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Late Registration and Student Success in On-Campus and Online Classes

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LATE REGISTRATION AND STUDENT SUCCESS

IN ON-CAMPUS AND ONLINE CLASSES

by

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ABSTRACT

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IN ON-CAMPUS AND ONLINE CLASSES

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The study examined the effect of late registration into on-campus and online classes upon student performance when accounting for completion of a college success skills course and the demographic factors of sex, race/ethnicity, age, and full-time/part-time enrollment status. The data source was 2010-2013 *ex post facto* data from 23 colleges in a large community college system in the southeastern United States. The statistical method of binary logistic regression was applied to the data. The regression models failed to yield strong predictions of the association between registration timing and student success. Coupled with previous studies, this study demonstrated that the presumed negative interaction between late registration and student success is misplaced. Researchers should turn their attention to student characteristics and behaviors that hold more promise for actionable findings. Colleges should develop more global and integrated strategies for improving student success instead of narrowly focusing on eliminating late registration.

DEDICATION

John.

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CHAPTER 1

INTRODUCTION

President Obama has set a goal of returning the United States to first place among

the 34 countries in the Organization for Economic Cooperation and Development

(OECD) in terms of per capita higher education attainment rates (The White House, n.d.).

This goal, which was echoed in Virginia by Governor McDonnell's goal of increasing

higher education awards by 100,000 in fifteen years, will require higher education to

enroll more students and to increase graduation rates (College, 2009; U.S. Department of

Education, 2006).

Community colleges will play a key role if the state and the country are to achieve

these higher education goals (The White House, n.d.). In doing so, community colleges

will have to make better use of assessment to understand factors that affect student

success (American, 2011; Arum & Roksa, 2011). Along with other community college

leaders, O'Banion (2012) has argued that late registration, the policy whereby colleges

allow students to register for classes after the semester is underway, "wreaks havoc on the

ability of colleges to achieve the goals of the emerging completion agenda" (O'Banion,

2012, p. 26). Additionally, community colleges have turned their attention to improving

student success in distance education classes, where success rates lag those in on-campus

classes (Xu & Jaggars, 2011). Community colleges are also exploring the degree to which

college success skills courses can improve student success rates (Habley, Bloom, &

Robbins, 2012; Zeidenberg, Jenkins, & Calcagno, 2007). Therefore, the goal of this study

was to investigate the course completion rates of students who register on-time and late

into on-campus and online courses while taking into account whether the students completed a college success skills course.

Background of the Study

The origins of American higher education can be dated to the opening of Harvard College in 1636 (Harvard University, 2012b). Significant developments in the nineteenth century include the *Morrill Land Grant Act* of 1862, which funded the establishment of land-grant colleges in every state of the union (Lattuca & Stark, 2011), and the second *Morrill Act* of 1890, which provided funds for what have come to be known as Historically Black Colleges and Universities or HBCUs (Lattuca & Stark, 2011).

In the 20th century the *Servicemen's Readjustment Act* of 1944 (popularly known as the G.I. Bill) was a significant leap forward because it allowed for tuition payment for veterans which resulted in the expansion of higher education to segments of society previously excluded (Lattuca & Stark, 2011). Where the 1965 *Higher Education Act* allocated more financial aid to students and thereby increased and broadened college enrollments (Lattuca & Stark, 2011), it was not until the 1972 reauthorization of that act, in its Title IX provision, that women were guaranteed equal higher educational opportunities by statute (Valentin, 1997).

Two other events led to an immense expansion of access. First, in 1901 Joliet Junior College was founded essentially as a preparatory school for the University of Chicago (Boggs, 2011); over the next century, more than 1,000 two-year colleges opened doors across the country (Vaughan, 2006). Second, the 1947 *Higher Education for Democracy Report*, often referred to as the Truman Commission Report, concluded that

about 50% of American adults could benefit from two years of post-secondary education (Andrews & Fonseca, 1998). Today, nearly half of undergraduates in the United States are enrolled in two-year colleges (American, 2012a). Andrews and Fonseca (1998) observed that "the growth of community college enrollment has been no less than phenomenal" (p. 3). From the development of Joliet Junior College, to the Truman Commission Report, to declarations by President Obama, the mission to broaden and deepen access to higher education for the American public has been a central feature of the community college identity (Andrews & Fonseca, 1998; American, 2001; Beach, 2011; Obama, 2009a).

This access to higher education is now under threat (Beach, 2011). Higher education faces a funding crisis (Hendrick, Hightower, & Gregory, 2011), which is nowhere more apparent than in California where enrollment at some community colleges has been capped (Beach, 2011). The value that is provided by open access institutions has been questioned by the National Commission for Excellence in Education's *A Nation at Risk* (1983), by Arum and Roksa in *Academically Adrift* (2011), by experts on education and employment (Carnevale, 2008), and by critics from within the community college culture (Beach, 2011). In *A Nation at Risk,* Copperman identified the threat to the economic competitiveness of the United States: "For the first time in the history of our country, the educational skills of one generation will not surpass, will not equal, will not even approach, those of their parents" (Indicators of risk section, para. 4). The concurrent burdens of decreased funding and increased need for an educated citizenry have focused attention beyond mere access to higher education towards the quality of that education

and policies that support student achievement (Arum & Roksa, 2011; Beach, 2011, Hendrick, Hightower, & Gregory, 2011). Lattuca and Stark (2011) documented the concomitant pressure for meaningful assessment.

In "Creating a New Architecture for the Learning College," O'Banion (2007) argued that the structure and policies of institutions must change in order to improve educational outcomes. O'Banion identified late registration, the policy whereby colleges allow students to enroll in classes after the semester is underway, as a threat to learning. On one hand, late registration increases access for students because it allows them to register for classes typically up to a week after the regular registration period has ended. On the other hand, if these students experience poor educational outcomes, then higher education's limited resources are used inefficiently, which ultimately negatively affects access for others (American, 2012b). Angelo (1990) noted that faculty often believe that students' educational outcomes are negatively affected by late registration. While a number of studies of late registration seem to support that argument, in other studies no strong relationships between registration timing and student success were reported, and in a few instances positive relationships were found (see Appendix A for a summary of late registration studies and findings).

Goodman (2010) conducted one of the most recent general studies of late registration in community colleges, finding a negative effect upon persistence into the second semester. Neighbors (1996) and Safer (2009) also found negative associations between late registration and course success and/or persistence into subsequent semesters. On the other hand, Angelo (1990), who claimed to have published the first study of late

registration and student performance, analyzed nearly 39,000 registrations and

surprisingly found a *positive relationship between late registration and course

completion.* Zottos' study of the Los Angeles Community College district (2005)

indicated that it is student ability rather than late registration which can lead to worse

student outcomes.

Furthermore, even if it can be demonstrated that late registration in community

colleges is generally associated with poor outcomes for students, there is evidence that a

blanket ban on late registration may be a policy so broad as to negatively affect students

for whom late registration is a benefit. For example, based on his research, Cornille

(2009) suggested that persistence for late registrants was higher for those with higher

GPAs, and Peterson (1986) observed that the academic performance of late registrants

differed by program of study and by number of credits for which a student enrolled. Of 29

studies of late registration and student success, in only McWaine (2012) and Sinclair

(2005) were recommendations made to issue a blanket ban on late registration; most

studies recommended modifications, rather than eradications, of late registration policies

(e.g., Zottos, 2005). Importantly, Keck (2007) found that student satisfaction with their

late registration choices is largely positive and that both late registration rates and student

performance differed by subject area.

Keck (2007) also noted that students were deliberately less likely to register late

for an online than an on-campus class, raising the question of whether late registration has

an especially negative affect on student achievement in an online class. Furthermore,

student success outcomes for online classes in Virginia's Community Colleges (VCCS),

as is true nationally, are markedly below outcomes for on-campus classes (Virginia's, 2009b; Jaggars & Xu, 2010). Importantly, there does not seem to be any published studies of the interactions among late registration, online delivery, and student outcomes. Johnston (2006) made passing mention of online courses as a potential target of research in regards to late registration only to dismiss the advisability of conducting such a study due to "difficulties understanding the results"(p. 10), although he did not specify to which difficulties he was referring.

The VCCS also found that completion of a college success skills course is positively correlated with student success (Virginia's, 2009a), a finding consistent with other research (Habley, Bloom, & Robbins, 2012; Zeidenberg, Jenkins, & Calcagno, 2007). These courses develop skills such as studying, note-taking, and time management that are associated with academic success (Habley, Bloom, & Robbins, 2012). Again, there does not seem to have been any research where the interactions among registration timing, college success skills courses, and student outcomes served as a focus of inquiry.

Finally, research summarized by Habley, Bloom, and Robbins (2012) has indicated that student demographic characteristics are associated with differential educational outcomes. Specifically, female students tend to perform better academically than males, as do whites compared to other racial/ethnic categories (excepting Asians), students of non-traditional age, and full-time students (Cofer & Somers, 2001; Cummings, 2009; Forman, 2009; Habley, Bloom & Robbins, 2012).

To better understand factors that affect student achievement, Astin (1993) proposed that the student experience be viewed as a three stage process which includes

inputs, environment, and outputs. This general concept can be applied to the student experience of late registration. A student's completion of a college success skills course prior to registering for courses in a second semester can be viewed from the perspective of an input. While the on-time or late registration behavior in the second semester may be regarded either as a student input factor or an environmental factor, the course delivery mode (on-campus or online) would seem to be an environmental factor. Finally, the course completion rates of students would be the output of a research model focused on late registration and student success. Other theoretical models are also pertinent to the conceptualization and design of the proposed study. In the 1970s, Spady (1971) and Tinto (1993) developed models of student retention based on social integration theory. Along the same lines, Astin (1999) articulated student involvement theory, which can be seen to inform the central argument of Roueche and Roueche (1993) about the important acculturation experience in a college course during the first days of the semester. In sum, student knowledge, skills, and abilities developed in a college success skills course coupled with subsequent registration timing (on-time or late) and the delivery mode of the course can be posited to exert an influence on student educational outcomes such as course success as defined by a final course grade (Astin, 1993; Roueche & Roueche, 1993).

Purpose Statement

The purpose of the proposed study was to advance understanding of how student success is affected by registration timing in the educational contexts of course delivery

modality and whether or not a student completed a college success skills course, and in

the personal context of student demography.

Research Questions

The following research questions were addressed in the study:

1. What effect does time of registration (on-time or late) and course delivery

   mode (on-campus or online) have on student success in the class?

2. What effect does time of registration (on-time or late) and course delivery

   mode (on-campus or online) have on student success in the class when holding

   constant the completion of a college success skills course?

3. What effect does time of registration (on-time or late) and course delivery

   mode (on-campus or online) have on student success in the class when holding

   constant the completion of a college success skills course and demographic

   characteristics (sex, age, race/ethnicity, and full-time/part-time enrollment

   status)?

Professional Significance of the Study

Recently there has been an increased interest in data related to late registration and

student success, especially at community colleges (McWaine, 2012; O'Banion, 2012).

While a majority of late registration studies have been conducted at community colleges,

only two dissertation-length studies drew data from more than one of these institutions

(Goodman, 2010; Hale, 2007). Furthermore, the results of studies of the association

between late registration and student success sometimes contradicted each other, and

there does not seem to be any publicly available study that compared the effect of late

registration on student performance in online versus on-campus classes or the effects of a

college success skills course on the academic performance of late registrants.

The present study adds to the research literature (1) by investigating the

association between late registration and student success in on-campus and online classes

at multiple community colleges in the southeastern United States, (2) by including in the

statistical analysis data about whether the student completed a college success skills

course, and (3) by including in the statistical model student demographic variables known

to be associated with differential rates of academic success. Grounded in theories that

directly link registration behavior to student performance (Astin, 1993; Roueche &

Roueche, 1993), the research design of this study improved upon other studies of late

registration (see Appendix A) because the focus was on student enrollment and success in

individual classes, as opposed to the overall performance of students who registered late

for every class in a semester. Furthermore, the primary statistical method in this study—

binary logistic regression—was an improvement upon the t-test and ANOVA methods

used in some other studies (e.g. Chilton, 1964; Hale, 2007) because the regression model

allowed for a more appropriate and complex statistical analysis (Field, 2009).

Results of the study also have implications for practice. Community college

leaders and scholars like O'Banion (2012) and Roeuche and Roueche (1993) have

lobbied colleges to eliminate late registration practices because of a posited negative

affect on student success. However, others have noted that more investigation is needed

of the general effect of late registration on student success and of late registration and

student success in different populations and contexts (Street, 2000). Thus, the results of

this study provide evidence to inform decisions by community college administrators about whether the nexus of policies and practices related to late registration, online education, and college success skills courses should be modified to increase a student's likelihood of successfully completing classes.

Overview of the Methodology

The proposed study used quantitative methods to address the research questions. The study population included first time in college (FTIC) students who were in their second semester of coursework and who registered for classes in the spring semesters of 2011, 2012, or 2013 at one of 23 public community colleges in Virginia. The community colleges from which data were drawn serve urban, suburban, and rural populations. As such, they provided a sizeable and heterogeneous sample. Because this study included seven independent variables, in order to maximize the power of the statistical test it was important to draw on a very large data set (Cohen, 1992); therefore, the entire population that falls within the delimitations of the study was included in the data set.

Based on the literature about the effect of student acculturation and engagement on the performance of student who register late (Goodman, 2010; Hale, 2007; Keck, 2007; Schmidt, 2004), the study looked at FTIC students in their second (spring) semester to exclude students whose decision not to persist into the second semester may indicate that significant personal or educational issues besides late registration affected their achievement.

A formal request for permission to conduct the study and for data was submitted to the System Office for Virginia's Community Colleges. The data set was comprised of

ex post facto data from 2010-2013 drawn from the student information system.

Demographic data described the study population and was compared with the FTIC

population of Virginia's Community Colleges (2013d). Data on student registration

history and grades were used to address the research questions. Inferential statistical

analyses were conducted using binary logistic regression.

