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A Comparison of Predictors of Student Grades in Online and Face-to-Face Community College Courses

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A COMPARISON OF PREDICTORS OF STUDENT GRADES IN ONLINE AND FACE-TO-FACE COMMUNITY COLLEGE COURSES

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by

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DEDICATION

This dissertation is dedicated to my daughter, Gillian Marie Wright.

ABSTRACT OF THE DISSERTATION

A Comparison of Predictors of Student Grades in Online and Face-to-Face Community College Courses
by
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There is an increased demand for online course offerings in community colleges while there is also an increased demand for college accountability. Many analyses examine persistence and completion rates as indicators of student success. This analysis focuses on grade outcomes. Although this traditional view of success is somewhat narrow, it will provide a starting point for an examination of online student success. This study examines to what extent the academic success of online and face-to-face course takers can be explained by student demographics, financial aid status, educational goals, and select high school performance measures. It, then, explores similarities and differences between the finding for online and face-to-face courses.

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CHAPTER 1

INTRODUCTION TO THE STUDY

BACKGROUND

There is an increased demand for online course offerings in community colleges. Online education is coursework that is delivered via the internet, usually in an asynchronous format. Online learning is lauded for presumably providing greater access to potential college students by providing learning experiences that are not bounded by physical location or a specific course time. Online course offerings and student enrollment in online courses has been increasing over the past 10 years. A recent national study found that online course enrollments have grown faster than overall higher education course enrollments over the past 8 years (Allen & Seaman, 2011). Online course offerings are growing the fastest among the nation's community colleges (Allen & Seaman, 2007; Ashby, Sadera, & McNary, 2011).

Online courses are a form of distance education where classes take place over the internet, usually in an asynchronous fashion. Hybrid courses have a blend of online and face-to-face course features. They have a significant portion of the class delivered online while the rest of the class is delivered face-to-face. This study compares 100% online courses to face-to-face courses and excludes hybrid courses from the analysis.

The increased demand for online courses in community colleges comes from societal change, technological change, and budget crises in community colleges systems. In terms of societal changes, college has become an option for growing numbers of people who previously may not have been able to, or encouraged to, attend. Community colleges are

open to adults regardless of their academic preparation. Hence, they attract a wide range of non-traditional students in terms of academic preparation, citizenship status, marital status, military status, economic status, and age. Non-traditional age students are the largest growing group of new community college students. Many of these students prefer non-traditional modes of course delivery because of their family and work obligations that make it difficult to physically attend classes.

There are advances in technology that make it easier to provide online courses. These advances include hardware, software, and learning management systems. In addition, expanded forms of social media and multimedia can be used for online courses.

The budget crisis in many community colleges, particularly in California, spawns the need for increased course offerings to meet student demand. Online courses are seen as a means to increase courses without increased instructors, resources, or classroom space. They are perceived as an inexpensive way to expand course offerings to local students and to students who would pay tuition at the higher out-of-state rate.

This study examines community college course offerings and outcomes with a focus on the California community college system. California has the largest community college system in the nation, serving more than 2.76 million increasingly diverse students (California Community Colleges Chancellor's Office, 2011a). Approximately 25% of all community college students nationwide are enrolled in a California community college. In addition, the California community colleges are the largest producers of workforce training in the nation (California Community Colleges Chancellor's Office, 2013; Foundation for California Community Colleges, 2013). There are also equity issues at hand since community colleges have historically enrolled approximately half of all undergraduate students from traditionally

underrepresented racial and ethnic groups (Mullin, 2012). Examining outcomes and factors leading to success in California community college online and face-to-face courses can provide valuable information to other state community college systems.

In addition to the demand for increased educational opportunities through different delivery modes, there is for a greater focus on accountability in the California community colleges. In 2004, Assembly Bill 1417 called for California community colleges to develop an accountability framework and construct a public report on accountability including student success in all 109 community colleges in existence at that time. The Accountability Report for Community Colleges (ARCC) was born out of this bill. The ARCC examines student success in the California community colleges. It initially defined success in terms of transfer rates to 4-year institutions, degree completion rates, passing basic skills and ESL courses, and student persistence. It currently includes the following rates: student progress and achievement; completed 30 or more units; fall to fall persistence; vocational course completion; basic skills course completion; English as a second language (ESL) course improvement; and basic skills course improvement (California Community Colleges Chancellor's Office, 2011a). Other reports examine similar "success factors."

The shift to increased online course offerings also means substantial change for college faculty. Faculty are encouraged to teach online and to convert course content previously taught in a face-to-face format to a format suitable for online instruction. This involves much more than simply lifting lectures and content and moving them to the web. Faculty need professional development and technical assistance as well as support in order to develop and teach viable online course offerings.

STATEMENT OF THE PROBLEM

California has the largest community college system in the United States. California community colleges, and community colleges throughout the nation, are expanding their online course offerings. The number of students taking online courses is increasing. When looking at online course enrollments as a percentage of all course enrollments over an 8-year period of fall semesters, there is a steady increase in online course enrollments where they start at 10% of course enrollments in Fall 2002 and grow to 32% of course enrollments in Fall 2012. The raw numbers show over 6.7 million students took an online course in 2012 (Allen & Seaman, 2007). The rapid rise of online course offerings comes a time of an increased call for accountability measures.

Community colleges throughout the nation are serving a broad and diverse population of students. Students come to community college with varied prior academic preparation as well as other factors and student characteristics. Hence, there is a dilemma in terms of how to best advise students regarding where and when to take online or face-to-face courses. Counselors and advisors need guidelines based on practical research. Guiding students with characteristics associated with online course success may increase success rates in online courses and increase institutional effectiveness.

There is a great deal of research that has been done on California community college performance, in terms of all courses. Most of the literature examines persistence, rates of transfer, completion, and drops (California Community College System Office, 2007; California Community Colleges Chancellor's Office , 2011a; Diaz, 2002; Frankola, 2001; Nather, 2005; Oblender, 2002; Shulock & Moore, 2007). There is an increasing body of literature on online courses and characteristics of online course-takers (Allen & Seaman,

2011; Hyllegard, Helping, & Hunter, 2008; Jost, Rude-Parkins, & Githens, 2012; Xu & Jaggers, 2011). Studies show that online course completion rates and success rates are lower than those for face-to-face courses. In general, online course success rates are approximately 10% lower than those for face-to-face courses. However, there is a lack of research on online learning and coursework in community college settings. In terms of online community college courses, the literature tends to focus on retention, including withdrawal rates, and reasons for withdrawal. What is missing is information on which factors lead to success and final course grade in online community college courses. In addition, many studies have relatively small sample sizes that may limit the generalizability of their results. This study has a large sample size of over 781,000 cases.

PURPOSE OF THE STUDY

In this paper, I will examine different factors that lead to student success in online and face-to-face courses. I will use the standard definition of success used in institutional research where success is denoted by a grade of C or higher. This quantitative analysis will focus on which factors best predict grade outcomes and final grades for students.

This study will answer the following research questions.

1. To what extent can the academic success of online course takers be explained by student demographics, financial aid status, educational goals, and select high school performance measures?
2. To what extent can the academic success of face-to-face course takers be explained by student demographics, financial aid status, educational goals, and select high school performance measures?
3. To what extent are the factors that explain the academic success of on-line and face-to-face course takers similar or dissimilar?

DEFINITION OF TERMS

- AB540—California Assembly Bill passed in 2001 that allows undocumented immigrant students to pay in-state tuition in public colleges and universities.

- Course persistence—the number or rate of students who are enrolled as of census for an initial and a subsequent term. The census date in this study is two weeks after the term begins.

- Course retention (or completion)—the number or percent of students who do not withdraw from a class and receive a valid grade.

- Course success—the number or rate of students who receive a passing grade. In this study, course success is defined by students receiving a grade of C or higher.

- DREAM Act—the Development, Relief, and Education for Alien Minors Act. The DREAM Act is a national legislation that went into effect in January of 2013. The DREAM Act provides certain undocumented immigrants who are under the age of 31 and entered the United States before age 16 with a pathway to United States citizenship through college or the armed forces. In addition, it deems them eligible for federal financial aid in the form of federal work study and student loans.

- Face-to-face course—a course that is taught where the instructor and students are in the same physical location together.

- Hybrid course—a course that is designed to integrate both face-to-face and online components. A portion of the class is taught face-to-face and a portion is taught online. Typically hybrid classes are 30%-49% online. Hybrid courses were excluded from this study.

- Logistic regression—a form of statistical analysis used for making predictions when the dependent variable is a dichotomy, and the independent variables are continuous and/or discrete.

- Multiple regression—a form a statistical analysis used to predict values of one variable on the basis of two or more other variables.

- Online course—a course that is taught via the internet where the instructor and students are not in the same physical location. Online courses are often taught asynchronously, meaning that the students and instructor do not need to meet or engage in the course at the same time. There are varying definitions as to what percent of the class must be online to qualify as an online course. A common definition is the course must be 80% or more online. The online courses used in this study were 100% online.

- Traditional-age college student—typically a college student between the ages of 18 and 22.

- Undocumented immigrant—people who came to the United States without legal documents or who entered the nation legally, but violated the terms of their visa status and remained illegally.

CHAPTER 2

REVIEW OF THE LITERATURE

Online education is a major topic of conversation in the higher education arena.

> With descriptions such as "open education" and "e-learning," references to the most recent forms of distance education hint at the educational promises of the new technologies: increased access to higher education, a more engaging learning experience for students; and preparation for success in the new information technology (IT)-driven economy. (Cox, 2006, p. 110)

Throughout the nation, online course offerings are increasing. During Fall 2012, over 6.7 million students were taking at least one online course. This is an increase of approximately 570,000 students over the number reported for the previous year (Allen & Seaman, 2013).

Much of the literature on online courses tends to focus on outcomes such as retention, including withdrawal rates, and reasons for withdrawal (Allen & Seaman, 2011; California Community Colleges Chancellor's Office, 2011a; Diaz, 2002; Jaggars, 2011; Nather, 2005). This may be due to the achievement gap between online and face-to-face courses. Measures of standard outcomes show that retention and success tend to be lower in online courses than in face-to-face courses. Some studies posit the lower outcomes for online courses are due to characteristic of online students. Such studies speak to how online students tend to be older, disproportionately female, work outside the home, care for children, and need a more flexible, non-traditional college schedule (Howell, Laws, & Lindsay, 2004; Hyllegard et al., 2008; Xu & Jaggers, 2011). What is missing from the literature is information on which factors lead to success in online courses.

This chapter seeks to provide background information on community colleges and online education. It covers the landscape of community colleges in general, with a focus on California community colleges. California has the largest community college system in the nation, consisting of 72 districts, 112 colleges, and enrolling more than 2.4 million students (California Community Colleges Chancellor's Office, 2013). In addition, California demographic changes account for an increasingly diverse California community college student population (California Community Colleges Chancellor's Office, 2011a; National Center for Educational Statistics [NCES], 2013). As previously mentioned, California community colleges enroll one quarter of the community college student in the nation and are the largest provider of workforce training in the nation. Examining factors leading to success in California community college online courses can provide valuable information to other state community college systems.

Online education consists of coursework that is delivered over the internet, rather than face-to-face. Online courses provide students with greater access to college because they provide greater flexibility to students by allowing them to attend class when it is convenient for them from their home, office, or wherever they access the internet. Taking online courses can save time and money by reducing the cost and time of commuting to college. The California Community Colleges Chancellor's Office (2011b) states in their distance education report:

> Online instruction (asynchronous Internet) delivery is by the far the most widely used method of conducting DE because it offers students the greatest flexibility in taking courses. Almost half of the colleges offer degrees and certificates that can be obtained exclusively through distance education; some colleges offer over forty degrees and certificates. As colleges expand their DE offerings and align courses, the number of degrees and certificates entirely using distance education has grown. (p. 1)

Asynchronous online courses allow students to "attend" class when it fits their schedule, rather than having to attempt to schedule their work, personal, and family obligations around the schedule of face-to-face courses.

This chapter is divided into seven sections. The first section reviews the literature on the history of community college systems, including a brief history of the California community colleges. The second section discusses the 2020 Initiative brought into being by the Obama Administration. The third section summarizes the literature relating to who attends community college, including information on academic preparation, student age, and citizenship. The fourth section touches on the role of faculty in online community college education. The fifth section provides a summary of student success in higher education. The sixth section focuses on the literature on online courses in community colleges. The final section provides a brief summary and ties the literature back to the research questions addressed in this study.

HISTORY OF COMMUNITY COLLEGE SYSTEMS

During the late 19th and early 20th century, states established public colleges and universities. The first 2-year college was created following what was called, "The Panic of 1893." This was a time period where the economy was not doing well.

> Reverend J. M. Carroll, president of Baylor University, convened the Baptist colleges in Texas and Louisiana the next year. The assembly recognized that there were insufficient finances and students to support the numerous small Baptist institutions in the two states. Carroll pragmatically proposed that the smaller colleges reduce their curriculum to the first 2 years of study and rely on Baylor to provide their students with the 3rd and 4th years of the baccalaureate degree. Thus, the 2-year college was born. By limiting the curriculum to the first 2 years, the colleges required fewer teachers, fewer resources, and fewer students to operate. (Ratcliff, 2002, para. 11)

During the 20th century, community colleges were established throughout the United States. California took the lead in the development of community colleges in the United States. California legislation led to the creation of some of the earliest community colleges in the country.

History of California Community Colleges

Our current California community colleges provide liberal arts education that prepares students for transfer to 4-year universities, basic skills education (in English, math, and English as a Second Language), workforce training, personal enrichment, and lifelong learning. The multiple types of education offered, have roots in the reasons community colleges were formed in California and the multiple missions that they were intended to fulfill.

The first 2-year colleges in California began because citizens observed that many young high school graduates were unable to attend colleges or universities because they were unable to afford to move away from home. There were very limited options for local higher education. Two-year colleges were developed to provide college studies for the local population. They were usually developed by a high school district in order to provide education and services to recent high school graduates.

In 1907, the Upward Extension Law was adopted in California. This law allowed high schools to offer "postgraduate" classes. Some historians credit the Upward Extension Law with starting the California junior college system. However, many California high schools were already offering classes to their graduates before the law passed.

Fresno High School was the first to make use of the Upward Extension Law. In collaboration with representatives from Stanford and Berkeley, the first junior college in

California was created in 1910. Soon, other California junior colleges were established. By 1920, California had the most extensive junior college system in the nation (Witt, Wattenbarger, Gollattscheck, & Suppinger, 1994).

Master Plan for Higher Education in California

The California Master Plan for Higher Education of 1960 was developed by a survey team appointed by the UC Regents and the State Board of Education. It defined the scope and roles of the University of California, California state universities, and the California community colleges each of which were already in existence. A special session of the 1960 Legislature passed the Donahoe Higher Education Act, which included much of what is included in the Master Plan.

