (Lack, 2013). Due to the conflicted findings of higher education researchers on this topic, many within the higher education community have concerns about the educational outcomes of online learners relative to residential students. In response to these quality concerns, Part Two of this dissertation sought to provide generalizable evidence examining the effectiveness of online education across higher education institution types.

This study aims to provide two major contributions to the current literature pertaining to the quality of postsecondary online education. First, I will complement previous studies solely examining a single-institution or institution type (community colleges) by providing nationally relevant findings to be applied across higher education institution types. Second, I will add a degree of nuance to the way online enrollment has been categorized in previous empirical work by distinguishing among postsecondary students who enrolled in no courses online, some courses online, and all courses online. Previous studies often fail to distinguish between residential students enrolled in one online course and online-only students learning from a

distance (Shea & Bidjerano, 2014; Xu & Jaggars, 2011), which represents a problematic confound when assessing the academic outcomes of online students.

The following sections will discuss findings and implications related to the influence of online education on the likelihood of obtaining a Certificate, Associate's degree, and Bachelor's degree. Additionally, findings and implications associated with the impact of online enrollment on both GPA and the transfer status of community college students will also be examined.

Certificate

For students aiming to obtain a Certificate in order to increase their knowledge, competencies, or earnings potential (Grubb, 1997, 1998), online education would appear to be a useful medium to ensure time constraints associated with meeting regularly in a physical classroom do not prevent postsecondary students from earning their desired Certificate. Surprisingly, the estimated odds of obtaining a Certificate within three years at a less-than-two-year institution were 54.2% ($p < .05$) lower for students who were enrolled in some online courses relative to their peers who did not take an online course. For students at four-year institutions, the estimated odds of obtaining a Certificate within six years were 123.4% ($p < .05$) higher for students who enrolled in some online courses when compared to residential-only students.

Associate's Degree

Contrary to previous findings by Xu and Jaggars (2011) and in partial support of findings by Shea and Bidjerano (2014), my results suggest enrolling in some (but not all) online courses has a positive effect on Associate's degree completion. When compared to community college

students who only enrolled in face-to-face courses, the estimated odds of earning an Associate's degree within three years were 27.1% ($p < .05$) higher for community college students who enrolled in some online courses. In addition, the estimated odds of obtaining an Associate's degree within six years increased by 30.5% ($p < .05$) for community college students who engaged with some online education. Postsecondary students at four-year institutions were also more likely to obtain an Associate's degree as students enrolled in an online-only program were more likely to earn an Associate's degree within three years when compared to their peers who enrolled in no online courses ($p < .05$). For students included in the pooled model comprised of all institution types, those who enrolled in some online courses were more likely to earn an Associate's degree within three years ($p < .05$) and six years ($p < .05$) relative to those students who only enrolled in face-to-face courses.

Bachelor's Degree, GPA, and Transfer Status of Community College Students

Unlike my findings pertaining to the influence of online enrollment on the likelihood to earn a Certificate or Associate's degree, there was no statistically significant difference in the likelihood to obtain a Bachelor's degree within three or six years when comparing residential students with students enrolled in some online courses or an online-only program. Regarding the impact of online enrollment on the GPA of students at four-year colleges and universities, enrolling in some online courses had a slightly negative effect on the GPA ($b = -.084$; $p < .05$) of four-year students relative to their peers who only enrolled in residential courses, but there was no statistically significant difference in GPA when comparing residential and online-only students. Although GPA has been found to be a significant predictor of persistence and credential completion (Cabrera, Nora, Terenzini, Pascarella, & Hagedorn, 1999; Pascarella &

Terenzini, 2005), proponents of online education can draw upon the positive impact of online enrollment on the likelihood of earning a Certificate and Associate's degree to combat the slightly negative effect of enrolling in some courses on the GPA of students at four-year institutions.

As mentioned earlier in this dissertation, credential completion for community college students is a complicated area of study because the majority of community college students who obtain a Bachelor's degree did not earn an Associate's degree beforehand (American Federation of Teachers, 2003). Given the complexity of credential completion at community colleges, I included transferring from a community college as another form of persistence to be examined. When compared to community college students who enrolled in no online courses, my findings show the odds of transferring from a community college within six years were 34.0% ($p < .05$) higher for students who enrolled in all online courses, but there was no significant difference in the likelihood to transfer for community college students who enrolled in no online courses and those who enrolled in some online courses.

Conclusion

In general, empirical evidence from Part Two suggests a positive relationship between enrolling in some (but not all) online courses and sub-baccalaureate credential completion. Additionally, enrolling in all online courses can positively influence one's likelihood to obtain an Associate's degree at a four-year institution or transfer from a community college, but enrolling in some (but not all) online courses can have a slightly negative effect on the GPA of students at four-year colleges and universities. Given the layers of my findings, previous work conflating the residential learner enrolled in one online course with the online-only student working from a

distance could help to explain why there have been inconsistent and inconclusive findings related to the quality of online education.

Higher education leaders looking to increase their reliance on online education will undoubtedly face an array of questions pertaining to the quality of online courses relative to residential courses offered on campus. With respect to the likelihood of credential completion, these data suggest enrolling in some online courses can actually prove to be beneficial. Even the lack of statistically significant differences when examining the likelihood to obtain a Bachelor's degree can be considered a positive development for online proponents as it would be difficult to argue that online education was the inferior option given these results. The lofty scope of this dissertation offers several complications for navigating my findings, but it provides a litany of fruitful opportunities for future research.

Implications for Future Research

National data pertaining to online education has been very limited up to this point, but this study can serve as the starting point for future research at the national level pertaining to the growing influence of online education in higher education. Within this section, I will outline four suggestions for future research in order to continue to advance scholarship related to online education in higher education. After doing so, I will close with a brief analysis of what has transpired since the last available year of these data (2012) and what these developments mean for the future of postsecondary online education.

First, future empirical work examining the quality of online education in higher education should consider the appointment type of online instructors (adjuncts versus tenure-track faculty) and the credentials they have (PhD or below). Without accounting for the instructor of the

course, future assessments of online instruction versus residential instruction would be omitting a critical variable to be considered. Second, my study provides a first step toward distinguishing between levels of online enrollment, but more nuanced studies using transcript data are needed to provide in-depth analysis of how many courses are taken online and the impact of online enrollment on academic outcomes.

Third, an examination of the distribution of online learners would be a fascinating study as my findings suggest 21.31% of online-only students attended high-enrollment (60,000+ students) institutions. As higher education institutions, such as Arizona State and Southern New Hampshire, continue to seek to grow enrollment through online education, will the majority of online-only students attend a small number of select universities? Fourth, and perhaps most obviously, my findings within this study are restricted to undergraduate students. Future research examining online enrollment patterns and the effectiveness of online education in graduate school would be a positive contribution to this growing body of literature.

In order to address the future of online education in higher education, I will briefly discuss a couple major developments that have taken place since the period of time covered in my study. As mentioned previously in this chapter, national enrollment numbers at for-profit institutions have decreased since 2012 (National Student Clearinghouse Research Center, 2014). Most notably, the University of Phoenix, the largest for-profit institution in the United States, saw its enrollment numbers drop from roughly 460,000 to 213,000 students within the past five years (Strauss, 2015). Whether one attributes enrollment declines at for-profit institutions to increased competition from not-for-profit universities, such as Arizona State University or Southern New Hampshire University, or a growing public perception of inferior quality, one thing is clear: for-profit institutions have a status problem. For students who are faced with the

choice between two institutions that offer the same convenience and flexibility, developments since 2012 suggest students are moving away from for-profits to attend the higher education institution with greater status.

Another recent development related to online education in higher education is the growing popularity of massive open online courses (MOOCs). The potential of MOOCs, which are typically available for free, has been widely publicized, but little has been accomplished with respect to for-credit MOOC offerings until recently. For the few universities, such as Arizona State University and San Jose State University, seeking to offer MOOCs for credit, there is widespread concern that affiliating with for-credit MOOCs would dilute the previously established status of the institution and its credentials.