Delimitations

The study focused on all 23 community colleges in Virginia. Only FTIC students

enrolled for at least three credits of an on-campus or an online class in their second

semester of coursework in spring 2011, 2012, or 2013 were included in the study

population. Dual enrollment students and students who were known to have transferred

into the colleges from another institution of higher education were excluded from the

population.

Students who enrolled in a spring semester class before the first day of the

semester were categorized as on-time registrants for that class. Those who enrolled in a

class after the first day of the semester were categorized as late registrants. Only classes

that met fully on-campus or fully online were included; hybrid classes which mixed on-

campus and online delivery modes were excluded.

The analysis of student performance outcomes was confined to final course

grades. In addition to registration timing, the independent variables of course delivery

mode and completion of a college success skills course were included in the statistical

model. Student demographics were held constant when addressing the third research

question in order to account for expected differences in student success within and across

the categories of sex, race/ethnicity, age, and full-time/part-time enrollment states.

Subjects for whom data relevant to the analyses are missing were excluded from the

study.

Definition of Key Terms

The following definitions apply throughout this study:

- Community college: "A regionally accredited institution of higher education

   that offers the associate degree as its highest degree" (Vaughan, 2006, p. 2).

- First time in college (FTIC): Students enrolled at the college for the first time

   who did not previously earn dual enrollment credits and for whom there is no

   record in the student information system of previous enrollment at another

   institution of higher education.

- Full-time equivalent student (FTE): A description of an institution's

   enrollment which is calculated by adding the number of credits students are

   enrolled in divided by 12 (National Center, n.d.)

- Hybrid class: Any class where 50-99% of instruction was delivered online

   (Virginia's, 2009). Hybrid classes were excluded from this study.

- Late registration (LR): Enrollment in a class on any day on or after the first

   day of the 15 or 16-week session of the semester (McWaine, 2012).

- On-campus class: A 15- or 16-week, regular session class where more than

   half of instruction was delivered in a face-to-face setting (Jaggars & Xu,

   2010).

- Online class: An asynchronous 15 or 16-week, regular session class where 95% or more of the instruction was delivered online (Jaggars & Xu, 2010).

- On-time registration (OTR): Enrollment in a class on any day before the first day of the semester (McWaine, 2012).

- Retention: The continued enrollment of a student in a class until the end of the semester.

- Persistence: The enrollment of a student for one or more credits into a subsequent regular academic semester or year, that is, continued enrollment from one academic semester to the next or from one academic year to the next.

- Student success: A student's grade of "A," "B," "C," "P" (Pass), or "S" (Satisfactory) in a class. Grades of "D," "F", "U" (Unsatisfactory), "R" (Repeat), and "W" (Withdrawal) were counted as nonsuccess. Enrollments where an "I" (Incomplete) or "X" (audit) grade was reported were excluded from the study. Success was set at the "C" level in courses graded on an A-F scale because that is the definition of success used by Virginia's Community Colleges and the grade required for the class to transfer to most four-year institutions (Virginia's, 2008-2013; Virginia's, 2011).

Summary

For more than a century the history and mission of the two-year college has been one of increasing higher education access for residents of the United States. That mission is now being called into question. Financial and accountability pressures require community colleges to use resources more efficiently in the service of improved student

outcomes. Policies which allow students to register after the start date of the semester are theorized to negatively affect student achievement. Findings from research on the effect of late registration on student outcomes, particularly in community colleges, have been inconclusive. The present study addressed gaps in the research literature by examining the effect of late registration at 23 community colleges into on-campus versus online classes on student final course grades when taking into account completion of a college success skills course.

In Chapter 2 a review of literature related to the topic of this study will be provided, including sections focused on community colleges in the United States, Virginia's Community Colleges, the current community college context, student outcomes, college success skills courses, online education, and late registration.

CHAPTER 2

LITERATURE REVIEW

The purpose of this study was to investigate the effect of late registration on students' grades in on-campus and online classes at 23 Virginia community colleges in the 2011-2013 time period. An additional independent variable was students' completion of a college success skills course.

This chapter provides a review of literature related to the topic for this study, including sections focused on community colleges in the United States, Virginia's Community Colleges, the current community college context, student outcomes, college success skills courses, and online education. The final section will provide an in-depth review of the literature on late registration with particular attention to the design and findings of previous research studies.

A History of Community Colleges in the United States

On board the *Arrabella*, whose precious cargo were the souls of those men and women who would found the English colony at Plymouth, John Winthrop took a passage from Matthew's account of Jesus' Sermon on the Mount to edify his flock: "For we consider that we shall be a city upon a hill. The eyes of all people are upon us" (Winthrop, 1630, p. 37). In building that city, the colony authorized the creation of a "schoale or colledge" which was established on the edge of Cow-yard Row north of Boston; the institution would later take the name of one of its early benefactors, John Harvard (Christensen & Eyring, 2011; Harvard University, 2012a). The opening of Harvard almost four hundred years ago is milepost zero on America's journey of higher education access.

Higher education access was expanded during the Civil War when Congress passed the *Morrill Land Grant Act* of 1862, which provided funds for the establishment of agricultural colleges in every state of the union (Lattuca & Stark, 2011). "Although the land-grant college was touted as the 'people's college,'" as the League for Innovation in the Community College has pointed out, "the original land-grant colleges did not admit minorities, offered few programs for women, and were inaccessible to many students because of their location" (2010, p. 2). Even so, some all-male colleges recruited women during the Civil War years because enrollments had been negatively affected by the vast number of men serving in the armed forces (Lattuca & Stark, 2011), and in 1890, the so-called second Morrill Act funded colleges for African Americans (Conrad & Weerts, 2011).

In the 20th century the most notable expansions of access to higher education at the federal level were the *Servicemen's Readjustment Act* of 1944 (popularly known as the G.I. Bill), which allocated funding for veterans' education (Lattuca & Stark, 2011); the *Higher Education Act* of 1965 and its many reauthorizations (Lattuca & Stark, 2011), which in its 1972 Title IX section guaranteed equal higher educational opportunities to women (Valentin, 1997); and the *Post-9/11 GI Bill* of 2008, which expanded educational benefits for today's military veterans (U.S. Department of Veterans Affairs, 2009).

Two additional 20th century innovations led to immense expansions in higher education access. First, in 1901, Joliet Junior College, the "nation's first public community college" (Joliet, para. 1), was founded in Illinois. Over the course of the century, more than 1,000 two-year colleges opened doors across the country, placing a community college within driving distance of every citizen of the nation (Vaughan,

2006). Second, the 1947 *Higher Education for Democracy Report*, commonly referred to

as the Truman Commission Report, popularized the term "community college" in calling

for "the expansion of a network of public community colleges that would charge little or

no tuition; serve as cultural centers; be comprehensive in their program offerings with an

emphasis on civic responsibilities; and serve the area in which they were located"

(American, 2001). Community colleges, also known as junior colleges and two-year

colleges, were defined by Cohen and Brawer as "any institution regionally accredited to

award the associate in science degree as its highest degree" (2003, p. 5). These

institutions typically offer "academic transfer preparation, vocational-technical education,

continuing education, developmental education, and community service"; such programs

have been part of community colleges since their inception (Cohen & Brawer, 2003, p.

20).

The rise of America's system of community colleges is attributable both to the

citizens' belief that America is the land of opportunity and to society's efforts to adjust to

changing economic and social circumstances. For example, the first period of a truly

globalized economy occurred at the start of the 20th, not the 21st, century which created

pressure to enhance the skills of the American workforce (American, 2001). Vaughan

(1983) bestowed on community colleges the epithet of "the Ellis Island of higher

education" (p. 9).

In 1917 the first accrediting standards for community colleges were adopted

(Pedersen, 1995). In 1918, under the aegis of U.S. Commissioner of Education Philander

Claxton, a directory of junior colleges was published, listing over 80 institutions (U.S.

Bureau of Education, 1918). Claxton lent federal government support for McDowell's

1919 report on "The Junior College" as well as the 1920 conference in St. Louis where 34

junior college leaders met for the first time (McDowell, 1919; Pedersen, 1995). That, in

turn, gave impetus to the organization that would become what is now known as the

American Association of Community Colleges (AACC).

At the time, according to AACC (2001), junior colleges were the most popular

higher education access points for women, most of whom were themselves preparing to

become educators. Beginning in the 1950s American demographic changes significantly

altered the face of community colleges. World War II veterans who enrolled in higher

education represented greater diversity in age, socio-economic status, and academic

preparation compared to previous generations of college and university students.

Similarly, in the early 1960s the Baby Boom generation increased the number, percent,

and diversity of Americans who enrolled in higher education. The use of technology to

expand access to community colleges dates back at least to the 1960s when the College of

San Mateo televised courses. Today, nearly half of undergraduates in the United States

are enrolled in two-year colleges (American, 2012a), and a majority of those who earn

associate's degrees are women (Lattuca & Stark, 2011). Andrews and Fonseca (1998)

identified part-time students as the fastest growing population in higher education, a

population which is primarily served by community colleges. Similarly, underrepresented

populations, such as non-dominant ethnic and socio-economic groups, are

disproportionately served by community colleges rather than four-year schools. "The

growth of community college enrollment has been no less than phenomenal" (Andrews &

Fonseca, 1998, p. 3), and schools such as Northern Virginia Community College have

campuses larger than most four-year institutions (National Center, 2013; Virginia's,

2013d). Cohen and Brawer (2003) attributed the rise of community colleges to a number

of social forces, including

> The need for trained workers to operate the nation's expanding industries; the
>
> lengthened period of adolescence which mandated custodial care of the young for
>
> a longer time; and the drive for social equality, which supposedly would be
>
> enhanced if more people had access to higher education. (p. 1)

AACC (2001) averred that America's community colleges are essential to the well-being

of society by providing "an open door of opportunity to all," becoming "one of the

primary drivers of the national economy" through the development of a skilled workforce,

interweaving their mission and services "into the fabric of communities across the

nation," and serving as partners in "students' efforts for personal empowerment" (pp. 11,

103). Ewell (2011) observed that community colleges are an essential component of

states' higher education systems, particularly as transfer feeders for four-year institutions.

Fonseca and Andrews (1998) summarized the multi-channel benefits of

community colleges to the nation:

> Community colleges…exemplify many prototypical American values….[They
>
> are] open admission, anti-elitist colleges….Instead of cautioning students about
>
> the academic distractions of job and family, community colleges welcome part-
>
> time students and orient their curricula, their schedules and their locations to serve
>
> these students….From a financial perspective community colleges are no-frill
>
> institutions; they are efficient and economical, and in the language of the market
>
> economy, they pass those savings along to their consumers—the students. They

are multi-purpose institutions offering curricula ranging from liberal arts to

vocational and technical courses. (p. 17)

In announcing the American Graduation Initiative, President Obama (2009b) set a

national goal to increase the number of college graduates by 5 million in the decade to

2020. As the President noted, the number of jobs requiring an associate's degree would

outpace jobs which do not require college by 2 to 1. Obama declared that "we will not fill

those jobs—or keep those jobs on our shores—without the training offered by community

colleges" (The White House, n.d., p.1).

Data from the U.S. Bureau of Labor statistics (2010) show that in the depth of the

Great Recession in 2009 associate degree holders experienced unemployment rates 2.9

percentage points below those whose highest educational credential was a high school

diploma, and an associate degree was worth over $7,000 more a year in median earnings.

In Virginia, on average, an associate degree commanded a $2,500 yearly wage premium

over a bachelor's degree in 2010 (Schneider, Massa, & Vivari, 2012). Yet according to

the Organization of Economic Cooperation and Development (OECD), the United States

is the only major industrialized nation where the rate of tertiary education credentialing is

higher for 55-64 year-olds, who are preparing to exit the workforce, than for 25-34 year-

olds, who have recently entered the workforce (OECD, 2011). Among the latter age

group the United States ranks 15th among 34 OECD countries in higher education

attainment. President Obama situated community colleges at the heart of efforts for the

United States to return to its status as the nation with the highest per capita rate of college

graduates by the year 2020 (The White House, n.d.).

In terms of human capital theory, investing in a citizenry's education yields economic benefits akin to investments in a nation's physical infrastructure (Cohen & Brawer, 2003). Former AACC president George Boggs stated that community colleges "owe their success to four enduring values: access, community responsiveness, creativity, and a focus on student learning" (American, 2001, p. 104). Those values impinge on the central issues related to late registration in community colleges.

Virginia's Community Colleges

In 1693, King William III and Queen Mary II chartered William and Mary, which became the second oldest college in the United States (The College of William & Mary, 2012). George Vaughan (1987), himself a former president of two Virginia community colleges, explained that Virginia is also notable for the University of Virginia, which was founded by Thomas Jefferson, one of the nation's leading advocates for public education. Despite these seminal accomplishments, Virginia significantly lagged the nation in higher education enrollment well into the twentieth century. In 1959 the State Council of Higher Education in Virginia (SCHEV), which had only been established three years earlier, published *The Needs, Policies, and Plans for 2-Year Colleges in Virginia*, the first state report to explicitly call for the creation of a community college system within the structure of the existing college and university system. Virginia culture and tradition, four-year schools' wariness of the erosion of their missions, economics, and racial issues all served to prevent the implementation of SCHEV's recommendations at the time.