The Master Plan created an educational system out of a collection of colleges and universities with overlapping and competing missions and needs. By providing structure, the colleges, universities, and citizenry benefitted from the educational system outlined in the Master Plan. It established a framework for three main types of educational segments with separate governing boards. This included differentiation of functions and access for students to each of the three segments. The University of California was designated as the state's primary academic research institution. As such, it was designated to provide undergraduate, graduate, and professional education, including doctoral degrees. In addition, the University of California was to restrict admission to the top 12.5% of the high school graduating class. The California state universities were to admit students from the top 33.3% of the high school graduating class. Their role was to provide undergraduate and graduate education through the master's level and to include teacher education. The California community colleges were to admit any student capable of benefiting from instruction, regardless of

previous academic history. The role of the community colleges was to provide academic and vocational instruction for students through the first 2 years of undergraduate instruction. In addition, community colleges were responsible for developmental coursework for students.

The California Education Code denotes the mission and functions of the California community colleges as follows: lower division coursework for college students, awarding for associate's degrees, remedial instruction, instruction in English as a Second Language (ESL), adult non-credit instruction, support services to help students succeed at the postsecondary level, to advance California's economic growth and global competitiveness through continuous workforce improvement, and to conduct institutional research concerning student learning and retention as needed to facilitate their educational missions (Legislative Council of California, 2011).

2020 Initiative

In 2009, President Obama spoke to the state of higher education in the United States. The nation does not lead the world in higher education. He set a goal for the United States to return to leading the world in postsecondary degree attainment. Obama said,

> And so tonight, I ask every American to commit to at least one year or more of higher education or career training. This can be community college or a 4-year school; vocational training or an apprenticeship. But whatever the training may be, every American will need to get more than a high school diploma. . . . That is why we will provide the support necessary for you to complete college and meet a new goal: by 2020, America will once again have the highest proportion of college graduates in the world. (2009, para. 6)

To help reach the President's college attainment goal, the Obama Administration has called for an additional 5 million graduates from community colleges by 2020. The community colleges play a major role in the 2020 initiative because they are the primary vehicle towards higher education for most of the population of the United States. There are

also equity issues at play since community colleges are typically the first step towards higher education for African Americans and Latinos. As such, it is important for community colleges to provide courses and programs of study to students in such a way to facilitate graduation, transfer, and lifelong learning. Providing courses in different modes of delivery such as online and face-to-face helps to meet student needs. However, it is important that these modes of delivery are marketed appropriately and students are counseled into courses in which they have the best chance of success.

According to Shulock and Moore (2007):

> Nowhere is the national priority of improving community college outcomes more important than in California, where nearly one-fourth of the nation's community college students are enrolled and where , with a high and growing percentage of Latino students, the benefits of closing the racial/ethnic performance gaps is the greatest. (p. 2)

WHO ATTENDS COMMUNITY COLLEGES?

According the Master Plan for Education in California, community colleges are to admit any student with the ability to benefit from instruction, regardless of their academic preparation, language skills, or previous academic history. The Ability to Benefit legislation was first implemented by the federal government in 1996. All students who do not have a high school diploma or General Education Development Certificate (GED) and who will be seeking federal financial aid must take a test to see if they demonstrate the ability to benefit from college coursework. The Federal Register has a list of approved "Ability to Benefit" tests and their passing scores. Students who are not applying for federal financial aid may not have to take the Ability to Benefit assessment.

The multiple missions of California community colleges defined by the California Education Code mandate such colleges to be open to students with diverse academic goals

and levels of preparation (Legislative Council of California, 2011). A diverse group of students attend community colleges from varying demographic categories, socioeconomic levels, citizenship statuses, English language skills, math skills, and prior levels of education. Students come to complete a degree or certificate program, to learn or improve a job skill, learn to speak English, gain basic literacy, enhance math skills, complete their lower division coursework for a bachelor's degree, and to enhance lifelong learning.

A great number of incoming community college students need instruction in Basic Skills. Basic Skills are foundation skills in reading, writing, math, and English as a Second Language (ESL). It also includes basic learning skills and study skills that are required for one to successfully complete college coursework. The need for Basic Skills instruction and improvement was so great that it was addressed in the California Community College System Office's Strategic Plan (California Community Colleges Chancellor's Office, 2006). The Basic Skills Initiative (BSI) was born out of the strategic plan:

The Basic Skills Initiative (BSI) was a grant funded initiative from the California Community Colleges Chancellor's Office which began in 2006 as part of the strategic planning process. The goal of the BSI was to improve student access and success. The Strategic Plan guides California community colleges as they serve over 2.9 million students annually at 110 colleges. The BSI was a part of Strategic Plan Goal Area 2—Student Success and Readiness (California Community Colleges Chancellor's Office, 2006). The project addressed credit and noncredit basic skills as well as adult education and programs designed to help underprepared students (Center for Student Success, 2007).

In addition to students who are unprepared for college-level work in various subject areas, there are students who are unprepared for taking online college courses. In order to be

successful, students must have an understanding of the structure of online courses. This includes knowing course expectations and having the appropriate technical skills. These issues can be addressed at the community college level with online course orientation, but they may be better addressed in high school. Students can learn how to succeed in an online course environment by receiving instruction and practice in high school.

Some educational practitioners and scholars question the multiple missions of community colleges and the notion that all people should go to college. Some believe basics skills issues should be addressed by adult education programs available through secondary education, rather than at the college level. Some practitioners push for entrance requirements to community colleges because it would make teaching easier and raise success and completion rates. There is also a notion that not all students should be encouraged to go to college. Proponents of the Pathways to Prosperity project at Harvard University posit all students are not meant to receive a college education. Instead, students should be given multiple pathways to career success (Harvard University Graduate School of Education, 2011).

Undocumented Students (AB540 & DREAM Act)

The nation and California are home to many undocumented immigrants. These are people who came to the United States without legal documents or who entered the nation legally, but violated the terms of their visa status and remained illegally. This group also consists of children who were brought with their parents at a young age and who attend school in the United States. Although undocumented students may attend and graduate from high school in the United States, they have historically hit a roadblock when attempting to

enroll in college due to having to pay non-resident tuition and their ineligibility for federal and state financial aid.

According to Kim and Diaz (2013), approximately 10.8 million undocumented immigrants live in the United States. Many undocumented immigrant children attend school in the United States. Of those undocumented immigrant students who graduate high school, only a small percentage enroll in college. This is important because

> Between 2010 and 2018, immigrants are projected to represent the majority of the labor force in the United States. As more and more occupations require a postsecondary education, it is of the utmost importance to provide undocumented students with the opportunity to attend and graduate from a college or a university without the fears and challenges they presently encounter. (Kim & Diaz, 2013, pp. 89-90)

Educating this group of students will have a positive effect on the nation's economy.

In 2002, California passed Assembly Bill 540 (AB 540) that allows undocumented students who meet certain criteria to pay in-state tuition fees at any college in the following three systems: University of California, California State University, and California Community College. The requirements for in-state tuition under AB 540 are the student must have attended a California high school for 3 years and graduated from a California high school (or attained the equivalent of a high school diploma) and they must register and be currently enrolled at an accredited institution of public higher education, and sign an affidavit with the college and not hold a valid non-immigrant visa (such as visas F, J, H, or L). The affidavit signed with the college typically states that the student meets the educational requirements and intends to establish legal residency. Not being required to pay out-of-state tuition is helpful to students. However, some students may still struggle to pay in-state tuition. The Development, Relief, and Education for Alien Minors Act (DREAM Act) addresses this issue.

The DREAM Act is a national bipartisan legislation that went into effect in January of 2013. The DREAM Act provides certain undocumented immigrants who are under the age of 31 and entered the United States before age 16 with a pathway to United States citizenship through college or the armed forces. In addition, it deems them eligible for federal financial aid in the form of federal work study and student loans. The eligibility for financial aid removes a serious roadblock for students who may not have been able to afford to attend college.

According to the Immigration Policy Center, there are approximately 2.1 million undocumented children and young adults in the United States who may be eligible to attend college and/or qualify for citizenship under the DREAM Act. Although DREAM Act-eligible young people live throughout the United States, the largest number of potential DREAM Act beneficiaries are in California (26% of the national total). This is not surprising since approximately 71% of potential DREAM Act beneficiaries are Mexican (Immigration Policy Center, 2012)

Academic success for these students, in terms of certificate or degree attainment would benefit the nation by allowing successful beneficiaries greater access to better jobs, which in turn creates more taxable income. Their success would also help in the Obama Administration's 2020 Initiative to increase postsecondary degree attainment. Their success would also increase the success rates of Hispanics, in general, since they are a subset of this group. Historically, African-American and Hispanic students have lower academic outcomes, including success rates, than other ethnic groups.

It will be interesting to track the performance of AB 540 and DREAM Act students in the community college system. Hispanic college graduation rates are low. The Immigration

Policy Center estimates that only 5-10% of undocumented high school graduates enroll in college. According to the Pew Hispanic Center, Hispanic college enrollment is increasing, mainly at community colleges (Jacobs, 2011).

Aging Community College Student Population

Community colleges have traditionally relied heavily on high school students to either graduate and enroll in college or to leave high school without a degree and come to adult education programs and/or community colleges to continue their education. However, this segment of the population is not growing at the same rate as in the past. Community colleges may notice a decline in these traditional-aged college students. Non-traditional age college students are growing at a high rate. These older students also utilize community colleges, but typically in different ways than traditional aged students. The 45-65 cohort enrolls in fewer transfer programs and concentrates more in basic skills, employment skills, vocational programs, and personal enrichment. This population also prefers non-traditional course delivery. Due to their personal and family obligations, they tend to want their classes delivered in shorter terms, in the evening or online. Community colleges will have to alter their delivery methods to best serve this changing population.

S. G. Johnson and Berge (2012) looked at data for postsecondary education to identify issues that impact three main areas of online education: issues that impact student success in online course, issues that impact faculty's ability to successfully transition classes to an online format, and issues that college administrators must consider to facilitate a successful transition.

Successful online students must be self-disciplined and self-motivated. These are characteristics identified with adult students. According to S. G. Johnson and Berge (2012):

> These similarities indicate that the best online student would be an adult learner. What is still open for debate is the point at which a learner becomes an adult learner. Legally, when a person turns 18 years old they are considered an adult; however, in education, the line is not as clearly defined. Perhaps a learner becomes an adult learner when they have achieved the characteristics of an adult learner, not when they achieve a specific age or degree. (p. 898)

Digital Youth

California community colleges are experiencing a decline in traditional-aged college students. Community colleges have traditionally relied heavily on high school students to either graduate and enroll in college, or to leave high school without a degree and come to adult education programs and/or community colleges to continue their education. However, this segment of the population is not growing at the same rate as in the past. There is a new generation of people who were born in the 1980s and beyond who some describe as the iGeneration. They are very internet- and technology-savvy. Traditional-aged college students (age 17-23) grew up with the internet. They are referred to in the literature as the net generation, the @ generation, MySpace generation, and millennials. These students are characterized as being technologically savvy and experts at multitasking via technology (Carlson, 2005; Oblinger & Oblinger, 2005; L. Robinson, 2005; W. Strauss & Howe, 2007). Many older adult internet users utilize the internet to accomplish certain tasks (paying bills, making purchases, conducting research, etc.), but use the real world for socializing. "The MySpace generation, by contrast, lives comfortably in both worlds at once" (Hempel & Lehman, 2005, para. 9). "To them, the smartphone, the Internet, and everything technological are not 'tools' at all—they simply are. Just as we don't think about the existence of air, they don't question the existence of technology and media" (Rosen, 2011, para. 6). One would expect these students to excel in online learning. However, there are many factors that go

into online learning. There is a question as to whether or not traditional teaching methods will engage students of the iGeneration.

Net generation or millennials were born between 1980 and 2000. They grow up with a sense of entitlement. They see education as a commodity to be purchased. They are expected to complete a college degree. They see the college degree of today as essential as the high school diploma of yesterday. They are technologically advanced, education-oriented, social, and good at multitasking. They are more knowledgeable and smarter at earlier ages than previous generations due to preschool television, computer games, and technologically-advanced children's toys. Their parents are very involved in their lives and are characterized as helicopter parents who hover around their children. They are self-directed, but get bored easily. They have short attention spans. They are frustrated by being more technologically savvy than their teachers (Worley, 2011).

The 2011 *Distance Education Report* indicates distance education (including online) courses are mainly taken by younger students. Figure 1 shows the enrollment by age for the 2009-2010 academic year. The three largest age categories taking distance education courses are 18-19, 20-24, and 25-29. These three categories make up 69% of the distance education student, indicating the majority of distance education students are below 30 years of age (California Community Colleges Chancellor's Office, 2011b).

There are also challenges, such as the disparity between digital literacy skills of faculty and instructors versus that of their younger students. While faculty who are interested in technology can seek out training, there is not much required formal training in using technology in the classroom. L. Johnson, Levine, Smith, and Stone (2010) state:

> The challenge is due to the fact that despite the widespread agreement on its importance, training in digital literacy skills and techniques is rare in any

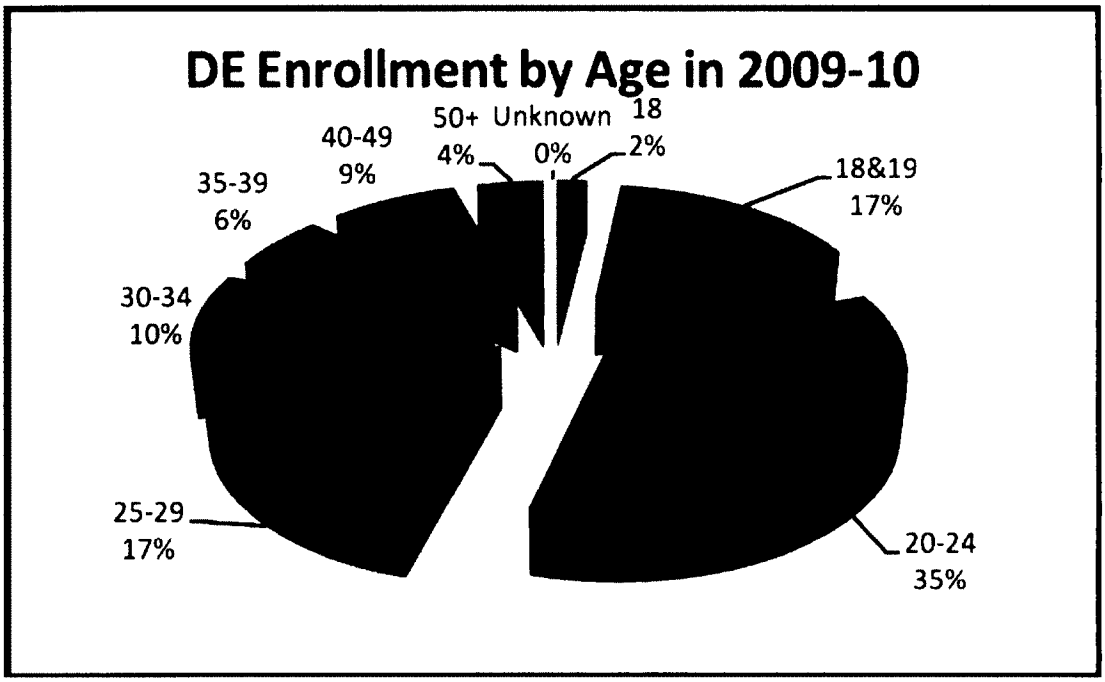

Figure 1. Distance education enrollment by age. Source: California Community Colleges Chancellor's Office. (2011b). *Distance education report.* Retrieved from http://www.cccco.edu/Portals/4/AA/Final%20DE%202011%20Report.pdf.