Despite the rapid growth of online education in higher education, it remains clouded by a degree of uncertainty. Beyond the fundamental issue of quality concerns, online education is often thought of as a niche service for time- and geography-constrained students. The pathway to prosperity for postsecondary online education is through a perception of quality equivalent to face-to-face courses delivered on campus. As higher education institutions move forward in discussions to increase their reliance on online education, higher education scholars can inform those conversations through more nuanced research pertaining to the constituency and quality of online education in higher education.

References

Allen, E., Seaman, J., Lederman, D., & Jaschik, S. (2012). Conflicted: Faculty and online education. *Inside Higher Ed,* Babson Survey Research Group, and Quahog Research Group, LLC.

Allen, E. & Seaman, J. (2014). Grade change: Tracking online education in the United States. *The Sloan Consortium*.

Altbach, P. G., Gumport, P. J., & Berdahl, R. O. (2011). *American higher education in the twenty-first century: Social, political, and economic challenges* (3rd ed.). Baltimore, MD: The Johns Hopkins University Press.

American Federation of Teachers. (2003). *Student persistence in college: More than counting caps and gowns.* Washington, DC: American Federation of Teachers.

American Psychological Association. (2015). *Who are family caregivers?* Retrieved from http://www.apa.org/pi/about/publications/caregivers/faq/statistics.aspx.

Arbaugh, J. B. (2000). An exploratory study of the effects of gender on student learning and class participation in an Internet-based MBA course. *Management Learning, 31*(4), 533–549.

Archibald, R., & Feldman, D. (2011). *Why does college cost so much?* Oxford: Oxford University Press. Bowen, W. (2013). *Higher education in the digital age*. Princeton, NJ: Princeton University Press.

Arkes, J. (1999). What do educational credentials signal and why do employers value credentials? *Economics of Education Review, 18,* 133-141.

Ary, E., & Brune, C. (2011). A comparison of student learning outcomes in traditional and online personal finance courses. *MERLOT Journal of Online Learning and Teaching, 7*(4), 465-474.

Arum, R., & Roksa, J. (2011). *Academically adrift: Limited learning on college campuses*. Chicago, IL: The University of Chicago Press.

Astin, A. W. (1993). *What matters in college: Four critical years revisited*. San Francisco: Jossey-Bass.

Attewell, P., Lavin, D., Domina, T., & Levey, T. (2006). New evidence on college remediation. *The Journal of Higher Education, 77*(5), 886-924.

Baum, S., Kurose, C., & McPherson, M. S. (2013). An overview of American higher education. *The Future of Children: Postsecondary Education in the United States, 23*(1), 17–39.

Baumol, W. & Bowen, W. (1966). *Performing arts, the economic dilemma: A study of problems common to theater, opera, music, and dance*. New York, NY: Twentieth Century Fund.

Belkin, D. (2013). U.S. private colleges face enrollment decline. *The Wall Street Journal*.

Belman, D., & Heywood, J. (1991). Sheepskin effects in the returns to education: An examination of women and minorities. *Review of Economics and Statistics, 73*, 720-724.

Bennett, D., Padgham, G., McCarty, C., & Carter, S. (2007). Economics: Internet vs. traditional classroom instruction. *Journal of Economics and Economic Education Research, 8*(1), 21-31.

Blau, P. (1964). *Exchange and power in social life*. New York, NY: Wiley.

Bok, D. (2013). *Higher education in America.* Princeton, NJ: Princeton University Press.

Bowen, W. (2013). *Higher education in the digital age*. Princeton, NJ: Princeton University Press.

Bowman, N. A., & Bastedo, M. N. (2009). Getting on the front page: Organizational reputation, status signals, and the impact of U.S. News and World Report on student decisions. *Research in Higher Education, 50,* 415–436.

Braxton, J. M. (2000). *Reworking the student departure puzzle*. Nashville, TN: Vanderbilt University Press.

Brint, S. (2011). Focus on the classroom: Movements to reform college teaching and learning, 1980-2008. In J. Hermanowicz (ed.), *The American academic profession: Transformation in contemporary higher education*. Baltimore, MD: The Johns Hopkins University Press.

Brint, S., Cantwell A., & Saxena, P. (2011). Disciplinary categories, majors, and undergraduate experiences: Rethinking Bok's "underachieving colleges" thesis. *Research in Higher Education, 53*(1), 1-25.

Cabrera, A., Nora, A., Terenzini, P., Pascarella, E., & Hagedorn, L. (1999). Campus racial climate and the adjustment of students to college: A comparison between White students and African-American students. *Journal of Higher Education, 70,* 134-160.

Cameron, K. S. (1984). Organizational adaptation and higher education. *The Journal of Higher Education, 55*(2), 122-144.

Castilla, E. J. (2008). Gender, race, and meritocracy in organizational careers. *American Journal of Sociology, 113*(6), 1479-1526.

Chapman, D. (2011). Contingent and tenure/tenure-track faculty: Motivations and incentives to teach distance education courses. *Online Journal of Distance Learning Administration*.

Chen, P., Lambert, A., & Guidry, K. (2010). Engaging online learners: The impact of web-based learning technology on college student engagement. *Computers & Education, 54*(4), 1222-1232.

Cheslock, J., & Rios-Agular, C. (2011). Multilevel analysis in higher education research: A multidisciplinary approach. In J. Smart (ed.), *Higher education: Handbook of theory and research*. Dordrecht, The Netherlands: Springer.

Choy, S. (2001). Students whose parents did not go to college: Postsecondary access, persistence, and attainment. In *The Condition of Education, 2011*, Washington, DC: U.S. Department of Education, National Center of Education Statistics.

Christensen, C. & Eyring, H. (2011). *The innovative university: Changing the DNA of higher education from the inside out.* San Francisco, CA: Jossey-Bass.

Clotfelter, C. T. (1996). *Buying the best: Cost escalation in elite higher education*. Princeton, NJ: Princeton University Press.

Colorado Department of Higher Education (2012). Online versus traditional learning: A comparison study of Colorado community college science classes. *WICHE Cooperative for Educational Technologies*.

Dabbagh, N. (2007). The online learner: Characteristics and pedagogical implications. *Contemporary Issues in Technology and Teacher Education, 7*(3).

Driscoll, A., Jicha, K., Hunt, A., Tichavsky, L., & Thompson, G. (2012). Can online courses deliver in-class results? A comparison of student performance and satisfaction in an online versus a face-to-face introductory sociology course. *Teaching Sociology, 40*(4), 312-331.

Duncan, A. (2012). The new platform for learning. Retrieved from http://www.ed.gov/news/speeches/new-platform-learning.

Dunn, D., McCarthy, M., Baker, S., & Halonen, J. (2011). *Using quality benchmarks for assessing and developing undergraduate programs*. San Francisco, CA: Jossey-Bass.

Elias, N, & Scotson, J. (1965). *The established and the outsiders: A sociological enquiry into community*. London: F. Cass.

Ellenberg, G., Stanny, C., & El-Sheikh, E. (2011). First things first: Attending to assessment issues, accountability, and accreditation. In Dunn, D. S. McCarthy, M. A., Baker, S. & Halonen, J. S. (Eds.).*Using quality benchmarks for assessing and developing undergraduate programs*. San Francisco, CA: Jossey-Bass.

Engle, J., & Tinto, V. (2008). Moving beyond access: College success for low-income, first-generation students. The Pell Institute. Retrieved from http://files.eric.ed.gov/fulltext/ED504448.pdf.

Enriquez, A. (2010) Assessing the effectiveness of synchronous content delivery in an online introductory circuits analysis course. Proceedings from the annual conference of the *American Society for Engineering Education*, Louisville, Kentucky.

Ewell, P. T. (2008). Assessment and accountability in America today: Background and context. *New Directions for Institutional Research, S1*, 7-17.

Gould. R.V. (2002). The origins of status hierarchies: A formal theory and empirical test. *American Journal of Sociology, 107*(5), 1143-1178.