On the other hand, interest from a rising college age population and the business community demonstrated a need for local two-year colleges that would offer programs in support of an educated workforce. In 1964, there were 11 two-year colleges in Virginia,

but Vaughan emphasized that they were not comprehensive community colleges, in part

because they did not offer terminal programs. By 1964, state government had recognized

an emerging critical need for two-year higher educational opportunities in Virginia when

it created a state board for technical education; Dana B. Hamel, who would later become

the first Chancellor of the Virginia Community College System, was appointed the first

director of the Department of Technical Education. Although this represented a step

forward, political, educational, and business leaders recognized that the technical schools

were not sufficient in mission or structure to meet the local post-secondary needs of

Virginians. In 1966, Governor Godwin outlined his vision for a comprehensive system of

community colleges that would

- Serve the local community

- Provide access to all citizens within commuting distance

- Open access to all high school graduates

- Deliver programs at reduced costs compared to four-year schools

- Offer a second chance to high school graduates denied admission to a four-year

  school and to first-year university students who dropped out. (Vaughan, 1987)

The current system of Virginia's Community Colleges is comprised of 23 institutions

(Figure 1) serving almost half a million Virginians, 3 out of every 5 undergraduates in the

state, and more than 11,000 employers annually (Virginia's, 2013e). Virginia generally

mirrors national trends in terms of the percentage of students enrolled in community

colleges, rates of ethnic and racial minority student enrollment, and number of

community colleges per capita (Fonseca & Andrews, 1998). However, threads of the

commonwealth's earlier neglect of support for higher education are still visible, for

example in data that indicated Virginia has had one of the five greatest differentials in the

nation between two-year and four-year faculty salaries (Fonseca & Andrews, 1998). In

2009, Governor McDonnell requested additional appropriations for Virginia's

Community Colleges as part of his initiative to increase the number of college degrees in

15 years by 100,000 (College, 2009; Commonwealth of Virginia, 2011).
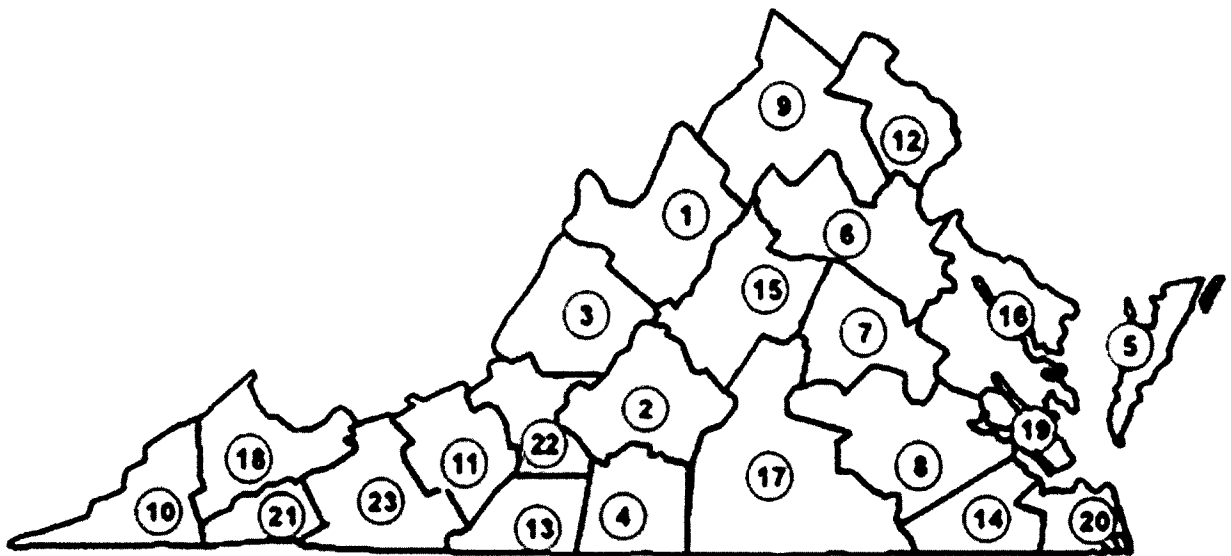
Figure 1. Virginia's Community Colleges (2013a). See Appendix C for key to the colleges.

Virginia's system of community colleges developed at the same time as the

interstate highway system with most campuses located at intersections of major highways

which serves the goal of easy access for citizens to higher education (Andrews &

Fonseca, 1998). Former General Assembly Delegate Slaughter, who chaired the

eponymous 1963 commission that led to the development of technical colleges in

Virginia, credited founding VCCS Chancellor, Dana B. Hamel, with the vision upon

which this system was built:

He was enthusiastic toward the idea; he understood it and he understood how it

should be operated and this was very important. You can imagine that if you had a

director who was sold on technical education only, and opposed to the community

college concept, that a lot of people would have wondered about our

recommendations. He is really a comprehensive man himself. (Vaughan, 1987, p.

44)

The Current Community College Context

The access to educational and economic opportunity that has been the hallmark of

community colleges for over 100 years is now threatened (Beach, 2011). Higher

education faces a funding crisis (Hendrick, Hightower, & Gregory, 2011), which is

nowhere more apparent than in California where enrollment at some two year colleges

has been capped (Beach, 2011). The value that is provided by open access institutions has

been questioned, for example by the National Commission for Excellence in Education's

A Nation at Risk (National Commission, 1983), by Arum and Roksa in *Academically*

Adrift (Arum & Roksa, 2011), by experts on education and employment (Carnevale,

2008), and by critics from within the community college culture (Beach, 2011). In *A*

Nation at Risk, Paul Copperman identified the threat that educational failure poses to our

economic competitiveness: "*For the first time in the history of our country, the*

educational skills of one generation will not surpass, will not equal, will not even

approach, those of their parents" (National Commission, 1983, Indicators of risk section,

para. 4, emphasis added).

The twin burdens of decreased funding and increased need for an educated

citizenry have focused attention away from simply providing access to higher education

towards the quality of that education and policies that support student achievement (Arum

& Roksa, 2011; Beach, 2011, Hendrick, Hightower, & Gregory, 2011). Lattuca and Stark

(2011) documented the concomitant pressure for meaningful assessment.

Rossi, Lipsey, and Freeman (2004) argued that "widespread systematic evaluation

research is a relatively modern 20th-century development" (p. 8). Education was one of

the first fertile fields for assessment because of the need to evaluate literacy and the

effectiveness of vocational training. Cohen and Brawer (2003) observed that there has

been continual government oversight of community colleges dating to 1907 when

California passed legislation enabling the creation of community colleges in that state. In

terms of the assessment movement in community colleges in the last quarter century,

Ewell (2011) offered a ranked list, from greater to lesser, of external agents which exert

accountability pressures on community colleges: "states, the federal government,

accreditors, service regions and employers, and various third party players" (p. 25). The

1986 adoption of assessment as a review criterion by the Southern Association of

Colleges and Schools (SACS) was a particularly important event. Today, SACS places

assessment at the heart of an institution's commitment to continuous improvement

(Southern Association, 2012). Furthermore, the Secretary's Commission on the Future of

Higher Education (aka the Spellings Commission) "prompted higher education to adopt a

more proactive stance with respect to accountability" (Ewell, 2011, p. 154). The use of

"business intelligence tools" outside academia has motivated some administrators and

even some faculty to turn to educational data mining, also called academic analytics, to

understand how inputs affect outputs and how research can inform policy (Baepler &

Murdoch, 2010, para. 1). AACC (2011) has been working on the Voluntary Framework of Accountability

> to determine how well community colleges are serving students. Lack of
> commonly accepted performance measures has often led to the misperceptions
> and frequently an underestimation of community college effectiveness and
> contributions. It has also limited the ability of the institutions to identify problems
> and set goals for improvement of outcomes. Thus the VFA was designed to help
> community colleges create sector-appropriate reporting formats and share them
> publicly. (p. 3)

Similarly, the Community College Survey of Student Engagement (CCSSE), whose indicators of engagement correlate with student success, provides benchmark data on community college performance that are easily accessible by the press and the public through the internet (CCSSE, 2012a; Ewell, 2011).

The state's role is primary because of its large contribution to community college funding, which places the state in the position of "investors and shareholders… [and] owner-operators" (Ewell, 2011, p. 25). For the state, efficiencies are important, but the efficacy of the two-year college as part of an integrated higher education system that provides preparation for both the workforce and baccalaureate degrees matters as much (Ewell, 2011). States like Florida and New Jersey have implemented statewide assessments to assess and ensure this efficacy (Cohen & Brawer, 2003). At the federal level, Christensen and Eyring (2011) tied the economic crisis of 2008 and community college's historic low costs with increased government support for and attention to community colleges. For example, as part of the American Graduation Initiative, the

Obama administration provided an additional $2 billion in funding over four years for community colleges and career training centers (The White House, n.d.).

Virginia's Community Colleges are responding to the need to align assessment and policy, in part, with the assistance of a federal Trade Adjustment Assistance Community College and Career Training program grant (TAACCCT), itself a partnership between the departments of Labor and Education, to fund a decision support system, which will be a data warehouse that facilitates data mining through report-generating capabilities (United States Department of Labor, 2012; Virginia Community College System, 2012a).

In "Creating a New Architecture for the Learning College," O'Banion (2007) argued that the structure and policies of institutions must change in order to improve educational outcomes. O'Banion identified late registration, the policy whereby colleges allow students to enroll in classes after the semester is underway, as a threat to learning. On one hand, late registration increases access for students because it allows them to register for classes after the regular registration period has ended. On the other hand, if these students experience poor educational outcomes, then higher education's limited resources are used inefficiently, which ultimately negatively affects access for others (American, 2012b). The Spellings Commission report summarized the high stakes for community colleges and the nation:

> American higher education …has yet to address the fundamental issues of how academic programs must be transformed to serve the changing educational needs of a knowledge economy….History is littered with examples of industries that, at their peril, failed to respond to—or even to notice—changes in the world around

them....Without serious self-examination and reform, industries of higher

education risk...seeing...their services increasingly characterized by

obsolescence. (U.S. Department of Education, 2006, p. xii)

Student Outcomes

A review of research by Habley, Bloom, and Robbins (2012) identified factors

that affect student success and retention. Several researchers have reported that high

school GPA had the greatest predictive power in relation to degree completion, and the

number of years of foreign language study also demonstrated a strong relationship. Other

influential factors included the educational level of parents, parents being alive and the

student residing with them, parental income, being female, being Roman Catholic or

Jewish, a positive self-rating of emotional health, and participation in student

communities. Based on their review of the literature on student success, Habley, Bloom,

and Robbins (2012) concluded that underrepresented populations experience worse

educational outcomes. The authors' own research indicated that learning habits and skills,

motivation, and commitment to college had the greatest impact on grades and retention.

In turn, "the only key driver of graduation is first-year academic performance" (p. 186).

Other research indicated that traditional aged students and part-time students were at

greater risk for worse educational outcomes in terms of grades, persistence, and degree

completion (Cofer & Somers, 2001; Cummings, 2009; Forman, 2009).

A meta-analysis by Kalechstein and Nowicki (1997) found that a student's general

locus of control of reinforcement expectancies was related to academic achievement.

Specifically, locus of control, which falls within attribution theory, "provides a measure

of a student's expectations about whether the results of actions are (a) internal and under

the student's control or (b) external and beyond the student's control" (Grimes & David, 1999, p. 88). An external locus of control is associated with lower grades, lower standardized test scores, lower class completion rates, and higher dropout rates at community colleges and universities (Gifford, Briceño-Perriott, & Mianzo, 2006; Grimes, 1997; Kalechstein & Nowicki, 1997).

The ACT, a private student assessment organization, conducted four "What Works in Student Retention" studies over the last 30 years in which institutional practices that can positively affect student retention have been investigated and described (Habley, Bloom, & Robbins, 2012). Transition programs, academic advising, learning support, and assessment were deemed to be most important. In the mid-1980s, Chickering and Gamson (1999) used research to develop the Seven Principles of Good Practice in Undergraduate Education. Similarly, the Community College Survey of Student Engagement (CCSSE, 2013b), which was established in 2001, uses categories of active and collaborative learning, student effort, academic challenge, student-faculty interaction, and support for learners as benchmarks against which community colleges can assess the degree to which their institutions advance the goal of student achievement.

Habley, Bloom, and Robbins (2012) concluded that between 1975 and 2010 community college retention and completion rates had not noticeably improved. Schneider and Yin (2011) estimated that between 2004 and 2009 taxpayers at the local, state, and federal levels allocated $3.85 billion in grants to first-year, full-time students who later dropped out of college. President Obama, in the 2009 State of the Union speech to a joint session of Congress, observed that while "three-quarters of the fastest-growing occupations require more than a high school diploma...just over half of our citizens have

that level of education...and half of students who begin college never finish" (Obama, 2009a, para. 44). To reverse this "prescription for economic decline" (para. 45), community colleges, which will have to deliver the majority of credentials necessary to achieve the President's goal (Obama, 2009b), must understand and address student success (Ewell, 2011).

A number of theoretical models have been proposed to provide concepts and assessment strategies for understanding why students do (not) succeed or persist. Both Spady (1971) and Tinto (1993) focused on academic and social integration, while Bean and Metzner (1985) investigated how environmental influences are more important than social influences for non-traditional aged students. Kuh (2009) and Astin (1999) explored engagement theory and involvement theory respectively, each of which focuses on the quantity and quality of students' educational interactions, from the amount of time they study to their out-of-class contacts with faculty. Astin's Input-Environment-Output (I-E-O) model of student retention can be applied to a range of variables (Astin, 1993). In this model, inputs are what students bring to college—their DNA, age, attitudes, and previous learning, for example. Cohen and Brawer (2003) cited evidence that most factors which lead to student withdrawal, particularly those Astin would classify as inputs, are impervious to college influence. Some inputs, such as work schedule changes and health issues may lie beyond the ken of a student's area of influence, while other factors, such as having achieved their personal educational objective or deciding that they can return to college at any time, are individual and essentially personal. In one survey of former students, "85% reported that no intervening college service would have helped them continue their education" at the community college (Cotnam & Ison, 1988, p. 3).

Although personal factors may be the primary determinants of student attrition (Cotnam & Ison, 1988), institutions can also influence student retention and success (Cohen & Brawer, 2003; Habley, Bloom, & Robbins, 2012). In Astin's model (1993), environmental factors are institutional policies, procedures, programs, and practices that affect students. Outputs, often defined in research literature as dependent variables, refer to the results of the educational experience, such as knowledge, skills, abilities, grades, and graduation.