> discipline, and especially rare in teacher education programs. As faculty and instructors begin to realize that they are limiting their students by not helping them to develop and use digital media literacy skills across the curriculum, the lack of formal training is being offset through professional development or informal learning, but we are far from seeing digital media literacy as a norm. This reality is exacerbated by the fact that as technology continues to evolve, digital literacy must necessarily be less about tools and more about ways of thinking and seeing, and of crafting narrative. That is why skills and standards based on tools and platforms have proven to be somewhat ephemeral and difficult to sustain. (p. 5)

COMMUNITY COLLEGE FACULTY

The increased demand for online course offerings means change for faculty. Faculty may be expected to accept online education. They are encouraged to develop courses in an online format. This means they need appropriate support. This support is needed in three main areas: administrative; training, and professional development; ongoing support and collaboration, such as a peer support network (S. G. Johnson & Berge, 2012).

Akroyd, Patton, and Bracken (2013) conducted a study to determine factors that predict full-time community college faculty engagement in online instruction. They conducted a quantitative analysis of the 2004 National Study of Postsecondary Faculty (NSOPF) data. The NSOPF is a national survey sponsored by the U.S. Department of Education's National Center for Education Statistics (NCES). The NSOPF data was edited to only include full-time community college faculty who taught credit courses. This yielded a sample of 2,133 respondents. They conducted the analysis using a logistic regression model where the dependent variable was whether or not the faculty taught an online course. The independent variables were demographics and proxy measures from the NSOPF for human capital, intrinsic rewards, and extrinsic rewards. They found that faculty with higher educational attainment were more likely to teach online. "Thus faculty with a master's degree or higher are almost three times more likely to teach online courses than their counterparts with a bachelor's degree or less" (NCES, 2013, pp. 192-193). In addition faculty who taught general education courses were 25% less likely to teach online than those who taught vocational courses.

Another study investigated to see if there was a relationship between differences in technology usage among community college faculty and the age of those faculty. The researchers did so by analyzing responses to a 120-item questionnaire that was mailed to full-time faculty at five Florida community colleges. The sample size consisted of 246 completed surveys. Age was divided into two categories: 54 or under, and 55 or older. The dependent variables included attitudes various issues related to technology such as professional development, use, skill, support, and barriers to use. The independent variables were age, gender, highest degree earned, and race/ethnicity. A comparative study was done between

those 54 or under and those 55 or older. They found older faculty were no less likely to use technology than younger faculty, and both age groups self-reported equivalent degrees of skill in using those technologies (van der Kaay & Young, 2012).

Bergstrand and Savage (2013) approached the comparison of online versus face-to-face courses in a different tack. They utilized quantitative methodology to analyze the student evaluations of 118 sociology courses taught by 21 faculty members at a large public university in the Southwest that were conducted either online or face-to-face. Student evaluations provide insight as to how the students view their professors and their classes. As such, they may be seen as an evaluation of perceived effectiveness of both professor and course.

In this study, the dependent variables were: (a) undergraduate perceptions of the amount learned in the course, (b) the teaching effectiveness of the instructor, (c) the overall rating of the course, and (d) whether the student felt he or she was treated with respect

These variables were measured via a 5-point Likert scale. The independent variables were whether the course was online or face-to-face. The study controlled for variables that might impact course evaluations such as faculty demographic factors, numbers of students enrolled in the course, and perceived difficulty of the course.

The study found that students rated online courses more negatively that face-to-face courses. Students reported learning less in online courses and being treated with less respect by instructors in online courses. In conclusion, the study by Bergstrand and Savage (2013) found online sociology classes to be rated as less effective than face-to-face courses.

Student Success in Higher Education

Assembly Bill 1417 and the resulting Accountability Report for Community Colleges (ARCC) examine student success in the California Community Colleges. ARCC defines success in terms of transfer rates to 4 year institutions, degree completion rates, passing basic skills courses, and student persistence. Other reports examine similar "success factors" (California Community Colleges System Office, 2007; Nather, 2005; Shulock & Moore, 2007). However, student success in the community colleges cannot be measured solely through these measures. Community college students may not be planning to transfer and may not want to complete a degree program or a specific class. Many enroll in classes to increase skills needed for employment or for personal enrichment. The California Community College System Strategic Plan acknowledges the need for more robust measures of student success (California Community Colleges Chancellor's Office, 2006).

The purpose of higher education is often to provide a gateway to employment. Students may or may not be interested in earning a degree or certificate, or transferring to a university. They may want to improve their skills for the workplace. Career technical education (CTE) is a large part of community college offerings. Success in CTE can be measured by job placement rates and licensure pass rates.

Although it costs more to recruit students than to retain them, colleges often focus on recruitment efforts, rather than retention. Studying which factors predict retention can help a college focus on appropriate intervention strategies for its students. Fike and Fike (2008) conducted a study examining which factors best predict fall to fall and fall to spring persistence in first year, first time community college students who enrolled in a 4-year period of time at a community college in West Texas. The sample size was 9,200.

The two dependent variables were fall to spring persistence and fall to fall persistence. The independent variables included student gender, age, and ethnicity; student completion status for developmental mathematics, reading, and writing courses; participation in Student Support Services (a selective, federally funded TRIO program for special-needs students); receipt of financial aid; enrollment in internet courses; semester hours enrolled in the first semester; semester hours dropped in the first semester; and the education level of parents. The study used multivariate logistic regression models to determine which factors best predict each outcome (in terms of persistence).

> The strongest positive correlate with retention was successful completion of a developmental reading course. Other positive correlates of retention included successful completion of a developmental mathematics course, receiving financial aid, taking an Internet course, semester hours enrolled in the first semester, and participation in student support services. Negative correlates included student age and semester hours dropped during the first semester. (Fike & Fike, 2008, p. 75)

California Community College System Strategic Plan

The California Community College System Strategic Plan calls for community colleges to, "Expand and sustain an appropriate range of delivery methods to enhance access while maintaining and promoting high standards of academic rigor and excellence" (California Community Colleges Chancellor's Office, 2006, p. 26). Goal A4 calls for colleges to utilize multiple delivery methods. The Plan calls for the development of strategies to expand the use of distance education, online and hybrid courses (California Community Colleges Chancellor's Office, 2006). Faculty and administrators may achieve this goal through the use of peer-reviewed learning objects.

Accreditation Standards

The Accrediting Commission for Community and Junior Colleges (ACCJC) calls for colleges to find alternative delivery methods to better serve the student population. Standard II.1.b states, "The institution utilizes delivery systems and modes of instruction compatible with the objectives of the curriculum and appropriate to the current and future needs of its students" (Accrediting Commission for Community and Junior Colleges, 2012, p. 11). In addition, the ACCJC stresses the need for professional development for faculty and staff. Standard III.5 states, "The institution provides all personnel with appropriate opportunities for continued professional development, consistent with the institutional mission and based on identified teaching and learning needs" (Accrediting Commission for Community and Junior Colleges, 2012, p. 11).

There are a number of cognitive and non-cognitive measures of college success. Student satisfaction is one such factor (Astin, 1993; L. C. Strauss & Vokwein, 2002). Other factors include academic and social integration, engagement, self confidence, and social competence (Kuh, 2001, 2003; Pascarella & Terenzini, 2005; Tinto, 1993).

For many years research has shown that there is a stratification of educational outcomes in terms of race/ethnicity, class, and gender (Goldstein, 1967; Persell, 1977; Teranishi, Allen, & Solórzano, 2004). Scholars of digital equity issues find internet usage patterns echo other patterns of disparity in society. Studies show that internet usage patterns vary by race/ethnicity, gender, age, and income level (DeBell, 2003; Flowers, 2003; Gorski, 2003; Kleiner & Lewis, 2003; National Telecommunications and Information Administration, 2004; Pew Research Center, 2004; Rojas, Roychowdhury, Okur, Straubhaar, & Estrada-Ortiz, 2001; Sutherland-Smith, Snyder, & Angus, 2003).

ONLINE COURSES IN COMMUNITY COLLEGES

Online course offerings are increasing in community colleges. Online learning provides greater access to college courses to diverse students with varied life circumstances. It also provides an alternate way for students to become engaged in subject matter through multimedia presentations. In addition, it is a good way to provide instruction to students using some of the modern technology they will be expected to use in the workplace, due to the increasing use of educational technology in society.

In 1994, the California Community Colleges Chancellor's Office created a 7-year pilot period with new regulations for distance education (including online) courses. Previously, distance education courses were only provided for courses that were transferrable to universities. In 1992, the Board of Governors approved Title V regulations to allow distance education courses for credit non-transferrable courses and non-credit courses (California Community Colleges Chancellor's Office, 2011b).

Digital epistemologies are growing and changing the way we look at knowledge. Traditionally, courses have focused on directing learners to learn discipline specific content. This trend is declining. In contemporary society, information literacy is surpassing content knowledge as the way to display literacy and intelligence. It is important to design learning educational experiences that allow learners to take advantage of the wealth of information available to them via the internet through distance education, hybrid courses, and online components to face-to-face classes. An artfully crafted course delivered online or with online components can engage the learners in activities and reflective processes that may enhance their information literacy skills. Bruce, Chesterton, and Grimison (2002) state, "Educators are recognizing the need for learners to engage with the information environment as part of

their formal learning processes" (p. 1). Working with real world data via webquests, internet exploration, and research facilitates increasing learners' information literacy skills. Increasing distance education offerings can help in this transformation towards digital epistemologies.

There have been studies comparing student performance in online courses versus face-to-face courses. Some early studies show online and face-to-face student perform about the same (Russell 1999; Tucker, 2001). According to Driscoll, Jicha, Hunt, Tichavsky, and Thompson (2012),

> many of the studies within this body of literature suffer from a range of methodological weaknesses, such as relying on small, nonrandom samples; failing to replicate findings; lacking demographic controls; and comparative courses with substantial differences in content, materials, instructors, and methods of evaluating student performance (Bernard et al., 2004; Jahng, Krug, & Zhang, 2007; Means, Toyama, Murphy, Bakia, & Jones, 2009; Urtel 2008). Recent work that uses comparisons of larger samples and replicated courses demonstrates that F2F students score higher grades on identical assessments (Urtel, 2008). (p. 313)

Ashby et al. (2011) sought to compare student success between developmental math courses offered online, blended (hybrid), and face-to-face. Their study took place during the summer and fall semesters at a mid-Atlantic community college that offered an introductory algebra class in three different delivery modalities. The sample consisted of 167 students who self-selected into a course section that was either online, blended, or face-to-face. A quantitative study was conducted using demographic information, course test grades, and standardized intermediate algebra competency exam scores. Student success was defined as passing the course (grade of 70% or higher). Comparisons were made regardless of course attrition and also adjusted for course attrition. The results of one way ANOVA analyses on data showed there were significant differences between student performance in courses with different learning modalities, with students in blended courses performing the worst.

Although age and gender differed between the different course learning environments, they were not found to explain the differences in outcomes between the learning environments based on the results of factorial ANOVA analyses.

As mentioned previously, Fike and Fike (2008) conducted a study on predictors of first-year student retention in community colleges where they found taking internet courses is a strong predictor of student retention. They state, "Allen and Seaman (2007) note that the growth in online enrollments in higher education is greatest for nontraditional students at community colleges and that demand for the availability of online courses is expected to continue to grow" (p. 81).

Xu and Jaggars (2011) conducted a study examining the effects of students taking their first college-level English or math course online, rather than face-to-face, in terms of course completion (retention) and course success. They used a statewide administrative dataset with a sample size of 24,000 students from 23 community colleges in Virginia during fall, spring, and summer terms over a 4-year period of time. They selected introductory college-level math and English courses because they are gatekeeper courses. Hence, as gatekeeper courses, successful completion marks an important momentum point in a student's academic career. Also, gatekeeper courses have high enrollments compared to more advanced courses which provide a larger sample size for analysis.

In order to assess the effects of taking introductory college-level math and English classes online versus face-to-face, Xu and Jaggers (2011) utilized logistic regression and two types of propensity matching estimation strategies. They examined attrition (to measure course completion) and whether or not students were likely to earn a grade of C or better. All drops prior to the course census date were excluded from the study. The findings show a

negative impact of online course taking for both math and English in terms of course completion and course grade. They conclude, "despite small variations in the magnitude of the treatment effects, all three empirical strategies suggest that students pay a price for taking these key introductory courses online, in terms of both course persistence and performance" (Xu & Jaggers, 2011, p. 374).

Students should have education and training in online course practices and procedures prior to taking online college courses. This training can take place in high school. Many high schools offer online coursework in addition to classes in the traditional face-to-face environment. In fact, some states have instituted a high school graduation requirement that students must successfully complete at least one online course in order to graduate. A 2013 report states:

> As of September 2012, five states require students to complete an online course in order to graduate: Alabama, Florida, Idaho, Michigan, and Virginia. . . . Other states have passed legislation that encourages online learning. The West Virginia State Board of Education recommends all students complete an online learning experience during grades 9-12. New Mexico's SB0561 (2007) included a requirement that "at least one of the 24 units required for graduation must be an Advanced Placement, honors, dual enrollment or distance learning course." Minnesota passed SF1528 (2012), which strongly encourages students to take an online course. In addition, school districts are considering adding—or have implemented—online learning requirements. These include Cedarburg School District (WI), Kenosha School District (WI), Marietta City Schools (GA), Memphis City Schools, Putnam County Schools (TN), and Sugar-Salem High School (ID). (Watson, Murin, Vashaw, Gemin, & Rapp, 2012, p. 4)

INTERNET ACCESS AND USE

There is widespread debate among researchers as to whether or not the digital divide is a problem in the United States. Some experts posit that the digital divide does exist, but is closing. Others contend that the digital divide is growing at a fairly rapid pace. Statistics show us that computer and internet access is stratified by race, class and gender (DeBell,

2003; Gorski, 2003; Kleiner & Lewis, 2003). Clearly not everyone has equal access to internet technology. In fact, many families do not even own a computer. Some people may gain access through technology found at a community center, public library, or school, but simply gaining access to technology is not enough. In fact, the divide related to physical access is closing. The more profound question is whether or not families who have access to computer technology know how to effectively use that technology. A careful analysis of the literature suggests that the digital divide is not a technological problem, but a social problem. Lack of social capital can account for the observation that patterns of computer and internet access and usage mirror societal disparity patterns in terms of phenomena such as scores on standardized educational exams, educational attainment, income levels, et cetera.