Graff, G., & Birkenstein, C. (2008). A progressive case for educational standardization. *Academe: Bulletin of the American Association of University Professors, 94*(3), 16-18.

Griffith, A., & Rask, K. (2007). The influence of the U.S. News and World Report collegiate rankings on the matriculation decision of high-ability students: 1995-2004. *Economics of Education Review, 26*, 244–255.

Grubb, W. (1997). The returns to education in the subbaccalaureate labor market, 1984-1990. *Economics of Education Review, 16*(3), 231-245.

Grubb, W. (1998). *Learning and earning in the middle: The economic benefits of subbaccalaureate education*. New York, NY: Columbia University, Teacher's College, Community College Research Center, Institute for Education and the Economy.

Hargens, L. L., & Hagstrom, W. O. (1982). Scientific consensus and academic status attainment patterns. *Sociology of Education, 55*(4), 183-96.

Harvey, L., & Green, D. (1993). Defining quality. *Assessment & Evaluation in Higher Education, 18*(1), 9-34.

Heller, D. (2001). *Debts and decisions: Student loans and their relationship to graduate school and career choice*. New Agenda Series. Indianapolis, IN: Lumina Foundation.

Hunter, B. (1995). College guidebooks: Background and development. In: Walleri, R. D., & Moss, M. K. (eds.), *New Directions for Institutional Research* No. 88: Evaluating and Responding to College Guidebooks and Rankings, San Francisco, CA: Jossey-Bass.

Inglis, A., Ling, P., & Joosten, V. (1999). *Delivering digitally: Managing the transition to the knowledge media*. London: Kogan Page.

Ishitani, T., & DesJardins, S. (2002). A longitudinal investigation of dropout from college in the United States. *Journal of College Student Retention: Research, Theory & Practice, 4*(2), 173-201.

Jaeger, D., & Page, M. (1996). Degrees matter: New evidence on sheepskin effects in returns to education. *Review of Economics and Statistics, 78,* 733-740.

Jaggars, S. (2014). Democratization of education for whom? Online learning and educational equity. *Association of American Colleges and Universities, 55*(1).

James, E. (1990). Decision processes and priorities in higher education. In Hoenack, S. A., & Collins, E. L. (eds.), *The economics of American universities*. Buffalo, NY: State University of New York Press.

Jenkins, G. D., Mitra, A., Gupta, N. & Shaw, J.D. (1998). Are financial incentives related to performance? A meta-analytic review of empirical research. *JAP*, 83, 777-787.

Kinser, K. (2007). Dimensions of corporate ownership in for-profit higher education. *The Review of Higher Education, 30*(3), 217-245.

Kramarae, C. (2007). Gender matters in online leaning. In M. G. Moore (Ed.), *Handbook of distance education* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum.

Lack, K. (2013). Current status of research on online learning in postsecondary education. *Ithaka S-R.*

LeBlanc, P. (2013). Disruptive technologies and higher education: Toward the next generation of delivery models. In *Stretching the higher education dollar: How innovation can improve access, equity, and affordability.* Cambridge, MA: Harvard Education Press.

Lewis, J., & Harrison, M. (2012). Online delivery as a course adjunct promotes active learning and student success. *Teaching of Psychology,* 39(1), 72-76.

Mankiw, N.G. (1998). *Principles of microeconomics*. Fort Worth, TX: The Dryden Press.

McGuire, M. D. (1995). Validity issues for reputational studies. In: Walleri, R. D., & Moss, M. K. (eds.), *New Directions for Institutional Research* No. 88: Evaluating and Responding to College Guidebooks and Rankings, San Francisco, CA: Jossey-Bass.

Means, B., Toyama, Y., Murphy, R., & Baki, M. (2013). The effectiveness of online and blended learning: A meta-analysis of the empirical literature. *Teachers College Record, 115*, 1-47.

Mentzer, G., Cryan, J., & Teclehaimanot, B. (2007). Two peas in a pod? A comparison of face-to-face and web-based classrooms. *Journal of Technology and Teacher Education, 15*(2), 233-246.

Merton, R. (1968). The Matthew effect in science. *Science, 159*(1380), 56-63.

Meredith, M. (2004). Why do universities compete in the rankings game? An empirical analysis of the effects of the U.S. News and World Report college rankings. *Research in Higher Education, 45*, 443–461.

Mettler, S. (2014). *Degrees of inequality: How the politics of higher education sabotaged the American dream*. New York, NY: Basic Books.

Middaugh, M. (2001). *Understanding faculty productivity.* San Francisco, CA: Jossey-Bass.

Miller, B. A. (2007). *Assessing organizational performance in higher education*. San Francisco, CA: Jossey-Bass.

Monks, J., & Ehrenberg, R. G. (1999). *The impact of U.S. News & World Report college rankings on admissions outcomes and pricing policies at selective private institutions.* National Bureau of Economic Research, Working Paper 7227.

Moore, M., & Kearsley, G. (2012). *Distance education: A systems view of online learning*. Belmont, CA: Wadsworth.

Mullins, M. (2007). Community Colleges. In M.G. Moore & W.G. Anderson (eds.), *Handbook of distance education* (2nd ed., pp. 491-500). Mahwah, NJ: Erlbaum.

National Center for Education Statistics. (2012). *Students attending for-profit postsecondary institutions: Demographics, enrollment characteristics, and 6-year outcomes*. Washington, DC: U.S. Department of Education.

National Student Clearinghouse Research Center. (2014). *Current Term Enrollment Report*. Retrieved from http://nscresearchcenter.org/currenttermenrollmentestimate-spring2014/.

Olson, T., & Wisher, R. (2002). The effectiveness of web-based instruction: An initial inquiry. *The International Review of Research in Open and Distance Learning, 3*(2).

Parsad, B., & Lewis, L. (2008). *Distance education at degree-granting postsecondary institutions: 2006-2007. First Look.* (NCES 2009-044). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center of Education Statistics.

Pascarella, E., & Terenzini, P. (1991). *How college affects students: Findings and insights from twenty years of research* (1st ed.). San Francisco: Jossey-Bass Publishers.

Pascarella, E., Pierson, C., Wolniak, G, & Terenzini, P. (2004). First-generation college students: Additional evidence on college persistence and outcomes. *The Journal of Higher Education, 75*(3), 249-284.

Petersen, T., Saporta, I., and Seidel, M. 2000. Offering a job: Meritocracy and social networks. *American Journal of Sociology, 106*(3), 763-816.

Pike, G. R. (2004). Measuring quality: A comparison of US News Rankings and NSSE benchmarks. *Research in Higher Education, 45*, 193–208.

Plumb, C., & LaMeres, B. (2011). Comparing student learning in a required electrical engineering undergraduate course: Traditional face-to-face vs. online. Proceedings from the annual conference of the *International Network for Engineering Education and Research*, Belfast, Northern Ireland. Retrieved from http://www.coe.montana.edu/ee/lameres/vitae/publications/d_conference_full/conf_full_024_comparing_live_vs_online.pdf.

Podolny J. (1993). A status-based model of market competition. *American Journal of Sociology, 984*, 829–72.

Poirier, C., & Feldman, R. (2004). Teaching in cyberspace: Online versus traditional instruction using a waiting-list experimental design. *Teaching of Psychology, 31*(1), 59-62.

Pollock, T., Lee, P., Jin, K., & Lashley, K. (2015). (Un)Tangled: Exploring the asymmetric coevolution of VC firm reputation and status. *Administrative Science Quarterly*.

Raudenbush, S., & Bryk, A. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). London: Sage Publications.

Reskin, B. F. (1979). Academic sponsorship and scientists' careers. *Sociology of Education, 52*, 129–46.

Reuter, R. (2009). Online versus in the classroom: Student success in a hands-on lab class. *American Journal of Distance Education, 23*(3), 151-162.

Sauder, M., Lynn, F., & Podolny, J. (2012). Status: Insights from organizational sociology. *Annual Review of Sociology, 38*, 267-283.