Thus, the theory and research on students' educational experience and the assessment of that experience offers a framework for conceptualizing the student experience of late registration, the focus of the current study. The late registration behavior can be viewed as an input, in that it is something a student brings to the educational experience of a class, but it is probably best understood in environmental terms, given that some community college scholars and leaders, such as Dunn and Mays, (2004), O'Banion (2007; 2012), and Roueche and Roueche (1993), identify late registration as in some measure an institutional construct which has an effect on student success. The delivery mode of the course—in the case of this study fully on-campus or fully online—is also part of the educational environment. Together, the student experience, or lack thereof, of a college success skills course and of late registration, coupled with the delivery mode of the course, can be posited to exert an influence on student educational outcomes such as course success as defined by a final course grade (Astin, 1993; Roueche & Roueche, 1993).

College Success Skills Courses

The problem of and concern with student success is not new, and in American higher education it has been attributed to inferior institutional inputs, that is, underprepared students, since the 18th century (Wyatt, 1992). In the 20th century the means to addressing the problem were through the development of theory and research and the implementation of programs to remediate or otherwise prepare students for success in college (Tinto, 1993; Wyatt, 1992). Evans, Forney, Guido, Patton, and Renn (2010) explained that the 1920s-1940s were the formative years of the student development movement which was directed towards managing and maturing an increasing diverse student population. In terms of theory, the student development movement initially drew on models of psychological development such as those described by Piaget and Erickson. In the 1960s Stanford offered one of the first models for college student development, and educators' interest in college students' general development (e.g. Chickering), intellectual development (e.g. Perry), and moral development (e.g. Kohlberg) was especially active during the decades that the Baby Boom generation entered college.

The application of these theories was realized, in part, in the development of models to explain student outcomes. Initially the focus was especially on student retention. In the 1970s both Spady (1971) and Tinto (1993) advocated for the applicability of Durkheim's model of social integration for understanding the adjustment experiences of new college students. Bean and Metzner (1985) adumbrated this literature by focusing on the adjustment experience of non-traditional students. Astin (1993) built the I-E-O model as a way to theorize how students' pre-college characteristics,

experiences, and abilities interact with college environments to affect a range of student

outcomes from the academic to the social. Astin (1999) also developed Student

Involvement Theory which emphasizes how the locus of control that belongs to the

student affects student success. Researchers applied these and other models to assess

student outcomes such as grades, retention/persistence, learning, and graduation (Habley,

Bloom & Robbins, 2012; Pascarella & Terenzini, 2005).

One of the most visible ways that colleges have addressed support for student

success has been through various orientation programs and study skills classes. Lee

College in Kentucky is credited with offering the earliest first-year seminar, in 1882;

Reed College, in 1911, is said to have been the first to establish the seminar as a college

credit course (University of South Carolina, n.d.). Wyatt (1992) dated to 1916 the first

college study skills class, as opposed to remedial classes focused on discrete skills such as

math or writing. Today, there are various models for these support programs, from one-

day orientations to semester-long courses (Habley, Bloom, & Robbins, 2012). The

development of academic skills was identified by 54.5% of colleges and universities as a

key outcome of these programs; 50.2% indicated building connections to the institution

was a program goal, and 47.6% reported that orienting students to campus resources was

important. Roueche and Roueche (1994) argued that orientation programs "socialize and

acculturate entering freshman to the norms and values of the institution. Students in

community colleges need this orientation and socialization more than any other group of

learners in American higher education" (p. 7).

In a survey conducted by the Center for Community College Student Engagement

(2012) 83% of community colleges reported offering college success skills courses, with

15% requiring these courses for all new students. Reported rates for course content were study skills, 90%; time-management skills, 88%; note-taking skills, 88%; test-taking skills, 85%; and use of information resources, 81%. However, according to data gathered in 2011 only 24% of students reported having taken these courses.

In studies conducted by the ACT, colleges were asked to rate the importance of various strategies to positively affect student success (Habley, Bloom, & Robbins, 2012). Freshman seminar received a rating of 3.68 on a four-point scale; however, only 10% of community colleges listed it among the top 3 of 94 strategies, against 24% of universities which so ranked them.

Habley, Bloom, and Robbins (2012) found evidence that attending to students' general academic skills positively affects student outcomes:

> Academic skill-based interventions have the strongest effects on academic performance and success. These interventions work directly to predict performance, but they also work through motivational control factors. Motivational control, in turn, is predictive of both performance and retention behavior. (Habley, Bloom, & Robbins, 2012, p. 200)

Zeidenberg, Jenkins, and Calcagno (2007) examined the effect of Florida community colleges' Student Life Skills (SLS) course on retention, transfer, and graduation rates. The SLS course focuses on "students' test-taking skills, study skills, time management, and financial management" (Florida, 2006, p. 7). Zeidenberg, Jenkins, and Calcagno tracked students who enrolled in the SLS course in the Fall 1999 term through 17 terms. SLS students were 8% more likely to earn a credential, including a 5% advantage for SLS remedial students compared to remedial students who did not enroll in the SLS course.

Using multiple regression models the researchers were able to demonstrate that positive effects on 5-year retention rates, transfer rates to the Florida State University System, and graduation rates were present even when adjusting for personal characteristics such as gender and student academic aptitudes such as those indicated by standardized test scores. On the other hand, Moore and Shulock's 2007 analysis of more than 260,000 students in California's Community Colleges found mixed, sometimes even negative, effects of orientation courses on program completion when other factors were controlled for in regression models.

Overall, there is a theoretical basis for believing that college success skills courses positively affect student outcomes, which is especially relevant in the context of late registration; Roueche and Roueche's (1993) argument that students who register late are at greater risk of negative outcomes can be viewed in terms of Student Involvement Theory and theories of student retention/departure. Additionally, for the most part research supports a positive association between student enrollment in a college success skills course and favorable educational outcomes (Habley, Bloom, & Robbins, 2012). It is possible, then, to posit that college success skills courses may improve outcomes for students who register late and for students who enroll in online courses.

College Success Skills Course Requirement in Virginia's Community Colleges. All students in Virginia's Community Colleges who are enrolled in a curricular program, except career studies certificate programs, are required to complete a college success skills course (SDV 100, 101, or 108) within the first 15 credit hours (Virginia's, 2013c). The courses focus on information to assist students' transition into college policies and procedures as well as academic and affective skills that have been associated

with student success (see Appendix D). Research by Virginia's Community Colleges

(2009a) indicated that students enrolled in a curriculum who completed a college success

skills course persisted from fall to spring semesters at a rate 13 percentage points higher

than students who did not take the course, suggesting that college success skills courses

may contribute to positive student outcomes.

Online Education

Access to higher education in America took another dramatic turn through

distance education. Traditional correspondence courses from American colleges date back

more than 100 years, and televised courses emerged in the 1940s (Schwitzer, Ancis, &

Brown, 2001). In the early 1970s, The British Open University's popular, high-quality

credit programs, delivered instruction around the world through television (Miller, 2000;

Schwitzer, Ancis, & Brown, 2001). Also in the 1970s Nova University (now called Nova

Southeastern University) began delivering content and student-faculty interaction online

using the UNIX operating system (Miller, 2000). Online education increased throughout

the first decade of the twenty-first century, especially during the economic crisis that

began in 2008, in part because it delivers educational opportunities at lower cost for both

schools and for students who do not have to quit work or relocate to take college classes

(Christensen & Eyring, 2011). AACC (2001) claimed that "community colleges were

among the first to embrace emerging technologies to expand educational opportunity...

[and] bring the classroom into the community" (p. 9).

Today, online education is ubiquitous. In 2008 about a quarter of college students

enrolled in an online course, and online course delivery is growing faster than on-campus

instruction (Jaggars & Xu, 2010). In support of the American Graduation Initiative,

President Obama called on community colleges to offer more online courses to "help

students learn more, and learn better, in less time" (The White House, n.d., p.1). Western

Governor's University, a collaborative venture of governors in 19 states, offers dozens of

degrees to 30,000 students across the nation (Western Governors University, 2012).

MOOCS (Massive Open Online Courses) can enroll tens of thousands of students in a

single online course, such as a history course offered by the University of Virginia

through Coursera, a company that claims 1.6 million students (Strong, 2012).

      In 2001 Virginia's Community Colleges drew up a strategic plan for online

education with the goal of supporting students, faculty, and institutions as they explored

and adopted this new educational medium (Jaggars & Xu, 2010). In the 2011-12

academic year 290,000 students enrolled in distance learning courses offered at Virginia's

Community Colleges, the vast majority of them in online only classes (Virginia's,

2012b). Additionally, in a study commissioned by Virginia's Community Colleges from

the Community College Research Center at Columbia University, Jaggars and Xu (2010)

calculated that the percentage of students enrolling in online courses increased

significantly in the four years covered in their study (2004-2008) and that the number of

credits taken online as a proportion of total credits taken also increased. Threkeld (2006)

reported that across the nation "enrollment growth was very rapid—almost explosive" (p.

5).

      Given the very different nature of online study compared to on-campus course

delivery, a different skill set—both in kind and degree—is required of students (Paloff &

Pratt, 2007; Yukselturk, 2010). For example, in asynchronous course delivery, which

represents the majority of online education in Virginia's Community Colleges, the

students and instructor share an online space, but they access that space at different times

of the day and different days of the week (Jaggars & Xu, 2010). Most students are not

required to meet with the instructor in-person or even synchronously online. Therefore, in

online courses students' performance requires that they be more independent and self-

directed in their learning (Paloff & Pratt, 2007; Yukselturk, 2010). They must also adjust

to the different psychological, emotional, cognitive, and social experience of the online

course delivery experience (Paloff & Pratt, 2007; Schwitzer, Ancis, & Brown, 2001).

Many students find the online learning experience to be more challenging, in part because

it is a much less familiar learning experience than traditional classroom learning, and in

part because it requires skills noted above that may not be well developed in students,

particularly those of traditional college age (Cummings, 2009; Evans, Forney, Guido,

Patton, & Renn, 2010; Paloff & Pratt, 2007).

Therefore, while online education has increased educational access and many

students have benefitted in terms of learning and credential attainment, the challenge

students experience with online education has negatively affected outcomes in the overall

student population (Harrell, 2008; Xu & Jaggars, 2011a; Xu & Jaggars, 2011b). As has

been true nationally since the advent of online education, students in Virginia's

Community Colleges have been more likely to fail or withdraw from these courses than

from courses delivered fully on-campus (Virginia's, 2009b). Jaggars and Xu (2010)

concluded that online students were slightly less likely to persist from semester to

semester, to transfer to a four-year school, or to earn an academic credential. There is

some evidence that online courses attract students with different characteristics from on-

campus students (Xu & Jaggars, 2011a). In a study of online "gatekeeper" courses (i.e.

the first college-level credit courses in English and in math students are required to take),

Xu and Jaggars applied a propensity matching statistical methodology with the goal of

isolating the effects of online and on-campus course outcomes independent of student

personal characteristics. They reported that previous studies may have "underestimate[d]

the negative impacts of online format on course outcomes" (p. 368). If America and

Virginia are to realize the educational goals they have set for their citizens, both

community colleges and online education will have to deliver on student success.

Late Registration

The practice of late registration, "deeply embedded in the culture of institutions of

higher education" (O'Banion, 2007, p. 721), goes back at least to the 1950s (Chilton,

1964; Innis & Shawhan, 1969) and is permitted policy at most colleges (Dunn & Mays,

2004). Smith, Street, and Olivarez (2002) explained that the two primary purposes of late

registration in community colleges are to serve their open access mission and to capture

more enrollments in order to realize increased revenue from tuition and government

funding in a formula O'Banion (2007) described simply as "the more students, the more

money" (p. 721). Writing in 1990, Angelo averred that contemporary late registration

policies were implemented as a customer service response to otherwise declining

enrollments, although a similar argument had been made 15 years earlier (Mannan &

Preusz, 1976). Perhaps a counterintuitive argument can be made that late registration may

inhibit college access for students who require financial aid to attend college in light of an

observation by Wang & Pilarzyk (2007):

The earlier students apply to a program, the earlier they apply for financial aid.

The earlier students apply for financial aid, the earlier it is awarded. The earlier

financial aid is awarded, the earlier students register. (p. 30)

Definition, Policies, and Frequency. There is not a single operational definition

of late registration. At one extreme it may indicate a time period *before classes start* but

after an established on-time registration date for adding, dropping, and switching classes

(Weiss, 1999); at another extreme it may signify a time period *after the first week of*

classes (Angelo, 1990; Summers, 2000). Late registration may refer to the behavior of

registering late for one or more classes (Diekhoff, 1992), or it may refer to the practice of

registering late for college in general and therefore all classes in a semester (Bryant,

Danley, Fleming, & Somers, 1996). Typically, late registration occurs during the first

week of classes (O'Banion, 2007). In Appendix A, definitions of late registration used in

the research literature have been compiled.

At some schools, a student is permitted to register late within a specified time

period without restriction (Angelo, 1990), whereas at other schools a student can only

enter a class late with the permission of the instructor (Cornille, 2009). It is difficult to

reliably estimate the frequency of late registration on a national scale across time.

O'Banion (2012) posited, without reference to empiricism, a hypothetical situation where

turnover in enrollment in a single class exceeded 50% between the first and second day of

class. This would seem to be no more than hyperbole, given the lack of evidence that this

phenomenon exists at all, much less that it is widespread. Looking at the question from a

slightly different angle—in terms of the frequency of late registration across all class

sections offered at a college—Zottos (2005), based on a study of one community college

in a single semester, found that over half of students registered late for at least one class

and therefore concluded that "many students occasionally register late" (p. 66). However

other evidence would seem to suggest that the frequency of adding, dropping, and

switching classes during the late registration period is much lower (see Appendix E). The

most credible, if not the only, national evidence comes from the Promising Practices data

of the Community College Survey of Student Engagement in which 11% of student

respondents at 435 colleges reported they had registered after the first class meeting for at

least one class (Center, 2012). It would seem reasonable to conclude that late registration

is a behavior exhibited by many students at some point in their college careers, but its

frequency is low (around 10%) for students and for classes. Furthermore, most students

do not continually enroll late (Mendiola-Perez, 2004).