The term "digital divide" came about in the 1990s as a way to characterize differential access to computer technology. The early definition was patterned after studies regarding telephone ownership and usage. It centered on whether or not an individual had physical access to a computer. The next phase examined whether or not an individual had physical access to the internet. This phase brought new dimensions to the issue; whether one had broadband or dial-up. In terms of physical access and connection type, studies showed that blacks and Latinos had less access and use than whites and Asians. This appears to support the concept of a "divide" between Asians and whites and blacks and Latinos. This is the same divide we see in terms of academic achievement and educational outcomes according to Bowen and Bok (1998). However, as Cisler (2000) states, such a simplistic, binary interpretation ignores the fact that the differences lessen as income increases in all income categories. Gorski (2003) explains that

> this traditional understanding of the digital divide fails to capture the full picture of inequity and privilege recycled by these gaps and the resulting educational,

> social, cultural, and economic ramifications, primarily for groups of people already educationally, socially, culturally, and economically oppressed. (p. 145)

A refined definition of the digital divide examines not only access and use of computers and the internet, but delves into the type of usage. Critical researchers are concerned with how computers and the internet are being used. Researchers find that there are differences in how computers are being used among different racial/ethnic groups and income levels. DiMaggio and Hargittai (2001) posit:

> At first, access to the new technology is restricted to an elite . . . and the great distinction is between haves and have-nots. Gradually, penetration increases, reducing the gap in access between rich and poor, urban and rural dwellers, old and young, the well educated and the unschooled. As access diffuses to parts of the public who were initially excluded, dimensions related to quality of use become important bases by which the benefits of the technology are stratified. (para. 4)

Researchers must examine how the internet is used by various social groups.

In addition, to physical access, how different groups use the internet is an educational equity issue.

> Research indicates, for example, that African American and Latina(o) people are much more likely than their White counterparts to view or use computer and Internet technologies for entertainment purposes, and that this trend begins in childhood (L. Jackson et al., 2007). White people, on the other hand, are more likely than people of color to use these technologies to seek financial or health information (Saunders, 2002; Spooner & Rainie, 2000). So as wealthier students, white students, and young men, on average, are being socialized and trained to participate in an increasingly computer reliant society and world, many students of color, young women, and low income students are being socialized to see computers more or less as digital flashcards. (Gorski, 2009, pp. 355-356)

Critical theorists forward an emergent view of the digital divide that delves much deeper than previous examinations of the digital divide. They show the connection between computer and internet use and power within society. The emergent view of the digital divide goes beyond equality of access and use. Critical social theorists focus on the equity of access and use as in, "As ICT literacies are becoming literacies of power, then, equity issues flow

from lack of access to the technologies" (Sutherland-Smith et al., 2003, p. 5). Therefore, rather than defining the digital divide in terms of physical access and suggesting a sort of binary divide, Warschauer (2003) provides us with a more accurate and complete definition: "the digital divide refers to social stratification due to unequal ability to access, adapt, and create knowledge via use of information and communication technologies" (p. 1).

There must be an explanation for why patterns of computer and internet usage are so similar to other societal disparity patterns. Physical access alone is not the answer to the problem.

> Generally, children who are already disadvantaged are the least likely to have access to the new technology. Minority children, children living in poor families, and particularly those living in high-poverty neighborhoods are the least likely to have a computer at home or access to the Internet. Schools close some of the gap, but significant disparities remain even after access at school is taken into account. (Wilhelm, Carmen, & Reynolds, 2002, p. 1)

This is where social capital comes into play. Social capital refers to the "sum of the resources, actual or virtual, that accrue to an individual or group by virtue of possessing a durable network of more or less institutionalized relationships, or mutual acquaintance and recognition" (Bourdieu & Wacquant, 1992, p. 118-119). Children and adults need social capital to develop a social system that values and encourages computer and internet use. In addition, they need networks or communities of practice to provide support in how to effectively use computer and internet technology. It is not surprising that people from lower income levels have differential types of usage patterns than people from higher income groups since these groups have less access to social capital and social networks that can be used to enhance upward social mobility (Stanton-Salazar, 1997).

There are important implications regarding whether or not people have the social capital that encourages regular computer and internet use. The Pew Internet and American

Life Project survey indicates that there are a number of people who have physical access who do not go online or have stopped going online. Their study found that "twenty percent of non-internet users live in wired homes yet remain offline" (Rainie, 2003, para. 5). There are many reasons why some people do not use the internet. Some may have issues gaining physical access. However, "Others don't live in a social world where Internet use matters and still others have no notion that the communication and information functions of the Internet can help them improve their lives" (Rainie, 2003, para. 1). Gaining social capital and its accompanying social network that values computer and internet use may change this attitude. When we look at the facial/ethnic disparities between internet users, the issue of social capital can be seen in the following quote:

> Badagliacco (1990) discussed the intersection of gender and racial factors in impacting the disposition towards the use of computers. . . . He illustrated that men and Whites had both the most computer experience and positive attitudes towards computers, and that computer-related practices are perceived as white and male-dominated activities. (Rojas et al., 2001, p. 5)

There are similar findings when one examines behavior that leads to school success. Many young Black and Latino males see such behaviors as "acting white." Kvasny and Keil (2002) indicate,

> From the individual perspective, we found that economic capital explains gaps in physical access to IT, but social capital and cultural capital explain gaps in the ability to use IT as well as disparities in the benefits that one derives from IT use. (p. 23)

In order to understand and effectively deal with issues related to inequity in computer and internet usage, one must first understand the root of the problem. Gorski (2003) explains,

> The digital divide has historically been understood too simplistically, as gaps in physical access to computers and the Internet among various identity groups. As a result, approaches for ending digital inequities, such as adding more computers to all schools and classrooms, have failed to take into account the historical and current social, cultural, political, and economic systems of power and privilege of which the digital divide is a symptom. (p. 145)

In order to remedy some of the problems related to racial,/ethnic, gender, and income stratification regarding internet use, researchers and policy-makers must steer away from measuring the divide merely in terms of physical access and usage. Something must be done to expand the social capital of certain groups in order to increase awareness of usefulness of computer and internet technology. In addition, there must be quality training for the unconnected and the underconnected. More studies must be conducted regarding how different groups use the internet. Finally, the cycle of reproduction of society inequality through the education system must be broken. Critical theorists posit that the digital divide is not a technological issue, but it is a social issue.

SUMMARY

Community college systems emerged out of a need to provide lower division college education to students who could either not make it to their local university due to cost, sheer distance, or lack of academic preparation. They are part of an educational system where they play an intermediary role between high schools, including adult education, and universities. As such, they have multiple missions.

Community colleges provide lower division education for students who are interested in pursuing a university degree. They are thought of as providing the first 2 years of instruction for a 4-year degree (even though most students take longer to complete a degree). They are the only institution that can issue the associate's degree. The associate's degree denotes that a student has completed a lower division education in a particular subject matter.

Community colleges also play the role of providing career and technical training for students who want to either gain or improve job skills. They play an important role in the

economy by preparing workers for the workforce. They do this by offering vocational programs and technical training.

Students with limited English, math, reading, and/or writing skills come to community colleges because of their commitment to teaching basic skills. Students with little to no academic preparation and/or language skills are accepted to community colleges where they can receive remediation to prepare them to move on to an academic program, enroll in a career technical program, or enter the world of work with enhanced skills.

Another mission of community colleges is to provide lifelong learning. Students can enroll in a wide variety of personal enrichment classes. They can take both credit and non-credit classes for fun or general interest. This includes exercise classes.

Due to the multiple missions of community colleges, their student population is quite diverse. There are traditional-aged college students, returning students, and older adults. There are students with varying citizenship statuses, including recent refugees and asylees who seek skills to become acclimated to life in the United States. There are students with varying levels of academic preparation and technological skill levels. Students also come from a wide variety of socioeconomic levels. There are a myriad of demographic and societal characteristics that incoming students bring to the community colleges due to the fact that they are open to virtually all adults.

Colleges must adhere to federal and state reporting requirements to show accountability. Accountability measures typically include success rates, course completion rates, and student retention rates. Success is defined as receiving a grade of C or higher or a pass in a course where letter grades are not given. Community college success also often includes examining graduation rates and transfer rates. However, these measures may not be

appropriate to measure outcomes for all of the multiple missions of community colleges. Not all students attend with a goal of transfer or graduation and lifelong learning students may not be concerned with completing classes or earning passing grades.

Within this diverse environment with multiple missions, there are also different forms of course delivery. Students can choose from traditional face-to-face courses, hybrid courses (where 50% or less of the class is taught online and the rest is taught face-to-face), and distance education courses, including online courses. The number of, and demand for, online courses is growing at a fairly rapid rate. A recent national report shows that as of Fall 2010, 31% of students take at least one course online (Allen & Seaman, 2011).

With the growing number of students taking online courses, it is important to understand more about their performance. Previous studies focus on the standard reporting measures such as success rates, course completion rates, and correlated withdrawal rates. There are also studies relating to student engagement in online courses. This study examines online courses from a different perspective. The focus of this study is determining which factors best predict success in courses, as well as which factors best predict final grade. A comparison will be done between online and face-to-face courses to see to what extent these predictive factors are similar or dissimilar.

CHAPTER 3

METHODS

This study examines different factors that lead to final grade and success in online and face-to-face courses for students in a southern California community college district, with success defined as earning a grade of C or higher. Although many studies have been done comparing course success rates and/or course completion rates, this study differs because it shows which factors best predict success and final grade outcome for students in online and face-to-face courses. This was achieved by building regression models using data on online and face-to-face courses that explore which factors have the best predictive value in two different ways. The purpose of this study is to answer the following research questions:

1. To what extent can variation in the academic success of online course takers be explained by demographics, financial aid status, educational goals, primary language, and previous educational status?
2. To what extent can variation in the final course grade of face-to-face course takers be explained by demographics, financial aid status, educational goals, primary language, and previous educational status?
3. What are the factors of success and final course grade in online courses?
4. What are the factors of success and final course grade in face-to-face courses?
5. To what extent are these factors similar or dissimilar?

PARTICIPANTS

The participants in this study include all students that took courses between Fall 2006 and Spring 2011 in a southern California community college district that enrolled 30,591

students in Spring 2011. Of these students, 55% were female and 44% male students, with the typical student being between 20 and 24 years of age (California Community Colleges Chancellor's Office, 2011a).

SETTING

The setting for this study is a southern California community college district in which the researcher works as an Institutional Research Planner in the Research, Planning & Institutional Effectiveness Office. The district is fairly typical in that it admits a diverse group of students to pursue goals consistent with the multiple missions of community colleges.

DATA COLLECTION

This study uses secondary data from a California community college district that is collected and maintained by the information systems office and utilized by the college institutional research office. The data can be generally categorized as application and enrollment data. The application data includes basic demographic information and information regarding their previous academic experiences and performance, as well as students' goals for attending community college. The enrollment data consists of basic course enrollment information including information such as course subject, course type, units, and grades. This is standard data used throughout the California community colleges for mandated state and federal reporting and for internal research studies. Specific definitions of variables may vary slightly throughout the state, but the data must align with the California State Chancellor's Office Management Information Systems taxonomy.

INSTRUMENTS

As mentioned previously, the data utilized in this study consists of student data and enrollment data. The student data is self-reported in the student's application to college. The course enrollment data, including grades, is collected by the district's data system. The student application data and student course enrollment data are merged into the district's data warehouse system.

The instrument used to collect student data is the college application available via web-only at http://www.cccapply.org/. CCCApply is the California statewide application system used in more than 100 of the 112 California community colleges. It has been in use since 2001. It consists of a college application in English and Spanish as well as an application for international students and a Board of Governors (BOG) fee-waiver application. The CCCApply application data includes basic self-reported data about the student such as standard demographic information, prior education, educational goals, citizenship, residency, employment status, primary language, disability status, veteran status, and high school grade point average information. The enrollment data includes course enrollment information such as course subject, course type (basic skills, transfer, career technical education, et cetera), section, units, and grades.

PROCEDURES AND DATA ANALYSIS

The researcher used a quantitative research methodology because this study seeks to explain the relationship between multiple independent variables and two dependent variables in a population of students. This is a correlational study as it seeks to explain the relationship between variables, rather than attempt to establish causality.

The researcher used SPSS, a computer program used for statistical analysis of data, to conduct two different types of regression analyses on the research data. A logistic regression analysis was used to determine which factors best predict course success, using a binary dependent variable of either "success" or "no success" (which will subsequently be referred to as "failure"), where success is defined as a final course grade of C or higher. In addition, the researcher used multiple regression analysis to determine which factors best predict final course grade among successful students. In other words, the logistic regression provides a broad look at factors contributing to course success, while the multiple regression will show finer grain factors due to greater variation in the dependent variable.

The data were requested from the community college district in which the researcher works. The research office in the study district prepared a dataset consisting of student and enrollment data. The research office removed any personally identifying information from the data file such as student names, addresses, student identification numbers, section numbers, and faculty names. The researcher received a clean data file consisting of data necessary for the study.

The researcher then examined the population data to assess whether or not the study population is typical or non-typical in terms of characteristics of online and face-to-face learners in a community college. The study sample was created by eliminating all summer courses, all non-credit courses, and hybrid courses. The researcher analyzed the sample data to determine the basic demographic breakdown and defining characteristics of students who take online and face-to-face courses in the community college district being studied.

The entire population is not being used in the analyses. The dataset consists of enrollment and student data from a southern California community college district for five

academic years (2006/07-2010/11). All non-credit courses, summer courses, and hybrid courses were eliminated. The final sample consists of 781,231 cases. The total sample is 55.3% female and 43.9% male. The largest three ethnic groups are White (51.1%), Hispanic (23.3%), and African American (8.6%). The mode of delivery of courses in the sample is 10.7% online and 89.3% face-to-face.

The main dataset (described above) was prepared for the analyses. Dummy variables were created for the categorical variables so that regression analyses could be performed. The dummy variables were created by making binary variables for each value in each of the variables selected for use in the analyses. For example, for Gender, females were coded with the value of one and males with the value of zero, making males the reference category. The reference category is the value to which the other values in a variable are compared in the regression analysis. Table 1 shows the variables selected for use in the study, including the reference category for each variable.