Schiffman, S., Vignare, K., & Geith, C. (2007). Why do higher education institutions pursue online education? *Journal of Asynchronous Learning Networks, 11*(2), 61-71.

Schmitz, C. C. (1993). Assessing the validity of higher education indicators. *Journal of Higher Education, 64*(5), 503-521.

Sener, J. (2012). *The seven futures of American education: Improving learning and teaching in a screen-captured world.* North Charleston, SC: CreateSpace.

Shapiro, D., Dundar, A., Ziskin, M., Yuan, X., & Harrell, A. (2013). *Completing College: A National View of Student Attainment Rates-Fall 2007 Cohort*. Herndon, VA: National Student Clearinghouse Research Center.

Shea, P., & Bidjerano, T. (2014). Does online learning impede degree completion? A national study of community college students. *Computers & Education,* (75), 103-111.

State Higher Education Executive Officers (2011). *State Higher Education Finance FY 2011*. Boulder, CO: The College Board.

Stavredes, T., & Herder, T. (2013). Student persistence—and teaching strategies to support it. In M.G. Moore (Ed.), *Handbook of distance education* (3rd ed., pp. 155-69). New York, NY: Routledge.

Straumsheim, C. (2014). 'Going' (but not going) to college. *Inside Higher Ed*. Retrieved from https://www.insidehighered.com/news/2014/09/25/u-florida-online-considers-how-sell-studying-online-high-school-graduates.

Strauss, V. (2015, March 26). Largest for-profit university in U.S. loses hundreds of thousands of students. *The Washington Post*. Retrieved from http://www.washingtonpost.com/blogs/answer-sheet/wp/2015/03/26/largest-for-profit-university-in-u-s-loses-hundreds-of-thousands-of-students/.

Summers, J., Waigandt, A., & Whittaker, T. (2005). A comparison of student achievement and satisfaction in an online versus a traditional face-to-face statistics class." *Innovative Higher Education, 29*(3), 233-250.

Thayer, P. (2000). "Retention of students from first-generation and low-income backgrounds." *Opportunity Outlook: The Journal of the Council for Opportunity of Education.* (ERIC Document Reproduction Service No. ED 446 633).

The National Center for Public Policy and Higher Education (2008). *Measuring Up 2008: The national report card on higher education*.

Toma, J. (2012). Institutional strategy: Positioning for prestige. In Bastedo, M. (ed.), *The organization of higher education: Managing colleges for a new era*. Baltimore, MD: The Johns Hopkins University Press.

Urtel, M. (2008). Assessing academic performance between traditional and distance education course formats. *Educational Technology & Society, 11*(1), 322-330.

Volkwein, J. F., & Sweitzer, K. V. (2006). Institutional prestige and reputation among research universities and liberal arts colleges. *Research in Higher Education, 47*, 129-148.

Wagner, S., Garippo, S. & Lovaas, P. (2011). A longitudinal comparison of online versus traditional instruction." *MERLOT Journal of Online Learning and Teaching, 7*(1), 30-42.

Washington, M., & Zajac, E.J. (2005). Status evolution and competition: Theory and evidence. *The Academy of Management Journal, 48*(2), 282-296.

Winston, G.C. (1999). Subsidies, hierarchies, and peers: The awkward economics of higher education. *Journal of Economic Perspectives, 13*(1), 13–36.

Xu, D., & Jaggars, S. (2011). Does course delivery format matter? Evaluating the effects of online learning in a state community college system using instrumental variable approach. *Community College Research Center*. Teachers College, Columbia University.

Xu, D., & Jaggars, S. (2013). Adaptability to online learning: Differences across types of students and academic subject areas. *Community College Research Center*. Teachers College, Columbia University.

Yukselturk, E., & Bulut, S. (2007). Predictors for student success in an online course. *Educational Technology & Society, 10*(2), 71-83.

Zemsky, R., Wegner, G. & Massy, W. (2005). *Remaking the university: Market-smart and mission-centered*. New Brunswick, MJ: Rutgers University Press.

Appendix A

Part One: NPSAS Tables

Table 10: Cross Tabulation of Characteristics of Online Learners in 2000

Variables	Students took no online courses (0%)	Students took some online courses (1-99%)	Students took all online courses (100%)
Total	94.41%	3.35%	2.24%
Male	40.43%	40.12%	33.62%
Female	59.57%	59.88%	66.38%
Minority	29.37%	26.06%	28.26%
White	70.63%	73.94%	71.74%
Age: <18	0.38%	0.00%	0.43%
18-22	55.05%	42.48%	31.30%
23-29	24.00%	27.04%	30.00%
30-39	11.44%	18.68%	22.46%
40-49	6.82%	9.05%	12.17%
50-59	2.31%	2.75%	3.62%
Major:			
Undeclared	3.89%	2.19%	4.87%
Humanities	13.20%	13.57%	10.69%
Sciences	19.53%	14.72%	15.09%
Math	12.50%	14.09%	9.28%
Education	9.74%	15.76%	14.94%
Business/mgmt.	15.16%	17.54%	19.34%
Health	10.50%	10.65%	12.89%
Vocation/tech.	15.47%	11.48%	12.89%
Class level: 1st year	24.13%	16.22%	20.14%
2nd year	17.72%	19.37%	15.36%
3rd year	13.19%	15.44%	13.91%
4th year	8.16%	10.91%	14.35%
5th year	0.58%	1.08%	1.16%
Unclassified	36.21%	36.97%	35.07%
Attendance: FT	65.98%	59.00%	47.10%
PT	20.25%	20.26%	36.23%
Mixed FT/PT	13.77%	20.75%	16.67%
Job: No job	22.05%	17.99%	12.46%
Part-time	48.89%	44.74%	36.81%

Full-time	29.05%	37.27%	50.72%
Not a veteran	96.36%	94.49%	93.64%
Veteran	3.64%	5.51%	6.36%
Non-FG	55.77%	57.59%	66.05%
First Gen.	44.23%	42.41%	33.95%
Not low-income	60.17%	60.40%	60.62%
Low-income	39.83%	39.60%	39.38%
Inst. Ctrl: Public	57.06%	59.49%	55.94%
Private (NFP)	21.87%	20.26%	17.25%
Private (FP)	9.29%	3.93%	3.19%
Attended multiple	11.78%	16.32%	23.62%
Inst. level: 4-year	62.61%	62.05%	53.48%
2-year	17.40%	20.06%	20.29%
Less than 2-year	8.21%	1.57%	2.61%
More than one inst.	11.78%	16.32%	23.62%
Selectivity:			
Not pub. or priv. NFP 4-yr	30.20%	27.34%	33.19%
Very selective	17.32%	13.77%	8.55%
Moderately selective	40.00%	44.25%	38.12%
Minimally selective	7.84%	7.96%	10.87%
Open admission	4.64%	6.69%	9.28%
Inst. enrollment size:			
0-9999	52.70%	54.55%	51.34%
10k-19999	22.93%	24.10%	27.82%
20k-29999	14.31%	12.47%	14.72%
30k-39999	5.86%	4.86%	2.96%
40k-49999	2.50%	2.33%	1.91%
50k-59999	0.00%	0.00%	0.00%
60k+	0.00%	0.00%	0.00%
No dependent	76.51%	66.11%	59.38%
With dependent(s)	23.49%	33.89%	40.62%
Not married	81.21%	70.48%	62.02%
Married	18.79%	29.52%	37.98%
N	26,687	947	632