Late registration fees, as a deterrent and revenue source, have been common

(Street, 2000). Although 14% of students in a Miami-Dade Community College study

(Belcher & Patterson, 1990) indicated they would elect not to register if a fee of $25 were

charged (in 1990 dollars), Morris (1986) found that fees have only a minimal effect on

students' add/drop behavior, even when the fee for each schedule change was increased

ten-fold from $1 to $10 (in 1983 dollars).

Hiller (2005) found that courses in English, communication, developmental math,

accounting, and biology had the highest frequency of late registration. In Keck's study

(2007) math and science, social science, business and computers, communication, and

public service courses, in that order, had the highest rates of late registration. Morris

(1976), looking at class drops as well as class adds, concluded that first-year courses and

courses in accounting, computer science, and history/political science recorded the most

transactions. Keck's interviews with students revealed that they were less likely to register late for online classes and for courses in subject areas that they did not have previous experience with.

Detriments and Benefits. As noted, colleges are increasingly expected to demonstrate that they are meeting the needs of students and serving society, which has engendered a particular focus on student achievement. Cornille (2009) wrote:

> It is critical that college administrators not only develop programs and services to enhance the persistence and goal attainment of individuals in order to meet the demands of a new and refined workforce, but also rely on a body of research that addresses the implications that policies of open access and late enrollment have on the success and persistence of students. (p. 108)

In this context, Morris (1986) described "varying degrees of toleration and animosity" (p. 327) towards the practice of adding and dropping classes, a "nightmare," according to the registrar at Gallaudet College (Mueller, Dillon, Erdsneker, Menzel, Montag, & Glaser, 1981, p. 386). Angelo (1990) argued that faculty dislike late registration, and Weiss (1999) documented a similar disdain among student advisors.

A number of scholars and researchers have argued for the elimination of late registration. O'Banion (2007, 2012) and Roueche and Roueche (1993; 1994) have been especially forceful in their opposition to a policy that O'Banion (2012) said "wreaks havoc on the ability of colleges to achieve the goals of the emerging completion agenda" (p. 26). Given that some factors associated with poor student outcomes are generally impervious to influence (sex, race/ethnicity, age, socio-economic status), Johnston argued that institutional control of policies such as late registration "may be one of the few

variables over which institutions may have any control whatsoever if they wish to

influence students success" (p. 34). Studies from Chilton (1964) to Goodman (2010) have

demonstrated negative effects of late registration on student outcomes, while research

from Angelo (1990) to McWaine (2012) has suggested these effects do not exist or are

negligible (see Appendix A for a summary of research findings). Angelo concluded that

institutions "no longer need concern themselves that [late registration] is endangering the

academic success of...students" (p. 327), Peterson (1986) used results from her study to

put forward an argument for continuing late registration at Honolulu Community College,

and Zottos (2005) asserted that late registration "within a reasonable timeframe"

effectively serves students (p. 101).

Nevertheless, in 2003 Sinclair Community College (SCC) identified late registration

as an "institutionalized policy" that undermined commitment to student success (Dunn &

Mays, 2004, p. 4); therefore, the college eliminated the policy that allowed students to

register for classes after the semester was underway. While SCC was concerned about the

effect of the policy on community perceptions of the college as well as negative effects on

enrollment, they reported no adverse effects when they eliminated late registration and

further noted that students have a natural propensity to accommodate themselves to an

institution's policies (Dunn & Mays, 2004). Valencia College, which also eliminated late

registration, has joined SCC in encouraging other colleges to ban late registration so as to

advance the goal of increasing student completion rates (Dunn & Mays, 2004; O'Banion,

2012). On the other hand, when Milwaukee Area Technical College banned late

registration full-time equivalent (FTE) enrollment was negatively affected (Wang &

Pilarzyk, 2007). One-fifth of late registrants in a Miami-Dade Community College study

said they would not register for classes if the late registration period were abolished

(Belcher & Patterson, 1990), presumably because late registration provided their only

registration opportunity that semester.

Opponents of late registration draw on a mix of research, intuition, and logic to

support their argument. Negative effects of late registration on community college student

outcomes, such as class withdrawal and class grade, have been documented from

Chilton's 1964 dissertation to Goodman's 2010 dissertation. At Jefferson Community

College in Kentucky, Horvath, described "a general 'feeling' among faculty and staff that

[late registrants do] not perform as well academically" (qtd. in Angelo, 1990, p. 318), a

sentiment echoed by Mendiola-Perez (2004). Roueche and Roueche (1994) derogated late

registration as a contravention of the belief that "the first days of any course are the most

important learning experiences that a student will have" (p.7). Thus, entering a class late

exacerbates the start-up workload for these students (Chilton, 1964), inhibits their

integration into the class and college (Sova, 1986), and fails to develop their planning and

organizational skills (Neighbors, 1996). Some have linked late registration to

procrastination which they have then linked to motivational issues which they have

further linked to negative influences on student retention (Freer-Weiss, 2005; Senécal,

Koestner, & Vallerand, 1995; Weiss, 1999). Weiss (1999) and Hale (2007) expressed

concern that the policy is particularly harmful to the success rates of at-risk students

because they are more likely than other students to register late.

Faculty suspicion of or hostility towards late registration may explain

confirmation bias in the conclusions offered by some researchers. For example, Diekhoff

(1992) claimed that "late registrants are at greater academic risk than timely registrants"

(p. 50) when in fact he had determined that there was no association between late registration and exam grades, class grades, or withdrawal from the class even when late registrants accumulated more absences in classes without attendance policies (negative effects on class absences and course withdrawal were documented only in classes with restrictive attendance policies). Worse, although Zottos (2005), expressly stated that *"since no significant associations were found regarding late registration, no true policy implications can be generated"* (p. 101, emphasis added), O'Banion nevertheless cited Zottos to buttress the central claim in his jeremiad against late registration that "overwhelming" evidence indicates late registration impedes student success (p. 28). A final example is Roueche and Roueche's curious inclusion in *Between a Rock and a Hard Place* (1993) of the elimination of late registration among six policy recommendations for serving at-risk students. Roueche and Roueche claimed their study and recommendations were based on a review of twelve award-winning college programs, yet the late registration recommendation is based solely on their report of a report from Moraine Valley Community College in Illinois that "retention and student performance improved significantly" after late registration was eliminated. However, Moraine was not included as one of the twelve award-winning programs cited by Roueche and Roueche, and the report of that policy success is attested without any details that would allow the reader to assess the strength of the claim made by Roueche and Roueche, and supposedly by Moraine.

It is also alleged that late registration is detrimental to institutions. O'Banion (2007) decried late registration for retarding the development of colleges into "learning-centered enterprise(s)" (p. 715). Amid the "frenzy of activity at the start of the semester"

(Dunn & Mays, 2004, p. 4), late registration strains and inefficiently uses institutional

resources, including faculty and staff time (Chilton, 1964; Perkins, 2002; Stein, 1984,

Wang & Pilarzyk, 2007). Morris (1986) suggested that there is a perception that the

accommodating policy of allowing students to add and drop classes is abused by students.

Tincher-Ladner (2006) documented that the likelihood of leaving Mississippi Gulf Coast

Community College with unpaid fees is 4.8 percentage points higher (73.3% more likely)

for late registrants (10.59% with unpaid fees) than non-late registrants (6.11%).

Most arguments in support of late registration center on access. Keck (2007)

averred that allowing students to register late respects personal choices that are influenced

by various and highly individual factors. Some reasons for late registration—such as

institutional, family, employment, and relocation issues—are largely out of the control of

the student (Zottos, 2005); late registration allows these students to retain access to higher

education in the current term. When a college cancels a class or a student finds that they

are incorrectly registered for a class, whether through their own error or misdirection by a

faculty or staff member, late registration policies enable students to adjust their schedules

and stay on track to progress through programs in a timely manner (Keck, 2007). Students

have stated that late registration is both a "viable and *critical* option" for them, and they

are overwhelmingly satisfied with their late registration decisions (Keck, 2007, p. 132,

emphasis added). Even in opposition to late registration O'Banion (2007) acknowledged

that such policies align with students' self-directed desires to select "more

accommodating times, more useful courses, and better teachers" (p. 720).

Based on research at Northwestern Michigan College, Hiller (2005) found that

late registration provides access to academically prepared students who are committed to

their success; it is especially helpful to part-time students. Arguments to ban late

registration ignore or elide inconsistent evidence from research about the negative effects

of late registration on student success (Zottos, 2005) as well as the fact that the majority

of late registrants are successful in those classes (Keck, 2007; Peterson, 1986).

Additionally, there is evidence that late registrants who persist into subsequent semesters

perform similarly to other students (Chilton, 1965). Weiss (1999) argued that late

registration provides access for students whose momentum would otherwise be

interrupted, which could substantially delay or forever negatively affect their likelihood to

enroll in higher education; Keck (2007) concluded that late registration is "an essential

component to help some students persist" (p. 137). Before eliminating late registration,

colleges can implement other strategies that have substantial positive effects on student

success. Adequate student support services are important (Cornille, 2009, Mannan &

Preusz, 1976), and colleges can help students avoid late registration by offering more

variety in the start dates for individual classes (Goodman, 2010).

Both Hale (2007) and Street (2000) suggested that eliminating late registration

would negatively affect enrollment and therefore revenues to such a degree as to make a

ban impractical. Tincher-Ladner (2006) demonstrated that although late registrants at

Mississippi Gulf Coast Community College dropped over twice as many credits as non-

late registrants (19.89% of credits vs. 8.91%), they nevertheless added a net of 2.5%

FTEs during the three fall semesters from 2002 to 2004.

To inform decisions about whether to retain, modify, or eliminate late registration, for

nearly half a century researchers have attempted to address whether late registrants have

different personal or academic characteristics than on-time registrants and how well late

registrants perform academically. The next sections summarize research related to these late registration questions.

Summary of Late Registration Study Designs. Three strategies were deployed to conduct a literature search for previous studies of late registration: (1) key word searches in the EBSCOhost databases including Education Full Text, Education Research Complete, and ERIC, (2) key word searches in the ProQuest Dissertations and Theses database, and (3) searches of reference lists in sources identified through the previous two methods. It appears that the earliest available study of late registration was a doctoral dissertation completed by Chilton in 1964. Ten years would transpire before the next study, which was a dissertation completed by Parks (1974) with Chilton as his dissertation committee chair. Angelo (1990) claimed to have published the first journal article on the topic. A total of 29 studies were located in which late registration was treated as a dichotomous or group variable, with over half coming in the last ten years (Appendix A). Community colleges have been the locus of most research, although only one study that focused on the association between late registration and student success was found that focused on a community college in the southeastern United States.

The research designs of these studies varied considerably (Schmidt, 2004), and they were of inconsistent quality, making comparisons among them challenging and final conclusions about the advisability of late registration policies elusive (Summers, 2000). For example, as noted above and further detailed in Appendix A, definitions of late registration varied, sometimes including students registering before the semester started. Also important to consider are those studies which defined late registration as registration after the start of a semester as opposed to after the first class meeting in light of Belcher

and Patterson's 1990 finding, based on student self-report, that 9% of those registering after the semester was underway were nevertheless registering before the first meeting of the target class. Wang and Pilarzyk (2007) were among a number of researchers who conflated late college application or admission with late registration. Stein (1984) proffered a dubious comparison of late registrant retention data from 1984 to on-time registrant data from 1973, 1976, and 1979; Belcher and Patterson (1990) based their conclusions on reported percentages without conducting tests of statistical significance.

Researchers in the vast majority of studies ($N = 24$) drew some or all of their data from community colleges. Most used census populations, sometimes comparing subgroups of sizes so small that the trustworthiness of reported conclusions is subject to debate (Keck, 2007; Stein, 1984; Tincher-Ladner, 2006; *cf.* Cohen, 1992; Field, 2007). Populations ranged from 6 interviewees in Bryant, Danley, Fleming, and Somers' qualitative study (1996) to over a quarter of a million students in 109 California community colleges (Moore & Shulock, 2007), although the magnitude of large samples may also create problems for statistical inference (Runkel, 2012). Furthermore, Street (2000) cautioned that studies which looked at large general populations fail to yield the kind of precise and practical insights that can be garnered from homing in on specific subpopulations, such as McWaine's study of African American males (2012) or Safer's study of math classes (2009). Additionally, most studies did not test or adjust for how well their samples represented the populations to which inferences were drawn.

The unit of analysis has an important effect on the relevance of findings (Rossi, Lipsey, & Freeman, 2004). In most studies, researchers analyzed dependent variables for students who had registered late for all classes (Appendix A); however, Hale (2007)

investigated each class enrollment which yielded a very large number of cases (171,400).

Safer (2009), who utilized a similar approach, was thus able to more directly associate an

outcome (success in a specific class) with a behavior (late registration into that class). The

focal time frame of the studies ran from a single semester in Goodman (2010) to

Diekhoff's 14-year retrospective (1992).

Who Registers Late and Why? Beginning with Chilton (1964) many researchers

have reported on the demographics of late registrants. The most common findings were

that late registrants were disproportionately male (9 studies, e.g. Chilton, 1964), African

American (7 studies, e.g. Moore and Shulock, 2007), Hispanic (3 studies, e.g. Street,

2000), enrolled part-time (7 studies, e.g. Mannan & Preusz, 1976), non-traditional age (5

studies, e.g. Mendiola-Perez, 2004), and those with weak high school performance (3

studies, e.g. Zottos, 2005). Other notable associations included non-enrollment in a

degree program (Belcher & Patterson, 1990), enrollment in an occupational program

(Cornille, 2009), previous attendance at another college (Chilton, 1964; Parks, 1974)

enrollment in small classes (Safer, 2009), upper collegiate class rank (Safer, 2009), and

non-native English language background (Zottos, 2005).

However, some researchers reported different findings, including for sex (5

studies, e.g. Wang & Pilarzyk, 2007), age (6 studies, e.g. Moore & Shulock, 2007),

race/ethnicity (4 studies, e.g. Perkins, 2002), and part-time enrollment (Keck, 2007).

Where Perkins (2002) documented an association between late registration and remedial

placement, Hiller (2005) reached the opposite conclusion. Differences in findings may be

attributable to unique college circumstances (Angelo, 1990) or different study

methodologies (Street, 2000).