The main dataset was used with the original logistic regression model built for the analysis and consists of all enrollments for online and face-to-face courses. This data set was divided into five other subsets for additional analyses. The other datasets are:

- All successful courses (online and face-to-face, success only)
- All online courses (online, success and no success)
- All face-to-face courses (face-to-face, success and no success)
- All successful online courses (online, success only)
- All successful face-to-face courses (face-to-face, success only)

The datasets consisting of both successful and not successful enrollments were used for the logistic regression analyses where the dependent variable was Success. The datasets consisting of only successful enrollments were used for the multiple regression analyses

Table 1. Variables and Categories

Variable	Categories	Reference
Gender	Female	
	Male	✓
Ethnicity	Asian	
	African-American	
	Filipino	
	Hispanic	
	American Indian/Alaskan Native	
	Pacific Islander	
	Two or More	
	White	✓
Primary Language	English	✓
	Not English	
Financial Aid Status	BOG Waiver	
	No BOG Waiver	✓
Residency	AB540	
	California Resident	✓
	CE	
	International	
	Non-resident	
Academic Year	06-07	✓
	07-08	
	08-09	
	09-10	
	10-11	
Age Group	<30	
	30-49	
	50+	✓
Prior Educational Status	No High School	
	HS or Equivalent	✓
	College Degree	
Educational Goal	Degree/Transfer	✓
	Vocational Degree/Transfer	
	Plan or Maintain Career	
	Basic Skills	
	Undecided/Uncollected	

where the dependent variable was Final Grade. The researcher used these datasets to examine to what extent variation in academic success and final course grade can be explained by demographics and other variables such as financial aid status, educational goals, and previous educational status.

First, the researcher sought to determine which factors best predict success or no success among online and face-to-face students. I built a logistic regression model for use with the main sample which includes both online and face-to-face courses. The dependent variable was "success" defined as success (pass with a grade of C or higher) or failure. The independent variables were ethnicity, age group, prior educational status, educational goal, primary language, financial aid status, residency, academic year, and online course status (whether the course is online or face-to-face).

Next, the researcher set out to find out for the successful students, which factors best predict final grade. A multiple regression model was used on the subset of data consisting of only successful enrollments. This model used the same independent variables as the previous model (ethnicity, age group, prior educational status, educational goal, primary language, financial aid status, residence, and academic year). However, this time the dependent variable was the final grade received.

Third, the researcher examined the course enrollments separated by online course status. This involved using the subsets of data consisting of online only and face-to-face only courses. The original logistic regression model was first applied to the online courses and then to the face-to-face courses to determine which factors best predicted success. After determining which factors best predict success and final course grade in both online and face-to-face course enrollments, the results were compared. This included examining the sets of

predictive variables and looking for similarities and differences among predictors for both online and face-to-face courses. Finally, the researcher applied the multiple regression model to my online only and face-to-face only subsets that consisted only of successful enrollments to determine which factors best predict final course grade. In this investigation, the aim was to explain to what extent these factors were similar or dissimilar.

LIMITATIONS

Of course, there are limitations to this study. For example, this study examines secondary data collected by a small, southern California community college district. The data consists of information collected from students on the application for admission to the colleges in the district and course enrollment data. As such, there are no variables indicating students' technological proficiency, internet usage patterns, types of access to the internet (home, work, school, community center, et cetera), number of hours spent studying, or other potentially telling explanatory variables. As such, this study is limited to standard data collected and used by community colleges for mandated federal and state reporting as well as internal research studies.

The outcome data in the study is limited in that the multiple regression models conducted on successful cases exclude non-evaluative grades and grades that do not carry a specific grade point value. This limits the model to examining only completed courses where students earned a grade that can be calculated into their grade point average.

There is also selection bias that is unavoidable due to the fact that faculty chose whether or not to teach an online course. Understandably, there may be differences in the teaching methodologies used by faculty. In addition, certain classes may better lend themselves to online instruction than others.

CHAPTER 4

RESULTS

This chapter reports on findings to explain which factors best predict success and final grade outcome for students in community college online and face-to-face courses. This was done by building regression models that used institutional data to explore the factors associated with first receiving a passing grade in the course, and then the factors associated with receiving a particular letter grade in the course for those who passed the class. Statistically speaking, logistic regression models were used to address the first question while multiple regression models were used to examine the second. Results from both sets of models are presented in this chapter.

Specifically, the results of this study addressed the following research questions:

1. To what extent can the academic success of online course takers be explained by student demographics, financial aid status, and educational goals?
2. To what extent can the academic success of face-to-face course takers be explained by student demographics, financial aid status, and educational goals?
3. To what extent are the factors that explain the academic success of online and face-to-face course takers similar or dissimilar?

RESULTS FOR PRIMARY DATASET: ONLINE AND FACE-TO-FACE COURSES, SUCCESS VS. NO SUCCESS

The participants in this study represent the sample of 781,231 students from a southern California community college district that took online and face-to-face classes between Fall 2006 and Spring 2011. These students were mainly female (55.8%), White (51.1%), with a primary language of English (89.3%), under 30 years of age (81.5%), with an

educational goal of degree or transfer (73.7%), taking mainly face-to-face courses (89.3%). Table 2 shows the breakdown of online course status by academic year.

Table 2. Online Course Status by Academic Year

		Academic Year					Total
		06-07	07-08	08-09	09-10	10-11	
Online	Count	10,477	14,597	18,602	20,757	19,397	83,830
	%	7.50%	9.70%	11.60%	12.30%	11.90%	10.70%
F2F	Count	128,775	135,160	141,636	148,089	143,741	697,401
	%	92.50%	90.30%	88.40%	87.70%	88.10%	89.30%
Total	Count	139,252	149,757	160,238	168,846	163,138	781,231
	%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

The researcher set out to see which factors best predicts success or failure among online and face-to-face students. This entailed building a logistic regression model for use with the online and face-to-face courses. The dependent variable was "success" defined as pass with a grade of C or higher, while those that did not pass were coded as "failure." This dichotomous variable indicated whether a student was successful in their course or not. The independent variables used were gender, ethnicity, age group, prior educational status, educational goal, primary language, financial aid status, residency, academic year, and online course status (whether the course is online or face-to-face).

In interpreting the individual predictors in the model, the unstandardized coefficients determine the direction of the relationship between the predictor variables and the dependent variable. For this model, the unstandardized coefficients of several variables were negative, indicating a negative relationship between the independent and dependent variables. For example, African-American students were much less likely to achieve course success than the reference group of White students.

In a linear regression model, the R^2 and adjusted R^2 are the percentage of the total variation and variation (respectively) explained by the regression model; however, these measures are not appropriate for logistic regression. Instead, the Nagelkerke R^2 can be used to quantify the proportion of variance explained in a logistic regression the model. As Table 2 indicates, the model explains about 6.3% of the variation in the outcomes, suggesting that other factors that contribute to students' success are not captured in this model because they are simply not tracked by the college district in their standard institutional data.

Each independent variable in the various models has a p value which indicates the statistical significance of the variable. In many respects, the p value is more important than the R^2 in determining whether the regression model is valuable. If the p value is less that 5%, then the regression model indicates a significant relationship between that variable and the dependent variable (success or failure). In other words, a p value of .05 means that there is a 5% chance that the relationship is non-existent and a 95% chance that the relationship is real. Many of the variables in the regression models below are significant at the $p < .05$ level, including many significant at the $p < .01$ level.

Most of the findings (see Table 3) were intuitive and aligned with results typically found in the literature on student success in terms of race/ethnicity, gender and economic status. For example, there were statistically significant results for ethnicity, age group, prior educational status, educational goal, primary language, financial aid status, residency, academic year, and online course status (whether the course is online or face-to-face). Females were positively correlated with success ($p = .000$). For the ethnicity variable, the ethnic groups performed as expected based on the literature. Students identified as Asian were positively correlated with higher course grades ($p = .009$), while students identified as

Table 3. Online and Face-to-Face Courses, Success and No Success

-2 Log likelihood	Cox & Snell R^2	Nagelkerke R^2	
548658.620	0.04	0.06	
	B	Wald	Sig.	Exp(B)
Female	0.21	948.49	0.00	1.23
Asian	0.05	6.87	0.01	1.05
AfricanAmerican	-0.77	4,126.37	0.00	0.46
Filipino	-0.13	50.86	0.00	0.88
Hispanic	-0.44	2,671.23	0.00	0.65
NativeAmerican	-0.43	152.55	0.00	0.65
PacificIslander	-0.41	220.03	0.00	0.67
TwoOrMore	-0.40	411.17	0.00	0.67
less.than.30	-0.13	41.18	0.00	0.88
from30to49	0.31	190.01	0.00	1.36
NoHighSchool	-0.65	814.15	0.00	0.52
CollegeDegree	1.03	6,881.71	0.00	2.81
Voc_Deg_Transfer	0.07	7.96	0.00	1.07
Plan_Maintain_Career	-0.06	16.92	0.00	0.94
Undecided_Uncollected	-0.20	415.44	0.00	0.81
NotEnglish	0.19	201.62	0.00	1.21
BOG_Award	-0.10	152.03	0.00	0.90
AB540	0.10	7.32	0.01	1.11
International	0.13	18.83	0.00	1.14
NonResident	-0.09	12.49	0.00	0.91
Year07_08	0.05	18.60	0.00	1.05
Year08_09	-0.02	1.71	0.19	0.98
Year09_10	0.06	22.39	0.00	1.06
Year10_11	0.19	243.46	0.00	1.21
Online	-0.43	1,581.61	0.00	0.65
Constant	1.52	4,706.15	0.00	4.57

African American or Hispanic were negatively correlated with success (p = .000) and (p = .000). For prior educational status, those who did not graduate from high school were negatively correlated with success (p = .000). Students with college degrees were positively correlated with success. Whether or not students received a Board of Governors (BOG) fee waiver was used as a blunt indicator of socioeconomic status. As expected, receiving a fee waiver was negatively associated with higher grades (p = .000). The results for the online course variable were consistent with the literature, showing that online courses were less likely to result in a successful outcome than face-to-face courses. Online courses were negatively associated with success (p = .000). The residency variable had an interesting significant finding for AB540 (DREAM Act) students. DREAM Act students were more likely to be successful than California residents. They were positively correlated with success (p = .007). Another interesting significant finding was that for age. Students who were less than 30 years of age were negatively correlated with success (p = .000), while those aged 30 to 49 were positively correlated with success (p = .000) when compared to the reference group of age 50 and above.

The logistic regression itself can be expressed in a way that shows the probability of success or failure for students of varying characteristics. The equation can be written as $p_i/(1-p_i) = e^u$ where $u = B_0 + B_1X_1 + B_2X_2 + \ldots + B_kX_k$ and to calculate the predicted probabilities of success for various scenarios, one can use the following equation: $\hat{Y} = p_i = e^u/(1 + e^u)$.

For example, in order to solve for the u value in the logistic regression model for the primary dataset, one would calculate as follows:

u = 1.519 + .211(Female) + .048(Asian) + -.769(AfricanAmerican) + -.128(Filipino) + -.435(Hispanic) + -.430(NativeAmerican) + -.407(PacificIslander) + -.399(TwoOrMore) + -.130(less.than.30) + .309(from30to49) + -.649(NoHighSchool) + 1.032(CollegeDegree) + .068(Voc_Deg_Transfer) + -.061(Plan_Maintain_Career) + -.205(Undecided_Uncollected) +

.187(NotEnglish) + -.100(BOG_Award) + .101(AB540) + .130(International) + -.093(NonResident) + .050(Year07_08) + -.015(Year08_09) + .056(Year09_10) + .190(Year10_11) + -.428(Online)

For example, utilizing the logistic regression model in Table 3 allows us to predict the probability of success for a 35-year-old African American female college graduate whose primary language is English, plans to transfer, is not on financial aid, is a California resident, and is taking an online course during the 2009/2010 academic year. In this case, $u = 1.621$. Inputting the u value into the equation predicting the probability for success, we get $\hat{Y} = p_i = e^{1.621}/(1 + e^{1.621})$. Therefore the probability of the above individual achieving success is .835 or approximately 83.5%

For comparison, consider the probability of success for a 22-year-old Hispanic male high school graduate whose primary language is not English, plans to get a vocational degree or transfer, is not on financial aid, is a non-resident, and is taking a face-to-face course during the 2009/2010 academic year. In this case, $u = 1.172$. Inputting the u value into the equation predicting the probability for success, we get $\hat{Y} = p_i = e^{1.172}/(1 + e^{1.172})$. Therefore, the probability of the above individual achieving success is .765 or approximately 76.5%.

Results for Online and Face-to-Face Courses, Success Only

Next, the researcher sought to examine which factors best predicted final grade among those individuals that received a passing grade in their course. For these individuals, a multiple regression model was used that revealed significant findings at the $p < .05$ level for ethnicity, age group, prior educational status, educational goal, primary language, financial aid status, residence, and academic year. In multiple regression models, the unstandardized coefficients indicate how much the dependent variable increases or decreases when that

independent variable increases by one, holding all the other independent variables constant, as well as showing the direction of that change.

Table 4 shows that most of the findings among the successful course enrollments were intuitive. Being female was predicted to increase one's grade approximately .15 grade points over the grade of a male. Being Asian only indicated a very slight increase in grade point over White students. However, African Americans were predicted to have grades approximately .62 grade points lower than those of their White counterparts. The age category had an interesting finding showing that students aged less than 30, and from 30 to 49 were predicted to have lower grades than those over 50 years of age. In fact, the grades of those under 30 were expected to be approximately .97 grade points lower than those for students over 50 years of age. Having a college degree was associated with higher predicted grades. Unlike the logistic regression model with all types of enrollments, the goals of Vocational Degree or Transfer and Plan or Maintain Career were associated with higher grade points than those with a goal of Degree or Transfer. In the age categories, enrollments for students below 30 and for students aged 30 to 49 were negatively correlated with success.

The most remarkable finding was that among successful enrollments (resulting in a grade of C or higher), online course status was not significant. This suggests that among successful students, whether they take online or face-to-face courses does not have predictive power over their final grade.