Table 11: Cross Tabulation of Characteristics of Online Learners in 2004

Variables	Students took no online courses (0%)	Students took some online courses (1-99%)	Students took all online courses (100%)
Total	86.41%	9.17%	4.42%
Male	41.61%	36.32%	36.23%
Female	58.39%	63.68%	63.77%
Minority	38.61%	35.64%	35.49%
White	61.39%	65.36%	64.51%
Age <18	0.77%	0.49%	0.74%
18-22	59.79%	43.96%	36.74%
23-29	19.96%	25.65%	25.87%
30-39	10.87%	17.18%	20.91%
40-49	6.15%	9.43%	11.55%
50-59	2.47%	3.29%	4.18%
Major:			
Undeclared	20.46%	18.04%	21.83%
Humanities	10.25%	9.48%	7.94%
Sciences	11.00%	8.79%	7.22%
Math	9.51%	9.44%	9.04%
Education	6.10%	8.03%	6.37%
Business/mgmt.	13.96%	16.90%	19.44%
Health	14.41%	16.24%	15.19%
Vocation/tech.	14.31%	13.07%	12.98%
Class level: 1st year	52.02%	39.35%	42.44%
2nd year	20.23%	25.21%	23.26%
3rd year	10.97%	13.23%	13.34%
4th year	10.41%	13.76%	11.20%
5th year	2.11%	3.16%	2.38%
Unclassified	4.25%	5.29%	7.40%
Attendance: FT	59.83%	49.62%	42.98%
PT	24.31%	31.48%	40.33%
Mixed FT/PT	15.86%	18.90%	16.69%
Job: No job	31.38%	23.42%	21.29%
Part-time	42.14%	39.23%	34.16%
Full-time	26.47%	37.34%	44.55%
Not a veteran	97.65%	96.12%	95.91%
Veteran	2.35%	3.88%	4.09%
Non-FG	59.11%	63.05%	64.65%
First Gen.	40.89%	36.95%	35.35%
Not low-income	57.73%	56.10%	58.10%

Low-income	42.27%	43.90%	41.90%
Inst. Ctrl: Public	54.69%	61.11%	53.13%
Private (NFP)	19.52%	13.89%	12.80%
Private (FP)	14.75%	8.06%	13.39%
Attended multiple	11.04%	16.94%	20.67%
Inst. level: 4-year	45.19%	37.85%	36.41%
2-year	32.70%	40.06%	37.63%
Less than 2-year	11.07%	5.16%	5.29%
More than one inst.	11.04%	16.94%	20.67%
Selectivity: Not pub. or priv. NFP 4-yr	52.12%	58.52%	61.61%
Very selective	12.37%	7.21%	5.94%
Moderately selective	25.84%	22.45%	20.16%
Minimally selective	5.94%	6.53%	6.67%
Open admission	3.73%	5.30%	5.61%
Inst. enrollment size:			
0-9999	62.55%	62.34%	61.75%
10k-19999	19.91%	21.46%	22.87%
20k-29999	11.83%	11.04%	11.19%
30k-39999	3.84%	3.02%	2.63%
40k-49999	1.86%	2.14%	1.56%
50k-59999	0.00%	0.00%	0.00%
60k+	0.00%	0.00%	0.00%
No dependent	76.53%	64.41%	58.37%
With dependent(s)	23.47%	35.59%	41.63%
Not married	84.27%	74.23%	68.92%
Married	15.73%	25.77%	31.08%
N	64,424	6,834	3,298

Table 12: Cross Tabulation of Characteristics of Online Learners in 2008

Variables	Students took no online courses (0%)	Students took some online courses (1-99%)	Students took all online courses (100%)
Total	80.17%	16.46%	3.36%
Male	41.95%	38.12%	37.82%
Female	58.05%	61.88%	62.18%
Minority	38.94%	33.40%	36.26%
White	61.06%	66.60%	63.74%
Age <18	0.31%	0.18%	0.11%
18-22	59.41%	43.09%	18.00%
23-29	23.28%	28.78%	29.11%
30-39	9.76%	16.05%	29.82%
40-49	4.98%	8.59%	16.96%
50-59	2.27%	3.31%	6.01%
Major:			
Undeclared	8.41%	8.73%	9.31%
Humanities	14.23%	14.08%	10.27%
Sciences	17.10%	13.64%	7.51%
Math	10.52%	10.61%	11.96%
Education	6.05%	7.29%	5.32%
Business/mgmt.	14.32%	16.78%	24.06%
Health	15.41%	16.23%	17.80%
Vocation/tech.	13.96%	12.64%	13.76%
Class level: 1st year	34.15%	24.48%	35.25%
2nd year	22.58%	27.49%	22.17%
3rd year	14.06%	15.60%	15.13%
4th year	24.63%	26.63%	21.85%
5th year	2.74%	3.34%	2.51%
Unclassified	1.84%	2.46%	3.09%
Attendance: FT	57.46%	44.82%	37.22%
PT	21.81%	30.10%	44.05%
Mixed FT/PT	20.73%	25.08%	18.73%
Job: No job	28.58%	20.54%	17.29%
Part-time	46.62%	42.69%	24.74%
Full-time	24.80%	36.77%	57.97%
Not a veteran	97.41%	95.94%	92.35%
Veteran	2.59%	4.06%	7.65%
Non-FG	59.53%	62.84%	71.00%
First Gen.	40.07%	37.16%	29.00%
Not low-income	59.30%	59.21%	59.48%

Low-income	40.70%	40.79%	40.52%
Inst. Ctrl: Public	54.91%	59.96%	40.63%
Private (NFP)	19.64%	12.15%	14.45%
Private (FP)	12.23%	7.11%	27.28%
Attended multiple	13.22%	20.78%	17.64%
Inst. level: 4-year	54.35%	45.27%	49.56%
2-year	26.20%	32.25%	30.28%
Less than 2-year	6.24%	1.70%	2.51%
More than one inst.	13.22%	20.78%	17.64%
Selectivity: Not pub. or priv. NFP 4-yr	43.30%	48.76%	62.32%
Very selective	14.72%	8.96%	3.58%
Moderately selective	30.80%	28.54%	18.24%
Minimally selective	7.08%	8.44%	6.88%
Open admission	4.09%	5.31%	8.98%
Inst. enrollment size:			
0-9999	56.44%	53.56%	57.23%
10k-19999	20.85%	23.24%	19.69%
20k-29999	13.60%	14.13%	13.77%
30k-39999	4.74%	4.73%	5.16%
40k-49999	2.61%	2.54%	1.05%
50k-59999	1.24%	1.23%	0.50%
60k+	0.16%	0.14%	2.14%
No dependent	79.37%	69.55%	45.63%
With dependent(s)	20.63%	30.45%	54.37%
Not married	86.42%	76.41%	57.92%
Married	13.58%	23.59%	42.08%
N	87,265	17,921	3,662

Table 13: Cross Tabulation of Characteristics of Online Learners in 2012

Variables	Students took no online courses (0%)	Students took some online courses (1-99%)	Students took all online courses (100%)
Total	73.35%	19.20%	7.45%
Male	44.99%	39.87%	34.92%
Female	55.01%	60.13%	65.08%
Minority	46.25%	40.93%	38.20%
White	53.75%	59.07%	61.80%
Age <18	0.86%	0.70%	0.55%
18-22	62.76%	53.66%	35.99%
23-29	18.62%	23.49%	25.03%
30-39	10.45%	13.65%	22.22%
40-49	4.90%	5.88%	11.31%
50-59	2.41%	2.62%	4.89%
Major:			
Undeclared	2.36%	1.37%	1.83%
Humanities	14.38%	15.45%	11.56%
Sciences	11.20%	11.33%	9.32%
Math	11.82%	10.90%	10.02%
Education	3.91%	5.06%	4.87%
Business/mgmt.	12.05%	16.66%	24.43%
Health	22.94%	21.99%	19.62%
Vocation/tech.	21.33%	17.24%	18.36%
Class level: 1st year	67.08%	49.71%	62.17%
2nd year	16.33%	23.76%	14.61%
3rd year	6.88%	9.93%	9.83%
4th year	6.75%	12.44%	7.33%
5th year	0.89%	1.59%	2.57%
Unclassified	2.07%	2.57%	3.49%
Attendance: FT	61.71%	51.82%	53.72%
PT	19.05%	23.91%	28.44%
Mixed FT/PT	19.23%	24.27%	17.84%
Job: No job	47.55%	33.95%	34.70%
Part-time	34.19%	38.96%	23.87%
Full-time	18.26%	27.09%	41.43%
Not a veteran	96.85%	96.61%	95.41%
Veteran	3.15%	3.39%	4.59%
Non-FG	66.21%	67.10%	73.99%
First Gen.	33.79%	32.90%	26.01%
Not low-income	49.13%	49.20%	45.98%