Weiss (1999) was not alone in arguing that "The profile of the late applicant in this study closely resembles the profile established in the professional literature for students at highest risk for attrition" (p. 152), such as males or those with low high school GPAs (Habley, Bloom, & Robbins, 2012). Even so, Cornille (2009), Hale (2007), and Hiller (2005) cautioned that the statistical models using personal characteristics predicted only a small portion of registration behaviors. Furthermore, one should be careful not to link innate personal characteristics like sex and race to registration behaviors, for such characteristics are not genetic determinants—although they can be proxies for social and environmental factors—and posited linkages between, for example, a student's race and academic performance reifies deficit models of some demographic groups that potentially become self-fulfilling (Quick & Shipley, 2004). Indeed, Bryant, Danley, Fleming, and Somers (1996) concluded that late registrants in general "are at the margins socially" (p. 60). Thus, research has shown that the demographic and other background characteristics of late registrants are highly localized, varying over time and place and by how late registrants are defined.

Chilton's survey of 52 late registrants (1964) yielded 14 reasons for late registration. Nearly 40% cited paperwork and policy obstacles; medical issues were also common, while other reasons included finances, employment conflicts, and transportation difficulties. Similarly, most other researchers found that paperwork issues, financial uncertainty, medical problems, employment changes, and general life circumstances led to adding and dropping classes, particularly during the late registration period (Belcher & Patterson, 1990; Bryant, Danley, Fleming, & Somers, 1996; Keck, 2007, Morris, 1986; Parks, 1974). Other issues included transfer needs, problems with academic advising,

problems with the instructor, classes that were too hard, procrastination, a late decision to

enter college, new arrival in town, and class cancellations (Belcher & Patterson, 1990;

Keck, 2007, Morris, 1986; Parks, 1974). Nearly 11% of late registrants in a Miami-Dade

Community College study were not aware that classes were already in progress (Belcher

& Patterson, 1990). Although some may believe students engage in add/drop behaviors

after the semester starts for frivolous reasons, Morris' survey of students (1986) indicated

that schedule conflicts were the main reason nearly half of students changed classes while

only 4% cited issues of personal convenience, which aligns with survey results from

Miami-Dade Community College (Belcher & Patterson, 1990). Regarding institutional

paperwork and policy obstacles, Zottos (2005) speculated that "limited knowledge about

how colleges function" (p. 101) caused some students to register late. More positively

perhaps, students have reported that family influences and career aspirations motivated

them to register, even though they would enter class late (Bryant, Danley, Fleming, &

Somers, 1996). Furthermore, students defended their right to exercise choice and

expressed satisfaction with their late enrollment decision (Keck, 2007).

How Well Do Late Registrants Perform? The issue of most importance in the

research on late registration is whether and in what direction registration timing affects

student success (Summers, 2000). In assessing the relationship between registration

timing and academic performance, researchers have focused on four outcomes: grades,

successful class completion, withdrawal, and persistence. Johnston (2006) noted the need

for more research, especially given the specific challenge of predicting non-success (as

opposed to success) and non-persistence into a subsequent semester (as opposed to

persistence). For example, in mapping date of enrollment to student outcomes, "correct

prediction of non-success and non-persistence routinely fell well outside the acceptable

95% confidence levels. In some cases the models predict[ing] non-success were as low as

30% and non-persistence as low as 8%" (p. 27).

Grades. Because they often defined late registration as registering late for all

classes, most researchers who examined the relationship between registration timing and

grades looked at semester and/or cumulative GPA rather than specifically examining the

effect on the grade for a class that a student registered late into (Appendix A); as noted,

the assumption that there is an association between late registration into a specific class

and semester or cumulative GPA is less tenable than the association with the grade in that

class. Adjusting for selected student characteristics, Zottos (2005) did not find a

significant effect on semester GPA, nor did Perkins (2002). Although researchers for four

studies reported negative effects of late registration on semester GPA (Mannan & Preusz,

1976; Neighbors, 1996, Parks, 1974; Wang & Pilarzyk, 2007), in seven other studies

researchers cautioned that negative effects were mixed, minimal, or less important than

factors such as being male, nontraditional aged, part-time, African American, or having a

lower high school GPA (Chilton, 1964; Hiller, 2005; Mendiola-Perez, 2004; McWaine,

2012; Stein, 1984; Street, 2000; Summers, 2000). When adjusting for age and number of

hours taken, Street (2000) concluded that late registration was associated with lower

semester GPA for returning students, but not for new students. By contrast, Chilton

(1964) found that late registering sophomores performed as well as on-time registrants

but late registering freshman performed worse. Data from Stein's study (1984) showed

that late registrants, compared to on-time registrants, were 9.4 percentage points more

likely to earn a semester GPA of 0.0 (30.8% vs. 21.4%), but also 10.4 percentage points

more likely to earn a semester GPA of 4.0 (28% vs. 17.6%). Importantly, although late registration into a class often represents a change in class section rather than a new class added, Summers (2000) concluded that changing class sections had no effect on a student's semester GPA. Also important, an increase in the number of classes a student added was associated with an increase in a student's GPA for the semester, while an increase in classes dropped was associated with a lower GPA (Summers, 2000), which suggests that it is the act of dropping classes, not registering late, that is a marker of poor performance.

Researchers in five studies looked specifically at the effect of late enrollment into a class on the grade for that class. Keck (2007) found negative associations between late registration and class grade; Safer (2009) determined that the effect was greater for males, those of upper collegiate rank, and students in large classes. However, Angelo (1990) and Diekhoff (1992) found no relationship between late registration into a class and the grade for that class. Sova (1986) concluded that late registrants in developmental English and college composition courses were more likely than on-time registrants to earn "F' grades but also more likely to earn "A" grades.

Successful Class Completion. Researchers examined the effect of late registration on successful completion of specific classes and successful completion of all classes in a term. Angelo (1990) notably concluded that late registrants were *more likely* to successfully complete the class (not earn a failing, incomplete, or withdrawal grade) into which they registered late, a result confirmed by Keck (2007) for students registering late for 5 or 6 classes (but not 1-4 classes). Although Zottos (2005) and Hale (2007) found no

significant effect of late versus on-time registration, Sova (1986) reported negative effects.

Turning to the association of late registration with successful completion of all classes in a semester, about which there has been more research, results were again mixed particularly, as Cornille (2009) and Zottos (2005) observed, if personal and academic factors were considered (Appendix A). Summers (2000) even discovered that as the number of late added classes increased so did the likelihood of completing all classes in the semester. As with semester GPA, Street (2000) found that results varied by student experience: new students' completion rates were not associated with registration timing while perhaps in surprising contrast returning students who registered late were less likely than early and on-time registrants to successfully complete all of their classes. Peterson (1986) reported that late registrants enrolling in 3-9 credits completed more classes than those enrolling in 12 or more credits. Some variation in the results reported above may be attributable to definitions of class completion (i.e. at the "C" level as opposed to the "D" level; see Appendix A).

Withdrawal. Withdrawal might be considered a species of non-successful class completion, but a student could fail to successfully complete a class (e.g., with a grade of "F"), without withdrawing from it. Bryant, Danley, Fleming, and Somers (1996) documented how employment conflicts, personal reasons, financial exigencies, and relocation were the most common reasons late registrants cited for withdrawing from their classes, but lack of time to study, conflict with sleep, and uncertainty about attending college were also noted. Researchers investigated withdrawal for each class

students registered late into, for all courses in a semester, and for withdrawal from college.

Keck (2007) concluded late registrants were significantly more likely to withdraw from the class, while Safer (2009) only found a significant effect in large classes, and Diekhoff (1992) only found a significant effect in classes where there was a restrictive attendance policy. Sova (1986) observed that late registrants were no more likely to withdraw from a college composition course but were more likely to withdraw from a developmental writing course.

When the proportion of all classes that late registrants withdrew from was calculated, Chilton (1964), Parks (1974), Street (2000), and Tincher-Ladner (2006), found significant negative effects, but Neighbors (1996) could not identify a significant effect, nor could Mendiola-Perez (2004) in two of the three semesters she studied. Looking at the frequency of withdrawal from every class in a semester, which may or may not indicate withdrawal from college, although Parks (1974) documented a significant negative association between late registration and semester withdrawal, Chilton (1964) did not find an effect, Peterson (1986) noted the withdrawal rate was very low, and Cornille (2009) concluded that the effect he discovered was small and not meaningful given that late registrants completed the semester at a high rate. Mendiola-Perez (2004), who tracked late registrants across four semesters, concluded there was no statistically significant difference in class withdrawal rates in 2 of 3 semesters subsequent to the initial semester of late registration.

Persistence. As with other aspects of student performance, the evidence for the effect of late registration on student persistence into subsequent semesters is inconclusive,

with negative associations reported by Cornille (2009), Goodman (2010), Stein (1984),

Street (2000), Tincher-Ladner (2006), and Wang and Pilarzyk, (2007); no statistically

significant differences reported by Moore and Shulock (2007), McWaine (2012), and

Perkins (2002). Hiller (2005) concluded that other factors were better predictors of

negative influences on persistence. Chilton (1964) found no association between late

registration and dropping out of college, and although Moore and Shulock (2007)

reported a negative association between late registration and 6-year graduation and

transfer rates at California community colleges, the effect was small and less significant

than the positive influence of full-time enrollment status and the negative influence of a

high rate of dropping courses.

    Summary of the Literature on Late Registration. The policy of allowing

students to register late into one or more classes is controversial. While it provides access

to students and increases enrollments and revenues, it is unpopular with faculty who

believe it negatively affects students' academic performance. In more than a score of

studies at two- and four-year schools, researchers have documented the characteristics of

students who register late and their reasons for doing so. Negative effects of late

registration on student performance were reported in more studies than not; however,

neutral and even positive effects on both performance and student satisfaction were

documented by other researchers. In consideration thereof, as well as the substantial

variation in study designs, definitions of late registration, and the local circumstances of

the institutions where the studies were conducted, the evidence in support of or in

opposition to late registration is inconclusive.

Two trends in the literature are especially relevant to the present study. First, in the five studies, all of which were conducted at community colleges, that specifically examined the association between late registration into a class and completion of that class no effect was consistently documented in any direction. Angelo (1990) surprisingly found a positive effect, Keck (2007) reported mixed results, and Sova concluded that there was a negative association between late registration and student success. Like Hale (2007), Zottos (2005) was unable to discern any effect of late registration on class completion in his well-designed study and therefore concluded that the benefits of late registration, particularly in terms of student access to higher education and opportunities to adjust their schedules as they deem most beneficial, militate against the elimination of late registration. Second, there does not seem to be any publicly available study that examined late registrants' success in classes where instruction was delivered online or that investigated the influence of a college success skills course on late registrants' academic performance.

Summary

One lens through which to view American history is the expansion of access to higher education, from the chartering of Harvard in 1636 to today's MOOCS that enroll tens of thousands of students in a single class. In the last 100 years the community college infrastructure in the United States has developed into a loosely coupled system (Orton & Weick, 2011) where all citizens of the nation are within driving distance of a campus. Online education has grown rapidly in the last decade, but research has indicated that student achievement has not kept pace with access. The current context for community colleges is one of increasing public attention to whether colleges are graduating enough

students to comprise the skilled workforce required for the globally competitive economy of today and the future. Research on student success has identified factors that are associated with student achievement, and theoretical models have been developed to explain the interactions between those factors and outcomes.

Late registration is one institutional policy that is thought to negatively affect student success to the point that some colleges have banned the practice. However, the research in support of that ban is of uneven quality and has yielded confusing and contradictory findings. Furthermore, it seems that to date there have been no publicly available studies of late registration where the effect of course delivery mode (on-campus vs. online) or the effect of a college success skills course was included in analyses.

CHAPTER 3

METHODOLOGY

The purpose of this study was to investigate the effect of late registration on students' class grades in on-campus and online classes at 23 Virginia community colleges during the 2011-2013 time period. An additional independent variable was students' completion of a college success skills course. This chapter includes the following sections: (1) research questions, (2) research design, (3) data source, (4) population, (5) data collection, (6) data analysis, (7) limitations, (8) assumptions, and (9) summary.

Research Questions

The following research questions were addressed in the study:

1. What effect does time of registration (on-time or late) and course delivery mode (on-campus or online) have on student success in the class?

2. What effect does time of registration (on-time or late) and course delivery mode (on-campus or online) have on student success in the class when holding constant the completion of a college success skills course?

3. What effect does time of registration (on-time or late) and course delivery mode (on-campus or online) have on student success in the class when holding constant the completion of a college success skills course and demographic characteristics (sex, age, race/ethnicity, and full-time/part-time enrollment status)?

Research Design

Because it would be unethical to manipulate the variables of late registration, course delivery mode, and completion of a college success skills course to test effects on

student success, the study design made use of *ex post facto* data. Although such a study

lacks the ability to make conclusions about cause and effect, the study's causal

comparative design is more powerful than a simple correlational study because in this

study independent and dependent variables were deliberately delineated (Leedy &

Ormrod, 2010).

Hiller (2006) argued for the importance of treating registration timing as a

categorical variable: "There is no theoretical reason to measure date of registration as a

continuous variable except to simplify the estimation technique" (p.6). While that

probably overstates the case and may only apply strictly to Hiller's study, Street (2002)

offered an example of the benefits of modeling registration timing as a dichotomous

variable. The current study employed a binary logistic regression analysis to examine the

effect of registration timing (on-time or late) on the dependent variable of student success

in on-campus and online courses when the additional independent variables of whether a

student completed a college success skills course (SDV 100, 101 or 108) and student

demographics (sex, race/ethnicity, age, and full-time/part-time enrollment status) were

taken into account.

Student involvement and retention theories (Astin, 1999; Tinto, 1993) informed

the conceptual model for this study. It was posited that the institutional policy that allows

students to register for classes after the first day of the semester and the student behavior

of availing themselves of that policy may exert some influence on student success.