Results for Online Only and Face-to-Face Only, Success and No Success

The next step in the examination of factors that best predict course success and final grade was to analyze the course enrollments separated by course status. As such, the dataset

Table 4. Online and Face-to-Face Courses, Success Only

R	R^2	Adjusted R^2	Std. Error of the Estimate		
.200	0.04	0.04	2.29		
	Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
	B	Std. Error	Beta		
(Constant)	6.39	0.02		298.08	0.000
Female	0.15	0.01	0.03	21.99	.000
Asian	-0.04	0.02	0.00	-2.29	.022
AfricanAmerican	-0.62	0.01	-0.06	-42.41	0.000
Filipino	-0.25	0.02	-0.02	-14.00	.000
Hispanic	-0.40	0.01	-0.07	-44.07	0.000
NativeAmerican	-0.27	0.04	-0.01	-6.85	.000
PacificIslander	-0.28	0.03	-0.01	-8.97	.000
TwoOrMore	-0.22	0.02	-0.01	-9.98	.000
less.than.30	-0.98	0.02	-0.16	-50.47	0.000
from30to49	-0.34	0.02	-0.05	-16.56	.000
NoHighSchool	-0.25	0.03	-0.01	-7.78	.000
CollegeDegree	0.56	0.01	0.10	62.59	0.000
Voc_Deg_Transfer	0.13	0.02	0.01	5.73	.000
Plan_Maintain_Career	0.16	0.01	0.02	11.63	.000
Undecided_Uncollected	-0.06	0.01	-0.01	-6.01	.000
NotEnglish	-0.12	0.01	-0.02	-9.29	.000
BOG_Award	-0.11	0.01	-0.02	-12.70	.000
AB540	0.12	0.04	0.00	3.26	.001
International	0.22	0.03	0.02	8.92	.000
NonResident	0.21	0.03	0.01	7.49	.000
Year07_08	0.11	0.01	0.02	9.51	.000
Year08_09	0.18	0.01	0.03	15.47	.000
Year09_10	0.21	0.01	0.04	17.52	.000
Year10_11	0.23	0.01	0.04	19.42	.000
Online	-0.01	0.01	0.00	-1.21	.227

was divided into two subsets: online only and face-to-face only. The descriptives for the online only and face-to-face only samples clearly differed from each other; for example, online classes had a higher proportion of female and White students, consistent with the existing literature. The dataset containing only online courses consisted of 83,830 cases, and these individuals were mainly female (64.3%), White (55.0%), with a primary language of English (92.5%), under 30 years of age (76.4%), with an educational goal of degree or transfer (73.8%). In contrast, the dataset containing only face-to-face students consisted of 697,401 cases, and these individuals were mainly female (54.7%), White (50.6%), with a primary language of English (88.9%), under 30 years of age (82.1%), with an educational goal of degree or transfer (737%). Table 5 shows a comparison of online and face-to-face course student characteristics.

The logistic regression model used on the primary dataset was also applied to the online courses as well as to the face-to-face courses to see if the same variables would be significant. They were not, as can be seen in Tables 6-9. Among only online courses, educational goal and residency status were not significant. Also, in the ethnicity variable, whether or not the student was Asian was not significant in online only course enrollments. The age category also differed. In online only courses, students age 50 and above were predicted to be more successful than those less than 30 and 30 to 49, who were negatively correlated with success. Alternatively, in face-to-face only courses, students aged 30 to 49 were predicted to have more success than the 50 and above reference group and students below 30 years of age.

As previously stated, the logistic regression models in this study are used to predict the likelihood of success or no success for students of varying characteristics. For

Table 5. Comparison of Online Only and Face-to-Face Only Courses (Reported as Percentage)

Variable	Value	Online (*N*=83,830)	Face-to-Face (*N*=697,401)
Gender	Female	64.32	54.75
	Male	35.68	45.25
Ethnicity	Asian	5.64	7.51
	African-American/Non-Hispanic	9.72	8.52
	Filipino	4.17	4.23
	Hispanic	19.97	23.72
	American Indian/Alaskan Native	1.03	0.91
	Pacific Islander	1.38	1.43
	Two or More	3.06	3.03
	White	55.03	50.64
Primary Language	English	92.54	88.86
	Not English	7.46	11.14
Financial Aid	BOG	38.96	33.36
	No BOG	61.04	66.64
Residency	AB540	0.63	0.79
	California Resident	95.54	93.72
	International	2.27	3.93
	Non-resident	1.57	1.56
Age Group	<30	76.42	82.08
	30-49	20.04	13.89
	50+	3.54	4.02
Prior Educational Status	No High School	1.87	1.83
	HS Diploma/Equivalent	80.82	82.48
	College Degree	17.31	15.68
Educational Goal	Degree/Transfer	73.82	73.73
	Vocational Degree/Transfer	2.58	2.66
	Plan or Maintain Career	7.88	6.64
	Basic Skills	3.88	4.27
	Undecided/Uncollected	11.85	12.70

Table 6. Online Courses Only, Success and No Success

Cox & Snell R^2	Nagelkerke R^2			
0.05	0.08			
	B	Wald	Sig.	Exp(B)
Female	0.23	119.47	0.00	1.26
Asian	-0.01	0.01	0.92	0.99
AfricanAmerican	-0.94	702.21	0.00	0.39
Filipino	-0.18	11.74	0.00	0.83
Hispanic	-0.50	354.04	0.00	0.61
NativeAmerican	-0.31	8.93	0.00	0.73
PacificIslander	-0.51	36.85	0.00	0.60
TwoOrMore	-0.42	49.55	0.00	0.66
less.than.30	-0.85	139.37	0.00	0.43
from30to49	-0.42	32.04	0.00	0.66
NoHighSchool	-0.47	44.70	0.00	0.62
CollegeDegree	0.99	923.29	0.00	2.69
Voc_Deg_Transfer	-0.12	3.29	0.07	0.88
Plan_Maintain_Career	-0.05	1.25	0.26	0.95
Undecided_Uncollected	-0.17	29.33	0.00	0.85
NotEnglish	0.24	30.36	0.00	1.28
BOG_Award	-0.19	63.94	0.00	0.83
AB540	0.00	0.00	0.97	1.00
International	-0.08	0.81	0.37	0.92
NonResident	-0.11	2.04	0.15	0.89
Year07_08	0.11	8.58	0.00	1.12
Year08_09	0.13	11.64	0.00	1.14
Year09_10	0.24	41.59	0.00	1.27
Year10_11	0.40	106.39	0.00	1.49
Constant	1.71	480.75	0.00	5.54

Table 7. Face-to Face Courses Only, Success and No Success

-2 Log likelihood	Cox & Snell R^2	Nagelkerke *RI*		
488500.056	0.04	0.06		
	B	Wald	Sig.	Exp(B)
Female	0.21	827.74	0.00	1.23
Asian	0.05	7.99	0.00	1.06
AfricanAmerican	-0.75	3,457.33	0.00	0.47
Filipino	-0.12	40.27	0.00	0.89
Hispanic	-0.43	2,313.72	0.00	0.65
NativeAmerican	-0.45	145.93	0.00	0.64
PacificIslander	-0.39	183.16	0.00	0.67
TwoOrMore	-0.40	360.80	0.00	0.67
less.than.30	-0.05	6.12	0.01	0.95
from30to49	0.39	274.01	0.00	1.48
NoHighSchool	-0.67	779.78	0.00	0.51
CollegeDegree	1.04	5,948.37	0.00	2.83
Voc_Deg_Transfer	0.09	13.07	0.00	1.10
Plan_Maintain_Career	-0.06	16.85	0.00	0.94
Undecided_Uncollected	-0.21	382.38	0.00	0.81
NotEnglish	0.18	173.11	0.00	1.20
BOG_Award	-0.09	102.44	0.00	0.92
AB540	0.11	7.93	0.00	1.12
International	0.15	23.01	0.00	1.16
NonResident	-0.09	10.55	0.00	0.91
Year07_08	0.05	13.88	0.00	1.05
Year08_09	-0.03	5.70	0.02	0.97
Year09_10	0.04	7.95	0.00	1.04
Year10_11	0.17	167.11	0.00	1.18
Constant	1.45	3,935.08	0.00	4.26

Table 8. Online Courses Only, Success Only

R	R^2	Adjusted R^2	Std. Error of the Estimate		
.215	0.05	0.05	2.25		
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6.46	0.07		98.83	0.000
Female	0.13	0.02	0.03	5.62	.000
Asian	0.03	0.06	0.00	0.58	.561
AfricanAmerican	-0.75	0.05	-0.08	-15.84	.000
Filipino	-0.09	0.06	-0.01	-1.61	.108
Hispanic	-0.37	0.03	-0.06	-11.87	.000
NativeAmerican	-0.34	0.12	-0.01	-2.84	.004
PacificIslander	-0.39	0.11	-0.02	-3.71	.000
TwoOrMore	-0.23	0.07	-0.02	-3.33	.001
less.than.30	-0.99	0.06	-0.19	-17.77	.000
from30to49	-0.40	0.06	-0.07	-6.78	.000
NoHighSchool	-0.16	0.09	-0.01	-1.74	.082
CollegeDegree	0.52	0.03	0.09	19.06	.000
Voc_Deg_Transfer	-0.03	0.07	0.00	-0.46	.643
Plan_Maintain_Career	0.32	0.04	0.04	7.77	.000
Undecided_Uncollected	-0.15	0.03	-0.02	-4.29	.000
NotEnglish	-0.06	0.04	-0.01	-1.30	.195
BOG_Award	-0.19	0.03	-0.04	-7.38	.000
AB540	0.09	0.14	0.00	0.65	.513
International	0.08	0.10	0.00	0.83	.407
NonResident	0.20	0.09	0.01	2.21	.027
Year07_08	0.05	0.04	0.01	1.23	.218
Year08_09	0.17	0.04	0.03	4.14	.000
Year09_10	0.16	0.04	0.03	4.02	.000
Year10_11	0.26	0.04	0.05	6.19	.000

Table 9. Face-to-Face Only, Success Only

R	R^2	Adjusted R^2	Std. Error of the Estimate		
.198	0.04	0.04	2.29		
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6.38	0.02		280.63	0.000
Female	0.16	0.01	0.03	21.26	.000
Asian	-0.05	0.02	0.00	-2.58	.010
AfricanAmerican	-0.61	0.02	-0.06	-39.48	0.000
Filipino	-0.26	0.02	-0.02	-14.15	.000
Hispanic	-0.40	0.01	-0.07	-42.39	0.000
NativeAmerican	-0.26	0.04	-0.01	-6.24	.000
PacificIslander	-0.27	0.03	-0.01	-8.24	.000
TwoOrMore	-0.22	0.02	-0.01	-9.41	.000
less.than.30	-0.97	0.02	-0.15	-47.24	0.000
from30to49	-0.34	0.02	-0.05	-15.13	.000
NoHighSchool	-0.26	0.03	-0.01	-7.59	.000
CollegeDegree	0.57	0.01	0.10	59.48	0.000
Voc_Deg_Transfer	0.15	0.02	0.01	6.16	.000
Plan_Maintain_Career	0.14	0.02	0.02	9.51	.000
Undecided_Uncollected	-0.06	0.01	-0.01	-4.97	.000
NotEnglish	-0.13	0.01	-0.02	-9.36	.000
BOG_Award	-0.10	0.01	-0.02	-10.86	.000
AB540	0.13	0.04	0.01	3.25	.001
International	0.24	0.03	0.02	9.06	.000
NonResident	0.21	0.03	0.01	7.21	.000
Year07_08	0.11	0.01	0.02	9.46	.000
Year08_09	0.18	0.01	0.03	14.71	.000
Year09_10	0.21	0.01	0.04	16.96	.000
Year10_11	0.23	0.01	0.04	18.11	.000

comparison purposes, let us use the same examples we used with the primary logistic regression model with the models for online only and face-to-face only courses. To calculate the predicted probabilities of success for various scenarios, one can use the following equation: $\hat{Y} = p_i = e^u/(1 + e^u)$, where $u = B_0 + B_1X_1 + B_2X_2 + \ldots + B_kX_k$.

For example, utilizing the logistic regression model in Table 6, the probability of success for a 35-year-old African American female college graduate whose primary language is English, plans to transfer, is not on financial aid, is a California resident, and is taking an online course during the 2009/2010 academic year is .859.

For comparison, the predicted probability of success for a 22-year-old Hispanic male high school graduate whose primary language is not English, plans to get a vocational degree or transfer, is not on financial aid, is a non-resident, and is taking a face-to-face course during the 2009/2010 academic year is .744.

Results for Online Only and Face-to-Face Only Courses, Success Only

Further examination of the data included looking at those individuals who were successful in passing their online only and face-to-face only courses. Tables 7 through 9 show that findings for online only, success only and face-to-face only, and success only courses are fairly consistent with their corresponding results in similar tables.

Summary

In all of the models, most of the findings were intuitive and aligned with results typically found in the literature on student success regarding gender, ethnicity, prior educational status, and financial aid status. For example, females tended to achieve more success and higher grades than males. In all models, there were also significant results for

ethnicity where African Americans and Hispanics were negatively associated with success and higher course grades in comparison with the reference group of White students. This result was amplified in online only courses where African American students were predicted to do much worse. Students who did not graduate from high school were negatively associated with success and higher grades, while those with college degrees showed a positive association. Receiving a fee waiver was negatively associated with success and higher grades.

There were interesting findings in terms of residency status. In the datasets containing both successful and non-successful course enrollments, AB540 (primarily undocumented) students were more likely to be successful than California residents, as were international students. Among successful enrollments, both groups were also associated with higher grades than the reference group of California residents.

The age category variable had some interesting findings. Among all students, those who were less than 39 years of age were negatively associated with success and final grade, while those aged 30 to 49 were positively correlated with success when compared to the reference group of age 50 and above. However, among successful enrollments, being less than 50 years of age was negatively associated with higher course grades. The same pattern held true for online only courses where students 50 years of age or above were predicted to be more successful than students below 50. However, in face-to-face only courses, students aged 30 to 49 were predicted to have more success than the younger and older age categories.

The most significant finding to emerge from this study was that for online course status. For the most part the results for online course status were also consistent with the literature. Whether or not a course's mode of delivery was online or face-to-face was

significant for the dataset that included both successful and unsuccessful course enrollments and indicated that online courses were negatively associated with success and higher grades than face-to-face courses. However, among successful course enrollments, the online course status was not significant. This suggests that among successful students, the mode of course delivery does not matter. Successful students will do well in online or face-to-face courses.

CHAPTER 5

DISCUSSION

This study addresses the following questions:

1. To what extent can the academic success of on-line course takers be explained by student demographics, financial aid status, educational goals, and select high school performance measures?
2. To what extent can the academic success of face-to-face course takers be explained by student demographics, financial aid status, educational goals, and select high school performance measures?
3. To what extent are the factors that explain the academic success of on-line and face-to-face course takers similar or dissimilar?

These questions were answered via logistic regression and multiple regression analyses of six datasets. The datasets consisted of the primary dataset comprised of online and face-to-face courses with both successful and unsuccessful outcomes, online and face-to-face courses with only successful outcomes, online-only and face-to-face-only datasets with both successful and unsuccessful course outcomes, and online-only and face-to-face-only datasets with only successful course outcomes.