Low-income	50.87%	50.80%	54.02%
Inst. Ctrl: Public	43.76%	59.53%	31.93%
Private (NFP)	12.01%	6.06%	5.75%
Private (FP)	32.39%	20.96%	47.82%
Attended multiple	11.84%	13.44%	14.49%
Inst. level: 4-year	46.00%	48.30%	62.21%
2-year	35.75%	37.43%	22.65%
Less than 2-year	6.42%	0.83%	0.64%
More than one inst.	11.84%	13.44%	14.49%
Selectivity: Not pub. or priv. NFP 4-yr	66.50%	64.77%	79.17%
Very selective	9.24%	7.09%	3.37%
Moderately selective	16.66%	18.06%	10.23%
Minimally selective	3.48%	3.68%	2.39%
Open admission	4.13%	6.41%	4.83%
Inst. enrollment size:			
0-9999	62.26%	52.34%	42.59%
10k-19999	17.35%	21.96%	19.90%
20k-29999	10.04%	11.71%	8.07%
30k-39999	4.69%	6.07%	4.86%
40k-49999	2.43%	3.77%	2.55%
50k-59999	0.73%	1.17%	0.54%
60k+	2.23%	2.72%	21.22%
No dependent	76.43%	71.63%	52.71%
With dependent(s)	23.57%	28.37%	47.29%
Not married	88.44%	84.30%	72.32%
Married	11.56%	15.70%	27.68%
N	66,220	17,330	6,727

Appendix B

Part Two: BPS Tables

Table 14: Cross Tabulation of Characteristics of Online Learners in 2004

Variables	Students took no online courses (0%)	Students took some online courses (1-99%)	Students took all online courses (100%)
Male	41.51%	39.12%	38.63%
Female	58.49%	60.88%	61.37%
Underrepresented Minority	29.77%	26.97%	29.58%
White/Asian	70.23%	73.03%	70.42%
Age <18	1.56%	1.47%	2.20%
18-22	81.90%	74.63%	69.19%
23-29	7.64%	9.35%	12.22%
30-39	4.75%	8.14%	7.82%
40-49	3.01%	4.67%	6.36%
50-59	1.15%	1.74%	2.20%
Major:			
Undeclared	31.09%	27.90%	31.30%
Humanities	7.35%	6.94%	6.11%
Math/Engineering/Sciences	17.90%	17.09%	14.67%
Education	6.59%	6.01%	7.58%
Business/mgmt.	11.69%	13.22%	15.16%
Health	13.27%	14.82%	13.45%
Vocatonal/tech./prof.	12.11%	14.02%	11.74%
Attendance: FT	77.93%	73.03%	64.06%
PT	12.27%	14.15%	22.49%
Mixed FT/PT	9.81%	12.82%	13.45%
Job: No job	42.51%	32.04%	31.78%
Part-time	41.41%	45.39%	41.08%
Full-time	16.08%	22.56%	27.14%
Non-FG	42.66%	37.78%	35.94%
First Gen.	57.34%	62.22%	64.06%
Not low-income	72.12%	71.30%	67.48%
Low-income	27.88%	28.70%	32.52%
Not for profit	89.51%	92.92%	92.67%
For profit	10.49%	7.08%	7.33%

Inst. level: 4-year	53.67%	39.39%	39.12%
2-year	37.87%	56.48%	54.77%
Less than 2-year	8.46%	4.14%	6.11%
Selectivity:			
Not pub. or priv. NFP 4-yr	48.74%	63.55%	63.33%
Very selective	15.51%	7.61%	7.82%
Moderately selective	27.70%	20.16%	18.83%
Minimally selective	5.26%	5.61%	6.11%
Open admission	2.79%	3.07%	3.91%

Table 15: Odds Ratios of Three-Year Credential Completion (Part Two)

	Two-Year b (se)	Four-Year b (se)	Less-than-two b (se)	Pooled b (se)
No Degree				
Certificate				
Some online	1.090	2.293	0.458*	0.905
	(0.23)	(1.06)	(0.17)	(0.16)
All online	0.838	1.273	1.180	0.988
	(0.26)	(0.97)	(0.47)	(0.22)
Female	0.938	1.389	1.221	1.028
	(0.11)	(0.41)	(0.16)	(0.08)
Underrepresented Minority	0.821	1.066	0.910	0.884
	(0.09)	(0.32)	(0.11)	(0.07)
Humanities	0.561	1.321	0.715	0.575**
	(0.17)	(0.70)	(0.23)	(0.11)
Science	0.521**	0.859	0.546*	0.528***
	(0.12)	(0.39)	(0.13)	(0.08)
Math	0.491*	1.543	0.719	0.606*
	(0.17)	(0.78)	(0.25)	(0.12)
Education	0.523**	0.990	0.526**	0.519***
	(0.12)	(0.45)	(0.11)	(0.07)
Business/Mgmt	1.717***	2.070	0.982	1.361**
	(0.24)	(0.82)	(0.14)	(0.13)
Health	1.387*	0.983	0.964	1.164
	(0.21)	(0.50)	(0.15)	(0.12)
Low income	0.771*	1.288	0.862	0.884
	(0.09)	(0.41)	(0.10)	(0.07)
First-gen	1.333*	1.150	1.020	1.289**
	(0.18)	(0.33)	(0.16)	(0.12)
Part-time	0.938	1.556	0.839	0.905
	(0.12)	(0.48)	(0.10)	(0.08)
Full-time	0.960	2.049	0.978	0.984
	(0.13)	(0.84)	(0.14)	(0.09)
With dependent/s	1.294	0.995	0.846	1.052
	(0.17)	(0.47)	(0.10)	(0.09)
Exclusively part-t~e	0.525***	0.792	0.544**	0.527***
	(0.08)	(0.41)	(0.11)	(0.06)
Mixed FT/PT	1.172	1.603	0.615	0.985

	(0.18)	(0.58)	(0.16)	(0.12)
For Profit	2.040***	0.662	0.801	1.325**
	(0.31)	(0.44)	(0.10)	(0.13)
Transferred	1.180	4.490***	1.201	1.370***
	(0.16)	(1.23)	(0.20)	(0.13)
Very Selective		0.461		0.208***
		(0.29)		(0.10)
Moderately Selective		0.385		0.301***
		(0.20)		(0.11)
Minimally Selective		0.822		0.808
		(0.47)		(0.32)
Open Admission		1.021		1.059
		(0.63)		(0.46)
2-year				3.368***
				(0.98)
Less than 2-year				22.962***
				(6.64)
Constant	0.026***	0.003***	0.694	0.013***
	(0.02)	(0.00)	(0.26)	(0.01)
<u>Associate's</u>				
Some online	1.271*	1.420		1.317*
	(0.17)	(0.37)		(0.16)
All online	1.002	2.179*		1.315
	(0.21)	(0.69)		(0.23)
Female	1.355***	0.979		1.237**
	(0.11)	(0.13)		(0.08)
Underrepresented Minority	0.575***	0.546***		0.576***
	(0.05)	(0.09)		(0.04)
Humanities	1.480**	0.716		1.234
	(0.22)	(0.21)		(0.16)
Science	1.834***	1.060		1.551***
	(0.22)	(0.20)		(0.16)
Math	1.663**	0.617		1.320*
	(0.26)	(0.20)		(0.18)
Education	1.647***	1.101		1.512***
	(0.20)	(0.23)		(0.16)
Business/Mgmt	1.152	1.089		1.147
	(0.15)	(0.26)		(0.13)
Health	1.681***	2.560***		1.941***
	(0.21)	(0.47)		(0.20)