Specifically, late registration behavior may be a student characteristic associated with

poor educational outcomes because students entering college late face greater challenges

engaging with their coursework, their instructors, and college support services (Roueche

& Roueche, 1993). It was also hypothesized that late registration behaviors may exert differential effects in on-campus and online courses, particularly in light of research that indicates students face greater acculturation challenges in online courses and that student success outcomes are worse for online courses than for on-campus courses (Jaggars & Xu, 2010; Schwitzer, Ancis, & Brown, 2001). Further, based on student retention and involvement theories and research in those fields, it was posited that a student's successful completion of a college success skills course may have mitigated assumed negative effects of late registration on student success (Habley, Bloom, & Robbins, 2012). Finally, student success rates are known to vary within and across the categories of sex, race/ethnicity, age, and full-time/part-time enrollment status (Habley, Bloom, & Robbins, 2012).

In sum, registration timing (on-time or late), course delivery mode (on-campus or online), and student academic aptitude (whether or not a student completes a college success skills course) were independent variables in the statistical model. Student demographics were held constant in addressing the third research question in order to account for the differential success patterns for the categories of sex, race/ethnicity, age, and full-time/part-time enrollment status. Student success in courses into which they registered late, defined as a grade of "C" or higher on an A-F scale, was the dependent variable. In keeping with the definition most commonly used in previous studies (see Appendix A), late registration was defined as registering for a course on or after the start date for all regular session (15 or 16-week) classes for the semester.

Data Source

The Office of Institutional Effectiveness for Virginia's Community Colleges (VCCS) provided data for this study. The data set consisted of student demographics, class enrollment history, and class grade history. The study design was approved by the Human Subjects Review Committee of the Darden College of Education and the VCCS. Student names and contact information were not part of the data set, ensuring the anonymity of the data. Access to the data was restricted to the researcher and to the VCCS. The data were kept in a secure location.

Virginia's Community Colleges. The 23 colleges that comprise the Virginia Community College System provide access to technical and transfer programs within driving distance of every Virginian. In the 2012-2013 academic year the colleges served over a quarter of a million students in credit programs for a total of nearly 125,000 full-time equivalent students (Virginia's 2013d). When non-credit and workforce programs are included, almost half a million Virginians are directly touched by the colleges (Virginia's 2013d). As shown in Tables 1 and 2 the overall student population in Virginia's Community Colleges is not too dissimilar from the national community college population.

The distribution by sex is almost identical: 58% female/42% male in Virginia as opposed to 57% female/43% male nationally. In Virginia students less than 21 years of age are overrepresented (50%) compared to the national population (39%), and full-time students are underrepresented (35% vs. 41%). Virginia's Community Colleges serve a larger percentage of whites (59% vs. 52%) and blacks (22% vs. 15%) than are enrolled

nationally, while Hispanics are underrepresented in Virginia compared to the national

population (7% vs. 18%).

Table 1

Comparison by Sex, Age, and Enrollment Status of VCCS and National Community

College Headcount, Fall 2011

		VCCS	National
Sex	Female	58%	57%
	Male	42%	43%
Age	≤ 21	50%	39%
	≥ 22	50%	60%
Enrollment	FT	35%	41%
	PT	65%	59%

Note. Percentages may not equal 100 due to rounding. FT: full-time enrollment (≥ 12

credit hours); PT: part-time enrollment (< 12 credit hours). Sources: American, 2012a;

Virginia's, 2013d.

Table 2

Comparison by Race of VCCS and National Community College Headcount, Fall 2011

		VCCS	National
Race / Ethnicity	American Indian or Alaskan Native	0%	1%
	Asian	6%	6%[a]
	Black or African American	22%	15%
	Hispanic	7%	18%
	Native Hawaiian or Other Pacific Islander	0%	N/A[b]
	Not Specified / Unknown	2%	9%
	Multi-race	4%	N/A
	White	59%	52%

Note: Percentages may not equal 100 due to rounding. a: Includes Pacific Islander; b: included in Asian category. N/A: Data not available. Sources: American, 2012a; Virginia's, 2013d.

Population

Data were gathered from the participating colleges on first time in college (FTIC) students who enrolled in a second semester of on-campus or online classes at the colleges during a spring semester in the 2011-2013 time period. The students initially enrolled in

each college, without transfer credits from another college or dual enrollment credits from

a high school, in the fall semester prior to the spring semester in which they were eligible

to participate in the study. The second semester of a student's academic career was

chosen because research has suggested that the performance of late registrants differs by

academic experience. Chilton (1964) found that late registering freshman earned lower

semester GPAs than their on-time registering peers, but this negative effect was not

present for late registering sophomores. By contrast, Safer (2009) concluded that the

negative effect of late registration on class grades was greater for upperclassmen, and

Street (2000) reported a negative effect of late registration on the class completion rates

of returning students. In general, however, scholars and researchers have argued that a

student's first semester of college presents the greatest acculturation challenges and

therefore the greatest risks of low grades and dropping out (Astin, 1999; Habley, Bloom,

& Robbins; Fike & Fike, 2008), in part because returning students "are better adjusted to

the academic requirements of college life" (Chilton, 1964, p. 74). In reporting his study of

enrollment date and student outcomes, Johnston (2006) explicitly argued for the value of

a study of students who are not in their first semester of college, theorizing that some

students who registered late in their first semester would have learned from the

experience and registered on-time for subsequent semesters and that returning students in

general would be more likely to register earlier than new students. Johnston further

theorized an effect whereby on-time registration behavior would accumulate and yield

benefits to student success over the duration of a student's college career. Therefore, to

remove statistical noise created by first-semester acculturation to college, only second

semester students were chosen for this study.

Data from courses which offer no college credit (such as developmental math courses) or which offer fewer than three college credits were excluded from the study. Short courses, that is, classes which did not meet for the full length of the semester, were excluded from the study. Only on-campus and online class enrollments were included in the data set; enrollment into hybrid classes (50-99% of instruction is delivered online) were excluded. On-time registration was defined as enrollment into a class before the first day of the semester; late registration was defined as enrollment into a class on or after the first day of the semester. Class enrollments where any of the variables that were the focus of the study were missing were excluded.

To determine the appropriate sample size that will yield a particular statistical effect size, it is necessary to know the desired Type I and Type II error rates, alpha (α) and beta (β) respectively (Field, 2009). Cohen (1992) defined the Type I error, or the "significance criterion," as "the risk of mistakenly rejecting the null hypotheses" (p. 156). A null hypothesis states that there is no statistically significant difference between two populations. Specifically in this study, a Type I error would be to conclude that there is a difference in success rates between on-time and late registrants when, in fact, there is not. Both Cohen and Field identified an α level of .05 as common in social science research, which signifies that there is no more than a 5% chance that a statistically significant finding would be false.

Field defined the Type II error rate (β) as the risk of mistakenly accepting the null hypothesis (i.e. mistakenly concluding that there is no difference in the success rates of on-time and late registrants when, in fact, there is). In turn, the Type II error rate affects statistical power, which is "the ability of a test to detect an effect" of a particular size (p.

58). Cohen (1992) identified .8 (or $1 - \beta$, when β is set by the researcher at .2) as the level most commonly accepted for statistical power for a given effect size. The effect size "is an objective and (usually) standardized measure of the magnitude of an observed effect" (Field, 2009, p. 56). As Field explained, a comparison of two groups may indicate that they are statistically significantly different, but that finding in itself does not provide guidance as to whether the size of that difference is meaningful. Cohen suggested three levels for effect sizes—small, medium, and large—and calculated the sample size necessary to establish corresponding effect sizes when the α level is set at .05 and β is set at .2.

For regression analyses that include seven independent variables (registration timing, completion of college success skills course, course delivery mode, student sex, race/ethnicity, age, and full-time/part-time enrollment status), as in this study, for a small effect to be detected at the .05 α level 726 cases are needed in each group, 102 are needed to detect a medium effect, while only 48 are needed to detect a large effect (Cohen, 1992). For a more reliable statistical test result where the α level is set at .01 and thus the risk of mistakenly observing an effect that is not real is reduced to a 1% chance, 998 cases are needed in each group to detect a small effect, 141 cases are needed for a medium effect, and 66 cases are needed for a large effect. Accordingly, for this study, the goal was to have at least 998 cases in both the on-time and late registration groups so as to detect even a small effect at the relatively stringent α level of .01; however, the study should be considered valuable even if only 102 cases were generated for each group because this sample size is typically needed to detect a medium effect at the commonly accepted α level of .05. Cohen argued that a medium effect size was one which is "likely to be

visible to the naked eye of a careful observer" (p. 156). This is an important claim in the

context of the current study because it supports the face value that the study's results

could have for college administrators and faculty who seek to use data to inform policy

decisions.

Data Collection

The VCCS uses a common student information system with common definitions

and fields for demographic information, course number and title, enrollment history, and

class grades. Data from the 23 colleges was assumed to be accurate. Below, the

independent and dependent variables are identified; they are further described in

Appendix F.

Independent Variables. Late registration is the independent variable of primary

interest. Two other independent variables were part of the analysis: course delivery mode

(on-campus or online) and student completion of SDV 100, 101, or 108. Student

demographic characteristics of sex, race/ethnicity, age, and full-time/part-time enrollment

status were added as independent variables in the statistical model when addressing the

third research question.

Dependent Variable. The dependent outcome variable was student success in the

class as defined by a grade of "C" or higher, or a grade of "P" (pass) or "S" (satisfactory).

Grades of "D," "F", "U" (Unsatisfactory), "R" (Repeat), and "W" (Withdrawal) were

classified as unsuccessful grades. Enrollments where an ("I") incomplete or "X" (audit)

grade was reported were excluded. Success was set at the "C" level in courses graded on

an A-F scale because that is the definition of success used by Virginia's Community

Colleges and the grade required for the class to transfer to most four-year institutions (Virginia's, 2008-2013; Virginia's, 2011).

Data Analysis

Data were aggregated across the spring semesters in 2011-2013. The unit of analysis for this study was a student's enrollment in a class. Descriptive statistics were reported to inform the data analysis, including totals and percentages for sex, age, race/ethnicity, and full-time/part-time enrollment status; VCCS categories were used for the foregoing. These figures were also broken down dichotomously within the independent variable categories of registration timing (on-time or late), course delivery mode (on-campus or online), and college success skills course (SDV 100, 101, or 108 completed or not completed). Measures of central tendency were reported for demographic characteristics of participants included in the data set, registration behaviors, course delivery mode, completion of a college success skills course, and course success.

For the causal comparative analysis to address the three research questions, a binary logistic regression model was created by using SPSS statistical software to analyze the independent variables in order to predict the probability of class success. Field (2009) explained that logistic regression is appropriate when the outcome variable (in this case successful class completion or non-completion) is categorical; the logistic regression is binary when there are only two categories of outcome.

Limitations

Generalizability of results was limited by the use of data only from Virginia colleges, although because the data set was very large and collectively the students in

community colleges in Virginia are not too dissimilar from the national profile this limitation was mitigated (American, 2012a; Virginia's, 2013d).

The results of this study cannot be used to draw conclusions about students who have transferred into the colleges, earned dual enrollment credits, registered late into a class during semesters other than their second semester of college, registered for hybrid or developmental education courses, registered for a semester shorter than 16 weeks, or registered for a course offering fewer than three credits in the semesters that were examined. Other input factors, such as family educational background, IQ, high school GPA, socio-economic level, and affective influences were not addressed in the study. Environmental factors, such as instructional effectiveness, course difficulty, tutorial assistance, and student activities, were not included in the theoretical or statistical models. The analysis of students' performance outcomes was limited to final class grades which may suggest, but does not provide evidence for, effects on other student outcomes such as semester and cumulative grade point averages (GPA), persistence into subsequent semesters, graduation, transfer to four-year institutions, or program completion.

Assumptions

The guiding assumption of this study was that the probability of student success can be predicted based on a student's late registration behavior. It was further assumed that the relationship between late registration and student success differed by delivery mode (on-campus or online) and by completion of a college success skills course.

Data from the college's student information system was assumed to be accurate. The validity of the results rests on the premise that the assumptions of the statistical tests employed for data analysis were met and are true.

Summary

The purpose of this study was to interpret *ex post facto* data through a conceptual framework drawn from theories of student involvement and retention and the statistical method of logistic regression in order to infer the effect of late registration into classes on students' grades in those classes. Seven independent variables—registration timing, course delivery mode (online or on-campus), completion of a college success skills course, and four demographic characteristics—were included in the model. The cases for the study were drawn from 23 community colleges that serve urban, suburban, and rural areas of Virginia. Although the size and composition of the study population enhanced generalizability of findings, the study's delimitations concomitantly limited generalizability.

CHAPTER 4

FINDINGS

Given recent claims about the presumed negative effects of late registration on

student success and the twin pressures to make greater use of data driven decision making

and to increase student success, the purpose of this study was to address research

questions pertaining to the relationship between registration timing and student success.

Data were drawn from all 23 of Virginia's Community Colleges (VCCS) in the Fall

2010-Spring 2013 time period. Specifically, the data set consisted of all course

enrollments from the Spring 2011, 2012, and 2013 semesters for students who were

identified as first time in college in the previous fall semester (Fall 2010, 2011, 2012).

Each case in the data set included student enrollment behaviors, student academic

performance, and student demographic characteristics which provided information used

to address the following three research questions:

1. What effect does time of registration (on-time or late) and course delivery

    mode (on-campus class or online) have on student success in the class?

2. What effect does time of registration (on-time or late) and course delivery

    mode (on-campus or online) have on student success in the class when holding

    constant the completion of a college success skills course?

3. What effect does time of registration (on-time or late) and course delivery

    mode (on-campus or online) have on student success in the class when holding

    constant the completion of a college success skills course and demographic

    characteristics (sex, race/ethnicity, age, and full-time/part-time enrollment

    status)?

Descriptive Statistics

For all 23 of Virginia's Community Colleges (VCCS) in the three spring semesters from 2011-2013, a total of 95,458 enrollment records of students who were first-time college (FTIC) in the fall semester immediately preceding the spring semester from which each student's record was drawn were provided. Enrollment records for students who were under 18 years of age in the spring semester from which their enrollment records were drawn had been eliminated in order minimize the effect of students dual enrolled in high school and college.