Many of the findings were intuitive and aligned with results typically found in the literature on student success in terms of race/ethnicity, gender and economic status. The results for the primary dataset which included both online and face-to-face courses and indicated which factors best predicted the dichotomous variable of success or no success, showed statistically significant results for ethnicity, age group, prior educational status, educational goal, primary language, financial aid status, residency, academic year, and online course status (whether the course is online or face-to-face). Overall, females were positively

correlated with success. Among successful course outcomes, females were correlated with higher grades than males, as expected. For the ethnicity variable, the ethnic groups performed as expected based on the literature. Students identified as Asian were positively correlated with success, and among successful course outcomes Asians were also correlated with higher course grades. In all models, there were also significant results for ethnicity where African Americans and Hispanics were negatively associated with success and higher course grades in comparison with the reference group of White students. This finding matches current and historical student success data where African American and Hispanic students tend to underperform when compared to findings for White and Asian students. This achievement gap is an issue within higher education. The finding that African American students had lower success was amplified in online only courses where African American students were predicted to have much lower success rates and grades than other ethnic groups. For prior educational status, those who did not graduate from high school were negatively correlated with success. Students with college degrees were positively correlated with success. Whether or not students received a Board of Governors (BOG) fee waiver was used as a blunt indicator of socioeconomic status. As expected, receiving a fee waiver was negatively associated with higher grades. In general, the results for the online course variable were consistent with the literature, showing that online courses were less likely to result in a successful outcome than face-to-face courses. Online courses were negatively associated with success.

Role of Course Status

The most noteworthy finding to emerge from this study was that for online course status. For the most part, results for online course status were consistent with the literature.

Whether or not a course's mode of delivery was online or face-to-face was significant for the primary dataset that included both successful and unsuccessful course enrollments and indicated that online courses were negatively associated with success than face-to-face courses. However, among successful course enrollments (those resulting in a grade of C or higher), the online course status was not significant. This suggests that among successful students, the mode of course delivery does not matter. Successful students will do well in online or face-to-face courses. This finding is not found in the literature.

The literature contains studies comparing the efficacy of online courses versus face-to-face courses modes of delivery. Some compared online and face-to-face student success by examining their performance on identical assessments. It was found that face-to-face students score higher grades on identical assessments (Driscoll et al., 2012; Urtel, 2008). Driscoll et al. (2012) found that "when online courses are designed using pedagogically sound practices, they may provide equally effective learning environments" (p. 312). This finding requires a definition of pedagogically sound practices and an accurate measure of such. However, there is a great deal of variation in the design and teaching of online courses. Factors relating to faculty characteristics, online support services, and other non-student factors may contribute to the success of online students. Fike and Fike (2008) found that other factors such as quality and design of online courses (Dietz-Uhler, Fisher, & Han, 2007, as cited in Fike & Fike, 2008) and student attributes, such as computer skills and prior experiences (Dupin-Bryant, 2004, as cited in Fike & Fike, 2008), may contribute to the differences in success rates between online and face-to-face courses (Fike & Fike, 2008). Other studies address students' reasons for taking courses in one mode of delivery over another.

> Why students choose one learning environment over the other is an important issue for faculty and administration to consider. By understanding factors that affect students' enrollment in online versus traditional courses, administrators and instructors can develop strategies to remove perceived barriers to online learning. (R. P. Robinson & Doverspike, 2006, p. 64)

However, the studies found in the literature do not address this study's new finding that mode of delivery (online or face-to-face) does not have predictive power over the final grade of successful students. The knowledge that mode of delivery (online versus face-to-face) is not a factor in predicting success among successful students may lead to innovations in marketing of online courses as well as policy changes within institutions. Further examination of this finding is warranted.

AGE OF PARTICIPANTS

Community colleges serve students from multiple generations. With more adults taking college courses to enhance job skills and/or take advantage of lifelong learning opportunities, age becomes a salient factor when examining student success. While the differences in online course grade outcomes mirror societal disparity patterns in terms of race/ethnicity, gender and socioeconomic status, the outcomes for age show non-intuitive results in this age of digital youth.

This study showed remarkable findings associated with age. One might expect the net generation to be successful in online coursework, while older student fall behind their millennial classmates. However, the data show the opposite finding. Despite traditional-aged college students being described as tech savvy, younger students are significantly correlated with lower online course grades. In this study, the results from the primary dataset (consisting of online and face-to-face courses with successful and unsuccessful outcomes) showed students who were less than 30 years of age were negatively correlated with success,

while those aged 30 to 49 were positively correlated with success when compared to the reference group of age 50 and above.

The above findings mirror success data broken out by age for students in face-to-face courses. Older students are more successful. However, among successful course outcomes for both online and face-to-face courses, the age category had an interesting finding. This study showed students aged less than 30 and from 30 to 49 were predicted to have lower grades than those over 50 years of age. Enrollments for students below 30 and for students aged 30 to 49 were negatively correlated with success.

A similar pattern emerged for online only courses. Students age 50 and above were predicted to be more successful than those below 50, who were negatively correlated with success. The finding that students 50 years of age and above are the most successful in online-only courses is non-intuitive given characterizations of millennial students' superior technical skills and drive for academic success. Alternatively, in face-to-face only courses, students aged 30 to 49 were predicted to have more success than the both the 50 and above reference group and students below 30 years of age. This particular age group is targeted by the Obama administration's 2020 Initiative as a key group to engage in order to meet the nation's goals regarding increased college graduates.

Success of AB540 and DREAM Act Students

California Assembly Bill 540 made undocumented students eligible for in-state tuition at public colleges and universities in California. The California DREAM Act was passed in 2011 and will go into effect in 2013. The DREAM Act makes undocumented students eligible for state college aid.

There were interesting findings in terms of residency status. In the datasets containing both successful and non-successful course enrollments, AB540 students were more likely to be successful than California residents, as were international students. Among successful enrollments, both groups were also associated with higher grades than the reference group of California residents.

Many AB540 and DREAM Act students in California are Hispanic. This study's results are very different from research about the overall Hispanic population and their success rates. This is an emerging successful demographic of potential students for online courses. However, it should be noted that the study included data from a five year period prior to the implementation of the DREAM Act. Undocumented immigrant students in the study are covered under AB540 (in-state tuition rates) and not DREAM Act (federal financial aid). As such, many undocumented immigrant students who may be eligible for entrance into four year institutions likely started their college education in a community college due to the significantly lower tuition rate. Further studies should include tracking the performance of DREAM Act students in the community college system.

ISSUES REGARDING DATA COLLECTION

This study brings up some interesting issues related to data collection in the community colleges. This study used data that is regularly collected in California community colleges. The main sources of data that are captured in the data system are application data and enrollment data. The relatively low R^2 for the regression models used indicates that the equations used only explain a small portion of the data. There are other factors that account for variation within the data. This is understandable since there are many factors that go into student success. There are many factors relating incoming student characteristics, current

student characteristics, course characteristics, factors relating to instructors, their practices and pedagogy, and climate factors in each college. It would be helpful if colleges regularly collected more of this type of data.

Regular collection of more data may help colleges increase their institutional effectiveness by going beyond the traditional measures of success such as course completion (retention), success, and persistence. Of course, these traditional measures have value, especially when disaggregated by various demographic, course, and enrollment factors, but they are not enough on their own to tell the story of student success and challenges. For online and face-to-face students alike, it would be helpful to know more about student characteristics. The following information would give a more robust view of the experiences of students: currently uncollected data (in the college district in the study) such as marital status, number of school-aged children, how students get to school (private car or public transportation), work status, hours worked and how work hours are structured (part-time, full-time, one job, multiple jobs), on-campus job or off-campus, study hours (how many per week), digital literacy factors, comfort level and experience with computer technology, internet access (home, work, school, public setting), wired or wireless access, dial-up or broadband, mobile device status. Such data would be helpful in getting a better picture of the college students' experiences.

There is a delicate balance involved in collecting student data. One wants as much valuable data as possible without inconveniencing students with long, tedious surveys or applications. The amount and type of data collected goes hand in hand with planning and evaluation, including determining which factors will be measured for institutional effectiveness. If a community college or district has improved means to develop and market

programs as well as innovative ways to advise students as planning agenda items, then the addition of data elements to the application may be helpful. Some of this additional data could be added to the college application and some may be more appropriate in a Districtwide or Collegewide survey. However, the data collected would be most helpful if student identification numbers could be connected to survey responses in order to see how student characteristics play out in their academic performance.

Another important type of data is that for the faculty. Just as student characteristics can be used as explanatory variables, so can those for faculty. It would be helpful to have basic demographic data for faculty such as age, gender, and ethnicity. Faculty data should also include whether or not the faculty has taught online in the past, and if so, how many times. Data regarding faculty members' digital literacy and comfort level with computer technology would be valuable. In addition, information regarding faculty degree attainment and years teaching in the field may prove to be valuable explanatory variables.

IMPLICATIONS

Colleges track measures of their institutional effectiveness. Common factors that are tracked are course completion (retention) and course success. Colleges normally have goals that include increasing the course completion and success rates of students regardless of course discipline and mode of instruction. Factors of institutional effectiveness can be improved by various innovations within academic affairs and student services.

As we have previously discussed, online courses have lower course completion and success rates. Numerous studies show the higher drop rate (hence lower completion rate) for online courses. Colleges are working to meet the demand of more online courses while also trying to improve success and course completion rates. The study of course outcomes should

include study of which factors predict various outcomes such as success, retention, and final grade. According to Fike and Fike (2008), presenting students with online course options may increase student success factors. They found taking online courses was a predictor of student retention. The reasons why taking online courses is a predictor of student retention are unknown. This finding warrants additional study.

Among the studies that examine which factors best predict success in online courses, many use factors that are not regularly collected by community colleges. Such factors may include student psychological factors, levels of self-efficacy in students, and previous technical knowledge and expertise. Such studies add to the body of knowledge about online courses. However, they may not have practical implications in terms of marketing of online courses or advising students whether or not to take online course options because the factors examined are not regularly collected by colleges. Students are not subjected to psychological testing prior to course selection. College staff need policies and procedures based on practical student data that is readily available.

This study examines data that is regularly collected by community colleges. It is the data that is regularly reported to the California Community Colleges State Chancellor's Office. No special studies or student surveys are needed to collect this data. It is collected from the student's college application and the colleges' course information and outcomes databases. As such, it can more readily be used to inform marketing and advisement in colleges. Colleges seeking to improve institutional effectiveness need to take this information in mind when planning course offerings and advising students which courses to take.

The results of this study have advising implications. Since traditional-aged students have much lower success rates in online courses, advisors should encourage them to take

more face-to-face coursework. Online coursework may be more appropriate to market to students who are over 30 years of age, as opposed to students from the net generation. These non-traditional-aged students, including those over 50, tend to perform better in online courses.

This has resonance with success data in face-to-face courses where older students tend to outperform their younger classmates. Successful course completion requires self-regulation and self-direction. S. G. Johnson and Berge (2012) state the best online student would be an adult student. The question is at what point is a student considered an adult? Is it based on age or on personal characteristics? Traditional-aged college students are legally adults, but they do not tend to have some of the self-regulatory skills that characterize successful adult learners.

The remarkable finding that among successful course outcomes, the mode of course delivery is not significant also has important implications in terms of student advising. A good predictor of future course success is previous course success. Institutional researchers should explore how student's college grade point average is related to course success and final grades. Academic advisors may look to steering students with demonstrated academic success in college courses into online courses, while discouraging students without demonstrated college academic success from taking online coursework.

Policy Recommendations

This study has policy implications based on the results. The study was conducted using a large dataset from a California community college district. The primary dataset (containing both successful and unsuccessful outcomes for online and face-to-face courses) contained over 781,000 cases. The secondary dataset (containing only successful outcomes

for online and face-to-face courses) was also large at approximately 513,000 cases. The nation can benefit from findings from the California community colleges because California has the largest community college system in the nation, serving a quarter of all community college students in the United States. Community colleges serve a broad and diverse group of students and California community colleges are no exception to this rule. They have very diverse populations of students from different backgrounds and with different educational goals. The findings from this study can inform policy-makers, counselors, and advisors on how to best serve community college students in terms of enrollment choices in online or face-to-face courses.

The recommendations based on the results to this study are as follows:

First, high school districts should require students to complete at least one online course in order to meet graduation requirements. Alabama, Florida, Idaho, Michigan, and Virginia have already taken the lead in making completion of an online course a requirement for high school graduation. Providing students with instruction and experience in taking an online course in high school will help to prepare them for online coursework in college. This recommendation has resonance with the recommendations by the California Community Colleges Student Success Task Force (2012) which recommends collaboration with the K-12 system in the following policy statement, "Community Colleges will collaborate with the State Board of Education, the California Department of Education, and join other statewide efforts to define and address college and career readiness" (p. 17). This will also help with student equity issues. African-American and Hispanic students tend not to perform as well in online college courses as students from other ethnicities. This may be due in part to findings that African-American and Hispanic students use the internet more for entertainment

purposes than for study or work (Gorski, 2009). Having a high school requirement to complete at least one online course will give students practice in navigating an online course.

Second, community colleges should limit online course enrollment to students who have successfully completed at least one face-to-face course at a college. New college students should be able to demonstrate success in college coursework in a traditional mode of delivery prior to attempting college coursework in an online environment. The finding that online course status does not matter for successful students suggests that students who have demonstrated academic success in college coursework may be better suited to online courses.

Third, community colleges should market online courses to non-traditional-age students in order to promote student success. According to the *Distance Education Report* (California Community Colleges Chancellor's Office, 2011b), approximately 69% of California community college online course-takers were under the age of 30 during the 2009-2010 academic year. Since students under 30 do not perform as well in online courses as older students, colleges should promote such classes to older students in order to increase success rates in online courses.

Finally, policy-makers, counselors, and advisors should keep in mind that statistics are not deterministic. Administrators, faculty, counselors, and advisors know a lot about their student population. They should keep that practical knowledge in mind and not advise or make policies based only on statistics. Students' demographics do not seal their academic fate.

LIMITATIONS AND RECOMMENDED FUTURE RESEARCH

The current study excluded data that was not collected by the southern California community college district examined. This uncollected data includes annual household

income, number of family members per household, marital status of students, number of children under 18 (if any), level of student satisfaction, whether or not students are concurrently enrolled in more than one college, and the number of hours studied per class. In addition, there are no variables indicating students' technological proficiency, internet usage patterns, types of access to the internet (home, work, school, community center, et cetera), number of hours spent studying, or other potentially telling explanatory variables. These variables could increase the explanatory power of a future study.

This study does not include faculty data. Future studies should utilize data regarding faculty characteristics and experiences to examine how they impact student success factors such as course completion and final course grade. The analysis of more complete student data as well as faculty data may uncover some interesting patterns in terms of student retention, success, and final course grade. It would be especially fruitful to conduct an analysis using a hierarchical linear regression model to analyze how faculty characteristics impact the regression model. This was not possible to do in this particular study because the dataset did not include any faculty data.

There is also selection bias that is unavoidable due to the fact that faculty chose whether or not to teach an online course. Understandably, there may be differences in the teaching methodologies used by faculty. Certain classes may better lend themselves to online instruction than others. In addition, students self-select whether or not to take an online course. It would be helpful to investigate the reasons students select online course options.