Low income	0.879	0.843	0.896
	(0.08)	(0.14)	(0.07)
First-gen	1.208*	1.559***	1.312***
	(0.10)	(0.21)	(0.09)
Part-time	0.960	1.245	1.038
	(0.08)	(0.17)	(0.08)
Full-time	0.578***	0.936	0.659***
	(0.07)	(0.20)	(0.07)
With dependent/s	0.732*	0.572	0.696**
	(0.09)	(0.17)	(0.08)
Exclusively part-t~e	0.259***	0.276***	0.261***
	(0.03)	(0.10)	(0.03)
Mixed FT/PT	0.704**	0.523*	0.693***
	(0.08)	(0.13)	(0.07)
For Profit	1.661***	2.840**	1.623***
	(0.22)	(1.00)	(0.19)
Transferred	1.186*	1.907***	1.447***
	(0.10)	(0.26)	(0.10)
Very Selective		0.151***	0.062***
		(0.06)	(0.02)
Moderately Selective		0.231***	0.114***
		(0.07)	(0.02)
Minimally Selective		0.883	0.489***
		(0.29)	(0.10)
Open Admission		1.271	0.743
		(0.45)	(0.16)
2-year			1.406*
			(0.21)
Less than 2-year			0.049***
			(0.02)
Constant	0.045**	0.000	0.020***
	(0.05)	(0.00)	(0.02)

* p<0.05, ** p<0.01, ***p<0.001

Reference categories: No online, Male, White/Asian, Undeclared, Not low income, Not FG, No job, No deg/cert expected, No dependent, Full-time, Not for profit, Never transferred, Not public/private NFP 4-year institution, 4-year institution

Table 16: Odds Ratios of Six-Year Credential Completion (Part Two)

	Two-Year	Four-Year	Pooled
	b	b	b
	(se)	(se)	(se)
No Degree			
Certificate			
Some online	0.950	2.234*	0.927
	(0.19)	(0.37)	(0.15)
All online	1.037	0.900	1.041
	(0.26)	(0.56)	(0.2)
Female	1.178	2.442***	1.282***
	(0.12)	(0.52)	(0.09)
Underrepresented Minority	0.766**	1.230	0.874
	(0.08)	(0.25)	(0.06)
Humanities	0.721	0.998	0.643**
	(0.17)	(0.40)	(0.11)
Science	0.580**	0.958	0.613***
	(0.11)	(0.28)	(0.08)
Math	0.373**	0.653	0.466***
	(0.12)	(0.28)	(0.09)
Education	0.566**	1.030	0.563***
	(0.10)	(0.33)	(0.07)
Business/Mgmt	1.437**	2.322**	1.315**
	(0.18)	(0.64)	(0.12)
Health	1.325*	1.481	1.186
	(0.18)	(0.46)	(0.11)
Low income	0.803*	1.012	0.862*
	(0.08)	(0.22)	(0.06)
First-gen	1.326*	1.307	1.311**
	(0.16)	(0.26)	(0.11)
Part-time	1.008	1.361	0.939
	(0.11)	(0.28)	(0.07)
Full-time	0.913	1.821*	0.980
	(0.11)	(0.50)	(0.08)
With dependent/s	1.271*	0.586	1.014
	(0.15)	(0.22)	(0.08)
Exclusively part-t~e	0.717**	0.861	0.625***
	(0.09)	(0.30)	(0.06)
Mixed FT/PT	1.213	1.252	0.997

	(0.17)	(0.33)	(0.11)
For Profit	1.728***	0.475	1.157
	(0.24)	(0.25)	(0.10)
Transferred	1.518***	3.433***	1.276***
	(0.15)	(0.71)	(0.09)
Very Selective		0.835	1.073
		(0.39)	(0.34)
Moderately Selective		0.538	0.850
		(0.22)	(0.22)
Minimally Selective		0.629	1.085
		(0.29)	(0.33)
Open Admission		0.710	1.136
		(0.35)	(0.38)
2-year			2.229***
			(0.49)
Less than 2-year			11.608***
			(2.57)
Constant	0.029***	0.003***	0.030***
	(0.02)	(0.00)	(0.01)
<u>Associate's</u>			
Some online	1.305*	1.468	1.292*
	(0.17)	(0.37)	(0.15)
All online	1.011	1.648	1.149
	(0.20)	(0.53)	(0.19)
Female	1.314***	1.031	1.260***
	(0.10)	(0.13)	(0.08)
Underrepresented Minority	0.591***	0.577***	0.605***
	(0.05)	(0.08)	(0.04)
Humanities	1.677***	0.847	1.362*
	(0.24)	(0.21)	(0.17)
Science	1.795***	1.059	1.492***
	(0.21)	(0.19)	(0.14)
Math	1.490*	0.404**	1.077
	(0.23)	(0.14)	(0.15)
Education	1.698***	0.781	1.387***
	(0.20)	(0.16)	(0.14)
Business/Mgmt	1.735***	1.655*	1.691***
	(0.19)	(0.33)	(0.16)
Health	1.683***	1.902***	1.718***
	(0.20)	(0.35)	(0.17)

Low income	0.788**	0.746	0.810**
	(0.06)	(0.11)	(0.05)
First-gen	1.257**	1.353*	1.268***
	(0.10)	(0.17)	(0.09)
Part-time	1.017	1.391*	1.093
	(0.09)	(0.18)	(0.08)
Full-time	0.665***	0.900	0.722***
	(0.07)	(0.18)	(0.06)
With dependent/s	0.925	0.829	0.876
	(0.10)	(0.21)	(0.08)
Exclusively part-t~e	0.486***	0.344***	0.460***
	(0.05)	(0.10)	(0.04)
Mixed FT/PT	0.727**	0.659*	0.704***
	(0.08)	(0.13)	(0.07)
For Profit	1.247	2.406*	1.102
	(0.16)	(0.83)	(0.12)
Transferred	1.254**	2.249***	1.290***
	(0.09)	(0.28)	(0.08)
Very Selective		0.455*	0.236***
		(0.17)	(0.06)
Moderately Selective		0.633	0.340***
		(0.20)	(0.06)
Minimally Selective		1.035	0.563**
		(0.34)	(0.11)
Open Admission		1.399	0.683
		(0.49)	(0.15)
2-year			1.142
			(0.17)
Less than 2-year			0.219***
			(0.05)
Constant	0.059***	0.041***	0.071***
	(0.04)	(0.02)	(0.04)
<u>Bachelor's</u>			
Some online	1.246	0.999	1.128
	(0.22)	(0.16)	(0.12)
All online	1.234	0.831	1.066
	(0.30)	(0.17)	(0.16)
Female	1.246*	1.457***	1.496***
	(0.12)	(0.09)	(0.07)
Underrepresented Minority	0.505***	0.541***	0.547***

	(0.05)	(0.04)	(0.03)
Humanities	1.037	0.893	0.935
	(0.18)	(0.10)	(0.08)
Science	1.216	1.032	1.131
	(0.18)	(0.09)	(0.07)
Math	1.553*	0.821	1.005
	(0.29)	(0.10)	(0.09)
Education	1.027	1.065	1.050
	(0.16)	(0.11)	(0.08)
Business/Mgmt	0.654*	0.921	0.761***
	(0.11)	(0.10)	(0.06)
Health	1.391*	1.035	1.046
	(0.23)	(0.11)	(0.08)
Low income	0.751*	0.617***	0.627***
	(0.09)	(0.05)	(0.04)
First-gen	0.801*	0.776***	0.708***
	(0.08)	(0.05)	(0.03)
Part-time	0.977	0.800***	0.811***
	(0.11)	(0.05)	(0.04)
Full-time	0.671**	0.525***	0.530***
	(0.10)	(0.06)	(0.04)
With dependent/s	0.439***	0.640*	0.486***
	(0.10)	(0.12)	(0.06)
Exclusively part-t~e	0.404***	0.280***	0.272***
	(0.06)	(0.05)	(0.03)
Mixed FT/PT	1.006	0.666***	0.760***
	(0.13)	(0.07)	(0.05)
For Profit	0.272**	0.378***	0.396***
	(0.11)	(0.11)	(0.07)
Transferred	1042.022***	0.169***	0.613***
	(1043.57)	(0.01)	(0.03)
Very Selective		1.996**	3.125***
		(0.49)	(0.51)
Moderately Selective		1.276	1.748***
		(0.30)	(0.27)
Minimally Selective		0.816	1.130
		(0.20)	(0.19)
Open Admission		0.473**	0.723
		(0.13)	(0.14)
2-year			0.459***
			(0.07)