The outcome data in the study is limited in that the multiple regression models conducted on successful cases excluding non-evaluative grades and grades that do not carry a specific grade point value. This limits the model to examining only completed courses where

students earned a grade that can be calculated into their grade point average. In addition, the current model predicts final course grade in terms of a range from C to A+. Future studies should include an additional type of analysis using sequential logistic regression analysis to determine characteristics that distinguish the differences between what it takes to get each separate grade. For example, using a sequential logistic regression, one could determine which factors best predict getting a B or which factors best predicting getting an A. Future studies should also examine just the top 10% of students (in terms of grades) and see which factors best predict their success and final grades.

This study was conducted by excluding all hybrid courses in order to make a clean comparison between factors that best predict success and final grades in online courses and face-to-face courses. It would be interesting to see which factors best predict course success and final grade in hybrid courses as well. Future studies should apply similar analytic approaches specifically to hybrid courses.

Another limitation is related to the use of data on student age. Student age is divided into three sections in this study: <30, 30-49, and 50 and above. It would be helpful to tease out the more data from the lower age category. Future studies should examine which of the students under 30 years of age are first-time first-year college students. This information was not available in the dataset used for this study. It may, however, show some interesting patterns in terms of student success and final grade. There is a possibility that first-time, first-year college students are negatively impacting the success and grades of this age group.

REFERENCES

Accrediting Commission for Community and Junior Colleges. (2012). *Accreditation reference handbook.* Retrieved from http://www.accic.org/wp-content/uploads/2012/p09/Accreditation-Reference-Handbook.2012.pdf

Akroyd, D., Patton, B., & Bracken, S. (2013). Factors that predict full-time community college faculty engagement in online instruction. *Community College Journal of Research and Practice, 37*(3), 185-195.

Allen, I. E., & Seaman, J. (2007). *Online nation: Five years of growth in online learning.* Needham, MA: Sloan Consortium. Retrieved from http://www.sloan.org/publications/survey/pdf/online_nation.pdf

Allen, I. E., & Seaman, J. (2011). *Going the distance: Online education in the United States, 2011.* Needham, MA: Sloan Consortium. Retrieved from http://sloanconsortium.org/publications/survey/going_distance_2011

Allen, I. E., & Seaman, J. (2013). *Changing course: Ten years of tracking online education in the United States.* Wellesley, MA: Babson College Survey Research Group.

Ashby, J., Sadera, W. A., & McNary, S. W. (2011). Comparing student success between developmental math courses offered online, blended, and face-to-face. *Journal of Interactive Online Learning, 10*(3), 128-140.

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

Bergstrand, K., & Savage, S. V. (2013). The chalkboard versus the Avatar: Comparing the effectiveness of online and in-class courses. *Teaching Sociology*. Retrieved from http://tso.sagepub.com/content/early/2013/03/05/0092055X13479949

Bourdieu, P., & Wacquant, L. (1992). *An invitation to reflexive sociology*. Cambridge, England: Polity Press.

Bowen, W. G., & Bok, D. (1998). *The shape of the river: Long term consequences of considering race in college and university admissions.* Princeton, NJ: Princeton University Press.

Bruce, C., Chesterton, P., & Grimison, C. (2002). Constituting collective consciousness: Information literacy in the university curriculum. *International Journal of Academic Development, 7*(1), 31-40.

California Community Colleges Chancellor's Office. (2006). *California community college system strategic plan.* http://www.asccc.org/sites/default/files /CCC_System_Strategic_PlN.PSD

California Community Colleges System Office. (2007). *Focus on results: Accountability reporting for the California Community Colleges.* Retrieved from http:// www.cpec.ca.gov/CompleteReports/ExternalDocuments/ARCC_Report_2007.pdf

California Community Colleges Chancellor's Office. (2011a). *Chancellor's Office datamart.* Retrieved from http://www.cccco.edu/divisions/tris/mis/reports.htm

California Community Colleges Chancellor's Office. (2011b). *Distance education report.* Retrieved from http://californiacommunitycolleges.cccco.edu/Portals/0/reportsTB /DistanceEducation 2011

California Community Colleges Chancellor's Office. (2013). *Key facts about California community colleges.* Retrieved from http://californiacommunitycolleges. cccco.edu/PolicyInAction/KeyFacts.aspx

California Community Colleges Student Success Task Force. (2012). *Advancing student success in the California community colleges.* Retrieved from http://californiacommunitycolleges.cccco.edu/Portals/0/Executive /StudentSuccessTaskForce/SSTF_Final_Report_1-1712_Print.pdf

Carlson, S. (2005). The net generation goes to college. *The Chronicle of Higher Education, 52*(7), A34.

Center for Student Success. (2007). *Basic skills as a foundation for success in California community colleges.* Sacramento, CA: California Community Colleges Chancellor's Office. Retrieved from http://www.cccbsi.org/Websites/basicskills/images /Lit_Review_Student_Success.pdf

Cisler, S. (2000, January 16). Subtract the digital divide. *San Jose Mercury News.* Retrieved from http://www.athenaalliance.org/papers/cisler.html

Cox, R. (2006). Virtual access. In T. Bailey & V. S. Morest (Eds.), *Defending the community college equity agenda* (pp. 110-131). Baltimore, MD: The Johns Hopkins University Press.

DeBell, M. (2003). Computer and internet use by children and adolescents in 2001. *Education Statistics Quarterly,* 4, 7-12.

Diaz, D. (2002, May/June). Online drop rates revisited. *The Technology Source Archives.* Retrieved from technologysource.org/article/online_drop_rates_revisited/

DiMaggio, P., & Hargittai, E. (2001). *University of Maryland, College Park scientific research on the Internet.* (2001). Retrieved from http://www.webuse.umd.edu /webshop/resources/Dimaggio_Digital_Divide.pdf

Driscoll, A., Jicha, K., Hunt, A. N., 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.

Fike, D., & Fike, R. (2008). Predictors of first-year student retention in the community college. *Community College Review, 36*(2), 68-88.

Flowers, L. (2003). Effects of college racial composition on African American students' interactions with faculty. *College Student Affairs Journal, 23*(1), 54-63.

Foundation for California Community Colleges. (2013). *About the colleges.* Retrieved from http://www.foundationccc.org/AbouttheColleges/FactsandFigures/tabid/636 /Default.aspx

Frankola, K. (2001). Why online learners drop out. *Workforce, 80*(10), 53-59.

Goldstein, B. (1967). *Low-income youth in urban areas: A critical review of the literature.* New York, NY: Holt, Rinehart, and Winston.

Gorski, P. (2003). Privilege and repression in the digital era: Rethinking the sociopolitics of the digital divide. *Race, Gender & Class, 10,* 145.

Gorski, P. (2009). Insisting on digital equity: Reframing the dominant discourse on multicultural education and technology. *Urban Education, 44,* 348-364.

Harvard University Graduate School of Education. (2011). *Pathways to prosperity project.* Retrieved from http://www.gse.harvard.edu/news_events/features/2011 /Pathways_to_Prosperity_Feb2011.pdf

Hempel, J., & Lehman, P. (2005). The MySpace generation. *BusinessWeek.* Retrieved from http://businessweek.com/stories/2005-12-11/the-myspace-generation

Howell, S. L., Laws, R. D., & Lindsay, N. K. (2004). Reevaluating course completion in distance education. *Quarterly Review of Distance Education, 5*(4), 243-252.

Hyllegard, D., Helping, D., & Hunter, C. (2008). Why do students leave online courses? Attrition in community college distance learning courses. *International Journal of Instructional Media, 35*(4), 429-434.

Immigration Policy Center. (2012). *Who and where the DREAMERers are, revised estimates.* Retrieved from http://www.immigrationpolicy.org/just-facts/who-and-where-dreamers-are-revised-estimates

Jacobs, J. (2011). Hispanic college enrollment surges. *Community College Spotlight.* Retrieved from http://communitycollegespotlight.org/content/Hispanic-college-enrollment-surges_6166

Jaggars, S. S. (2011). *Online learning: Does it help low-income and underprepared students?* (CCRC Working Paper No. 26, Assessment of Evidence Series). New York, NY: Columbia University, Teachers College, Community College Research Center.

Johnson, L., Levine, A., Smith, R., & Stone, S. (2010). *The 2010 horizon report.* Austin, TX: The New Media Consortium. Retrieved from http://infousa.state.gov/education/overview/docs/2010-HorizonReport.pdf

Johnson, S. G., & Berge, Z. (2012). Online education in the community college. *Community College Journal of Research and Practice*, *36*(11), 897-902.

Jost, B., Rude-Parkins, C., & Githens, R. P. (2012). Academic performance, age, gender, and ethnicity in online courses delivered by two-year colleges. *Community College Journal of Research and Practice*, *36*(9), 656-669.

Kim, E., & Diaz, J. (2013). *Immigrant students and higher education: ASHE higher education report 38:6.* Hoboken, NJ: Jossey-Bass.

Kleiner, A., & Lewis, L. (2003). *Internet access in U.S. public schools and classrooms: 1994-2002* (NCES Publication No. 2004-011). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Kuh, G. (2001). Assessing what really matters to student learning: Inside the National Survey of Student Engagement. *Change*, *33*(3), 10-17, 66.

Kuh, G. (2003). What we're learning about student engagement from NSSE: Benchmarks for effective educational practices. *Change*, *35*(2), 24-32.

Kvasny, L., & Keil, M. (2002, December 15). *The challenges of redressing the digital divide: A tale of two cities.* Paper presented at the Twenty-Third International Conference on Information Systems, Barcelona, Spain.

Legislative Council of California. (2011). *California education code.* Retrieved from http://www.leginfo.ca.gov/cgi-bin/calawequery?codesection=edc&codebody=&hits=20

Mullin, C. M. (2012). *Why access matters: The community college student body* Policy Brief 2012-01PBL. Washington, DC: American Association of Community Colleges.

Nather, K. (2005). *California community colleges distance education report: Fiscal years 1995-96 through 2003-04.* Sacramento, CA: California Community College Chancellor's Office.

National Center for Educational Statistics [NCES]. (2013). *Integrated postsecondary education data system.* Retrieved from http://nces.ed.gov/ipeds/

National Telecommunications and Information Administration. (2004). *A nation online: Entering the broadband age.* Retrieved from http://www.ntia.doc.gov /legacy/reports/anol/Nation/OnlineBroadband04.pdf

Obama, B. (2009). *Remarks of President Barack Obama address to Joint Session of Congress, Tuesday, February 24th, 2009.* Retrieved from http://www.whitehouse.gov /the_press_office/Remarks-of-President-Barack-Obama-Address-to-Joint-Session-of-Congress

Oblender, T. (2002). A hybrid course model: One solution to the high online dropout rate. *Learning and Leading with Technology, 29*(6), 42-46.

Oblinger, D., & Oblinger, J. (2005). Educating the net generation. *Educause*. Retrieved from http://www.educause.edu/educatingthenetgen

Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: A third decade of research.* San Francisco, CA: Josssey-Bass.

Persell, C. (1977). *Education and inequality*. New York, NY: Free Press.

Pew Research Center. (2004, April 16). The shifting internet population recasts the digital divide debate. *The Pew Internet and American Life Project*. Retrieved from http://www.pewinternet.org/PPF/r/62/press_release.asp

Rainie, L. (2003). The shifting internet population recasts the digital divide debate [Abstract]. *PEW Internet & American Life Project*. Retrieved from http://www.pewinternet.org /Press-Releases/2003/The-Shifting-Internet-Population-Recasts-the-Digital-Divide-Debate.aspx

Ratcliff, J. L. (2002). Community Colleges. In *Encyclopedia of Education.* Retrieved from http://www.encyclopedia.com/doc/1G2-3403200148.html

Robinson, L. (2005). Consumers of online instruction. *Issues in Information Systems. 6*(1), 170-175.

Robinson, R. P., & Doverspike, D. (2006). Factors predicting the choice of an online versus a traditional course. *Teaching of Psychology, 33*, 64-68.

Rojas, V., Roychowdhury, D., Okur, O., Straubhaar, J., & Estrada-Ortiz, Y. (2001). *Beyond access: Cultural capital and the roots of the digital divide*. Austin, TX: University of Texas, Austin.

Rosen, L. D. (2011). Teaching the igeneration. *Educational Leadership, 68*(5), 10-15. Retrieved from http://asod.org/publications/educational-leadership/feb11 /vol68num05/Teaching-the-iGeneration.aspx

Russell, T. L. (1999). *The no significant difference phenomenon.* Raleigh: North Carolina State University.

Shulock, N., & Moore, C. (2007). *Rules of the game: How state policy creates barriers to degree completion and impedes student success in the California community colleges.* Sacramento, CA: Institute for Higher Education Leadership & Policy.

Stanton-Salazar, R. (1997). A social capital framework for understanding the socialization of racial minority children and youths. *Harvard Educational Review, 67,* 1–40.

Strauss, L. C., & Volkwein, J. F. (2002). Comparing student performance and growth in 2- and 4-year institutions. *Research in Higher Education, 43*(2), 133-161.

Strauss, W., & Howe, N. (2007). *Millennials go to college: Strategies for a new generation on campus.* Washington, DC: American Association of Collegiate Registrars.

Sutherland-Smith, W., Snyder, I., & Angus, L. (2003). The digital divide: Differences in computer use between home and school in low socio-economic households. *Educational Studies in Language and Literature, 3,* 5-19.

Teranishi, R., Allen, W., & Solórzano, D. (2004). Opportunity at the crossroads: Racial inequality, school segregation, and higher education in California. *Teachers College Record, 106*(11), 2224-2225.

Tinto, V. (1993). Leaving *college: Rethinking the causes and cures of student attrition.* Chicago, IL: University of Chicago Press.

Tucker, S. (2001). Distance education: Better, worse, or as good as traditional education? *Journal of Distance Learning Administration, 4*(4). Retrieved from http://www .westga.edu/~distance/ojdia/winter44/tucker44.html

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

van der Kaay, C. D., & Young, W. H. (2012). Age-related differences in technology usage among community college faculty. *Community College Journal of Research and Practice, 36*(8), 570-579.

Warschauer, M. (2003). Demystifying the digital divide. *Scientific American, 289,* 42-47.

Watson, J., Murin, A., Vashaw, L., Gemin, B., & Rapp, C. (2012). *Keeping pace with K-12 online and blended learning.* Retrieved from http://kpk12.com/cms/wp-content /uploads/KeepingPace2012.pdf

Wilhelhttp://www.aecf.org/upload/publicationfiles/connecting%20kids%20technology.pdf
http://www.aecf.org/upload/publicationfiles/connecting%20kids%20technology.pdf

Witt, A. A., Wattenbarger, J. L., Gollattscheck, J. F., & Suppinger, Josephe E. (1994). *America's community colleges: The first century.* Washington, DC: Community College Press.

Worley, K. (2011). Educating college students of the net generation. *Adult Learning, 22,* 31-39.

Xu, D., & Jaggars, S. S. (2011). The effectiveness of distance education across Virginia's community colleges: Evidence from introductory college-level math and English courses. *Educational Evaluation and Policy Analysis,* 33, 360-377.