Less than 2-year			0.046***
			(0.02)
Constant	0.000	0.228**	0.335
	(0.00)	(0.12)	(0.35)

* p<0.05, ** p<0.01, ***p<0.001

Reference categories: No online, Male, White/Asian, Undeclared, Not low income, Not FG, No job, No deg/cert expected, No dependent, Full-time, Not for profit, Never transferred, Not public/private NFP 4-year institution, 4-year institution

Table 17: OLS Regression Models – First-Year GPA (Part Two)

	Two-year	Four-year	Less-than-two	Pooled
	b	b	b	b
	(se)	(se)	(se)	(se)
Some online	0.081	-0.084*	0.075	0.026
	(0.04)	(0.04)	(0.14)	(0.05)
All online	0.047	-0.053	-0.015	-0.012
	(0.06)	(0.06)	(0.16)	(0.07)
Female	0.150***	0.206***	0.056	0.183***
	(0.02)	(0.02)	(0.05)	(0.02)
Underrepresented Minority	-0.238***	-0.189***	-0.166***	-0.221***
	(0.02)	(0.02)	(0.05)	(0.02)
Age	0.020***	0.017***	0.009***	0.017***
	(0.00)	(0.00)	(0.00)	(0.00)
Humanities	-0.039	0.083**	-0.008	0.038
	(0.04)	(0.03)	(0.13)	(0.04)
Life/Phys/Beh Scie~s	0.009	0.094***	-0.052	0.076*
	(0.05)	(0.03)	(0.16)	(0.03)
Math/Engineering/C~e	0.046	0.071*	-0.041	0.043
	(0.04)	(0.03)	(0.11)	(0.04)
Education	0.003	-0.017	-0.169	-0.035
	(0.05)	(0.03)	(0.14)	(0.04)
Business/Mgmt	0	0.001	0.019	0.012
	(0.04)	(0.03)	(0.09)	(0.03)
Health	-0.004	0.007	0.064	-0.056
	(0.03)	(0.03)	(0.06)	(0.04)
Vocational/Technic~f	-0.062	-0.055	0.067	-0.025
	(0.03)	(0.03)	(0.06)	(0.03)
Low-income	-0.078***	-0.051*	-0.036	-0.110***
	(0.02)	(0.02)	(0.05)	(0.03)
First-gen	-0.009	-0.109***	-0.005	-0.027
	(0.02)	(0.02)	(0.06)	(0.02)
Part-time job	-0.088***	-0.049**	-0.05	-0.059**
	(0.03)	(0.02)	(0.05)	(0.02)
Full-time job	-0.024	-0.080*	-0.089	-0.002
	(0.03)	(0.03)	(0.06)	(0.03)
With dependent/s	0.186***	0.217***	-0.038	0.157***
	(0.03)	(0.04)	(0.05)	(0.04)
Exclusively part-t~e	0.074**	-0.003	0.094	0.019
	(0.03)	(0.05)	(0.08)	(0.04)
Mixed FT/PT	-0.037	-0.113***	0.097	-0.06
	(0.03)	(0.03)	(0.10)	(0.03)

Private NFP	0.131**	0.114***	0.057	0.125***
	(0.05)	(0.02)	(0.11)	(0.02)
Private FP	0.323***	0.169*	0.085	0.220***
	(0.04)	(0.08)	(0.05)	(0.05)
Very selective		0.081		0.221**
		(0.07)		(0.07)
Moderately selective		-0.095		0.015
		(0.07)		(0.07)
Minimally selective		-0.065		0.032
		(0.07)		(0.08)
Open admission		-0.127		0
		(0.08)		(0.09)
2-year				0.09
				(0.07)
Less than 2-year				0.230**
				(0.08)
Constant	3.099***	3.313***	3.229***	2.877***
	(0.11)	(0.24)	(0.13)	(0.14)

* p<0.05, ** p<0.01, *** p<0.001

Reference categories: No online, Male, White/Asian, Undeclared, Not low income, Not FG, No job, No deg/cert expected, No dependent, Full-time, Not for profit, Never transferred, Not public/private NFP 4-year institution, 4-year institution

Table 18: Odds Ratios of Community College Transfers Within Three/Six Years (Part Two)

	3Y Transfer b (se)	6Y Transfer b (se)
Some online	1.081	1.129
	(0.13)	(0.12)
All online	1.324	1.340*
	(0.21)	(0.20)
Female	1.061	1.189**
	(0.07)	(0.07)
Underrepresented Minority	0.795***	0.918
	(0.05)	(0.05)
Age	0.952***	0.953***
	(0.01)	(0.01)
Humanities	0.989	1.021
	(0.12)	(0.11)
Science	0.907	1.025
	(0.09)	(0.09)
Math	1.139	1.048
	(0.15)	(0.13)
Education	0.883	1.009
	(0.09)	(0.09)
Business/Mgmt	0.820*	0.851
	(0.08)	(0.07)
Health	0.855	0.750**
	(0.09)	(0.07)
Low income	0.784***	0.831**
	(0.06)	(0.05)
First-gen	0.728***	0.675***
	(0.05)	(0.04)
Part-time	0.992	1.122
	(0.07)	(0.08)
Full-time	0.794**	0.941
	(0.07)	(0.07)
With dependent/s	0.763*	0.803*
	(0.08)	(0.07)
Exclusively part-time	0.588***	0.591***
	(0.05)	(0.04)
Mixed FT/PT	1.204*	1.069

	(0.10)	(0.09)
For Profit	0.527***	0.577***
	(0.08)	(0.07)
Constant	0.156	1.130
	(0.16)	(0.51)

* p<0.05, ** p<0.01, *** p<0.001

Reference categories: No online, Male, White/Asian, Undeclared, Not low income, Not FG, No job, No deg/cert expected, No dependent, Full-time, Not for profit, Never transferred, Not public/private NFP 4-year institution, 4-year institution

Justin C. Ortagus

Curriculum Vitae

EDUCATION

The Pennsylvania State University, University Park, PA
Ph.D., Higher Education – August 2015
Cognate, Management and Organization

University of Florida, Gainesville, FL
M.Ed., Educational Leadership – May 2011

University of Florida, Gainesville, FL
B.A., English – August 2007

SELECTED PEER-REVIEWED PUBLICATIONS

Umbricht, M., Fernandez, F., & Ortagus, J. (Revise and Resubmit). "Proceed with Caution: The (Un)Intended Consequences of Performance Funding in Higher Education," *Educational Policy*.

Ortagus, J., & Merson, D. (2015). "Leveling the Playing Field: Faculty Influence on the Academic Success of Low-Income, First-Generation Student-Athletes," *Journal for the Study of Sports and Athletes in Education*.

Stedrak, L., & Ortagus, J. (2013). "Improving Professional Development in Education: The Role of Digital Technology and Assessment," *Journal for Computing Teachers*.

Ortagus, J., & Stedrak, L. (2013). "Online Education and Contingent Faculty: An Exploratory Analysis of Issues and Challenges for Higher Education Administrators," *Journal of Educational Considerations*.

SELECTED PEER-REVIEWED PRESENTATIONS

Ortagus, J., Umbricht, M., & Wymore, J. 2015. "Unpacking the IT Productivity Paradox: The Influence of Technology Spending on Faculty and Staff Employment in Higher Education." Paper to be presented at the annual meeting of the American Educational Research Association. Chicago, Illinois, April 2015.

Ortagus, J. 2013. "The Influence of College Rankings on Perceptions of Prestige and Institutional Behavior in Higher Education." Paper presented at the annual meeting of the Association for the Study of Higher Education. St. Louis, Missouri, November 2013.