Success in the course into which a student enrolled on-time or late was defined as a grade of "A," "B," or "C." Grades of "D," "F," and "W" were counted as non-success in keeping with the definition of success used by Virginia's Community Colleges (no courses graded pass/fail were included in the data set).

An enrollment was considered on-time if it occurred before the first day of classes in the spring semester and was considered late if the enrollment occurred on or after the first day of classes in the spring semester. This definition is common to other studies of late registration (see Appendix A). Only enrollments into courses offering three or more credits were included in the data set. The data set only included classes identified as meeting fully on-campus or fully online.

Students who earned a grade of "A," "B," C," or "P" (pass) in any of the three college success skills courses required of all new students in Virginia's Community Colleges (SDV 100, SDV 101, SDV 108; see Appendix D) during the fall semester prior to the spring semester from which their data were drawn were identified as having achieved success in a college success skills course. Students who did not enroll in a

college success skills course in the fall semester prior to the spring semester from which their data were drawn and did not enroll in a college success skills course in that spring semester itself were identified as not having completed the college success skills course. In an effort to better isolate whatever beneficent effects might attend completion of a college success skills course, cases where a student enrolled in but did not successfully complete a college success skills course in the fall semester prior to the spring semester from which their data were drawn or where a student was co-enrolled in a college success skills course in the spring semester from which their data were drawn were not part of the study.

A student's sex, race, and age were identified by student self-report on the college application. Students were classified as traditional if they were 18-21 years of age in the spring semester from which their data were drawn; students aged 22 and older were classified as nontraditional. Students were categorized as full-time if they enrolled in 12 or more credits in the spring semester from which their data were drawn.

Tables 3-6 summarize the frequencies of enrollment cases for the variables of interest in this study and provide comparisons to frequencies of the overall headcount for students in all community colleges in Virginia. It is important to bear in mind that the demographic frequencies from the study data set represent frequencies by individual course enrollment, rather than by student, whereas the aggregate state data on student demographics was reported by unduplicated headcount of individual students. In the former data set, then, a student demographic characteristic might be counted multiple times if the student enrolled in multiple courses, a common phenomenon as indicated by the 58.8% full-time enrollment rate for all first time in college students in the VCCS

(Table 4). Therefore, comparison of the study data set of course enrollments to student headcount enrollments must be interpreted cautiously.

As shown in Table 3, students who achieved success in a course may be underrepresented in the cases used in the study compared to the overall VCCS population (68.5% vs. 73.8%) while enrollments in on-campus classes may be overrepresented (89.2% vs. 65.7%). The overall success rate for the study population in the classes that were included in the study was nearly 70 percent, and almost three-quarters of cases (72.6%) represented students who successfully completed a college success course in their first semester. It is worth noting that as a percentage of course enrollments, the frequency of late registration in this study (9.2%) aligned with the average findings of other studies (see Appendix E).

In Table 4 the sex distribution of the cases of enrollments used in the study closely matched the distribution in the FTIC population at large. The breakdown by sex in the study population was 52.5% female and 47.5% male, as opposed to 51.9% and 48.1% respectively in the overall unduplicated headcount of Virginia's Community Colleges. It appeared that in general the FTIC population was strongly skewed towards students under the age of 22 (82.8% in the study and 77.5% in the overall population), an unsurprising observation when considering the assumption that older students are more likely to have previous college experience. A final note from Table 4 is that the cases in the study are much more heavily skewed towards full-time (76.5%) students when compared to the overall unduplicated headcount enrollments (58.8%).

Table 3

Comparison by Course Factors of Cases in the Study and VCCS FTIC Headcount

		Study Cases Number / Percent[a]	VCCS FTIC HC[b] Number / Percent
Timing	On-time	86,664 / 90.8	[c] / [c]
	Late	8,794 / 9.2	[c] / [c]
Course Success	Success	65,380 / 68.5	[c] / 73.8[d]
	Non-success	30,078 / 31.5	[c] / 26.2[d]
Delivery Mode	On-campus	85,104 / 89.2	21,648 / 65.7[d]
	Online	10,354 / 10.8	11,302 / 34.3[d e]
CSS Course	Success	69,280 / 72.6	[c] / [c]
	Non-enrollment	26,178 / 27.4	[c] / [c]

Note. a: Percentages may not equal 100 due to rounding; b: VCCS FTIC HC:

Unduplicated headcount of all FTIC students enrolled in Virginia's Community Colleges,

Fall 2011 data (Northern, 2013); c: data unknown/unavailable; d: 2008 Data (Virginia's,

2009b); e: includes students enrolled in hybrid (mix of online and on-campus delivery)

and compressed video classes. CSS Course: college success skills course.

Table 4

Comparison by Sex, Age, and Enrollment Status of Cases in the Study and VCCS FTIC

Headcount

		Study Cases	VCCS FTIC HC[b]
		Number / Percent[a]	Number / Percent
Sex	Female	50,069 / 52.5	17,124 / 51.9
	Male	45,389 / 47.5	15,877 / 48.1
Age	18-21	79,033 / 82.8	25,570[f] / 77.5
	22-81	16,425 / 17.2	7,431 / 22.5
Enrollment	FT	73,025 / 76.5	19,397 / 58.8
	PT	22,433 / 23.5	13,604 / 41.2

Note. a: Percentages may not equal 100 due to rounding; b: VCCS FTIC HC: Headcount

of all FTIC students enrolled in Virginia's Community Colleges, Fall 2011 data

(Northern, 2013); f: VCCS FTIC HC includes students less than 18 years of age. FT: full-

time enrollment ($\geq$ 12 credit hours); PT: part-time enrollment (< 12 credit hours).

In Table 5 a comparison is reported for the race/ethnicity of cases included in the

study against the average Fall 2010–Fall 2012 headcount race/ethnicity of all students

enrolled in Virginia's Community Colleges respectively as follows: American

Indians/Alaskan Natives, 0.4% and 0.5%; Asians, 7.0% and 5.9%; Black or African

Americans, 19.9% and 21.7%; Hispanics, 11.0% and 7.5%, Native Hawaiian/other

Pacific Islander, 0.4% and 0.4%; Not specified/Unknown, 1.2% and 2.3%; Multi-race, 4.1% and 2.0%; White, 55.9% and 59.7%. This indicated a reasonable matching of the study cases and overall headcount population, except for the relative overrepresentation of Hispanics and underrepresentation of whites among the cases in the study.

In a slightly different comparison where the study cases were aggregated and compared to three race/ethnicity categories reported by Virginia's Community Colleges in Fall 2011 for FTIC students only (Table 6), the study cases represented a close match to the overall population respectively as follows: 42.9% and 44.4% Minorities, 1.2% and 1.0% Not Specified/Unknown, and 55.9% and 54.5% Whites.

In sum, at the surface it was apparent that the study population differed from the national community college population, the general population of Virginia's Community Colleges, and the more specific FTIC population in Virginia's Community Colleges. However, caution must be exercised when interpreting what those differences ultimately signified. Specifically, in the study data set some students were represented more than once because they registered for more than one class in a semester from which the data were drawn, whereas the demographic data for the overall national community college population and the overall population in Virginia's Community Colleges represented unduplicated headcount. Furthermore, the issue of the representativeness of the study population may not be especially pertinent because the data set consisted of a census population of all those cases that fell within the delimitations of the study, although those delimitations constrain the generalizability of findings to other populations, such as students who register late in their first semester of college.

Table 5

Comparison by Several Races of Cases in the Study and VCCS Headcount

		Study Cases	VCCS HC[g]
		Number / Percent[a]	Number / Percent
Race / Ethnicity	American Indian or Alaskan Native	410 / 0.4	933 / 0.5
	Asian	6,656 / 7.0	11,421 / 5.9
	Black or African American	18,987 / 19.9	42,356 / 21.7
	Hispanic	10,521 / 11.0	14,632 / 7.5
	Native Hawaiian or Other Pacific Islander	425 / 0.4	816 / 0.4
	Not Specified / Unknown	1,189 / 1.2	4532 / 2.3
	Multi-race	3,929 / 4.1	3,909 / 2.0
	White	53,341 / 55.9	116,580 / 59.7

Note: a: Percentages may not equal 100 due to rounding. g: VCCS HC: Average

headcount of all students, not just FTIC, enrolled in Virginia's Community Colleges Fall

2010-Fall 2012 (Virginia's, 2013d).

Table 6

Comparison by Three Race Categories of Cases in the Study and VCCS FTIC Headcount

		Study Cases	VCCS FTIC HC[b]
		Number/Percent[a]	Number/Percent
Race	Minorities	40,928 / 42.9	14,659 / 44.4
	Not Specified / Unknown	1,189 / 1.2	340 / 1.0
	White	53,341 / 55.9	18,002 / 54.5

Note: a: Percentages may not equal 100 due to rounding; b: VCCS FTIC HC: Headcount

of all FTIC students enrolled in Virginia's Community Colleges (Northern, 2013).

Tables 7 and 8 show selected additional disaggregation of data directly relevant to

the study. Each cell included well more than the five cases required to make the chi-

square and logistic regression analyses viable (Field, 2009).

Table 7

Distribution of Cases by Course Success, Registration Timing, Delivery Mode, and Completion of College Success Skills Course

	Course Success (65380 / 68.5%)				Course Non-success (30078 / 31.5%)			
	OTR (60484 / 63.4%)		LR (4896 / 5.1%)		OTR (26180 / 27.4%)		LR (3898 / 4.1%)	
	F2F	DE	F2F	DE	F2F	DE	F2F	DE
#	54863	5621	4393	503	22672	3508	3176	722
%	57.5	5.9	4.6	0.5	23.8	3.7	3.3	0.8

	CSY	CSN	CSY	CSN	CSY	CSN	CSY	CSN	CSY	CSN	CSY	CSN	CSY	CSN	CSY	CSN
#	41300	13563	4294	1327	2756	1637	373	130	15856	6816	2437	1071	1817	1359	447	275
%	43.3	14.2	4.5	1.4	2.9	1.7	0.4	0.1	16.6	7.1	2.6	1.1	1.9	1.4	0.5	0.3

Note: Percentages should be added across each row to yield ~100% for each row. Percentages might not equal 100 due to rounding. OTR: On-time registration, LR: Late registration; F2F: On-campus class, DE: Online class; CSY: Successfully completed college success skills course, CSN: Did not take a college success skills course.

Table 8

Distribution of Cases by Course Success, Registration Timing, Age, and Enrollment Status

	Course Success (65380 / 68.5%)				Course Non-success (30078 / 31.5%)			
	OTR (60484 / 63.4%)		LR (4896 / 5.1%)		OTR (26180 / 27.4%)		LR (3898 / 4.1%)	
	TR	NT	TR	NT	TR	NT	TR	NT
#	49959	10525	3933	963	21942	4238	3199	699
%	52.3	11.0	4.1	1.0	23.0	4.4	3.4	0.7

	FT	PT	FT	PT	FT	PT	FT	PT	FT	PT	FT	PT	FT	PT	FT	PT
#	41786	8173	6962	3563	2925	1008	552	411	15944	5998	2483	1755	2005	1194	368	331
%	43.8	8.6	7.3	3.7	3.1	1.1	0.6	0.4	16.7	6.3	2.6	1.8	2.1	1.3	0.4	0.3

Note: Percentages should be added across each row to yield ~100% for each row. Percentages might not equal 100 due to rounding. OTR: On-time registration, LR: Late registration; TR: Traditional aged (18-21), NT: Nontraditional aged (≥ 22); FT: Full-time (≥ 12 credits), PT (≤ 12 credits).

Additional data analysis indicated that when completely disaggregated by course

success, registration timing, course delivery mode, completion of a college success skills

course, and student demographic characteristics of sex, race/ethnicity, age, and

enrollment status (FT/PT) some cells—such as for female Hawaiian/Other Pacific

Islander late registrants who did not succeed in an online class, who did not take the

college success skills course, who were 22 or more years of age, and who were enrolled

part-time—had a count of 0. For this reason, the race category was transformed into a

dichotomous variable. The first category consisted of whites, Asians, and those whose

race was unspecified or unknown because preliminary data analysis and previous research

showed that the academic performance of these groups was more alike than the

performance of non-Asian minorities (Habley, Bloom, & Robbins, 2012). The second

category included all non-Asian minorities because again data analysis and previous

research showed that these groups were more alike than the first category in terms of

academic success.

In Table 9 the resultant frequencies for the dichotomous race categories are

displayed. This raised the count in the smallest cell (did not pass the class, registered late,

enrolled in an online class, did not take the college success skills course, was male, was

non-Asian minority, was non-traditional age, and enrolled part-time) to $N = 16$; running

the same frequency analysis but replacing males with females yielded 27 cases.

Table 9

Cases in the Study Categorized Dichotomously by Race

	Number	Percent
White, Asian, Unknown	61,186	64.1
Non-Asian Minorities	34,272	35.9

Note: Non-Asian minorities: American Indian/Alaskan Native, Black/African American,

Hawaiian/Other Pacific Islander, Hispanic, and Two or More Races.

Using Cohen's guidelines (1992) the study was designed with the goal that there

would be a minimum of 998 cases in each cell for each variable in each of the three

regression models in order to detect a small effect where the α level is set at the stringent

criterion of .01 and thus the risk of mistakenly observing an effect that was not real would

be reduced to a 1% chance. Upon reflection, it was certainly too ambitious to expect that

all cell sizes would reach that level when all seven variables were included in the model.

Nevertheless, for the first research question, the smallest cell (registered late into an

online class without earning a successful grade; see Table 7) included 722 cases, which is

very near the mark of 726 that Cohen suggested was necessary to detect a small effect at α

level of .05 and much more than the 141 cases suggested for a medium effect—what

Cohen referred to as an effect that is "likely to be visible to the naked eye of a careful

observer" (p. 156)—at the more strict α level of .01. For the second research question

where the variable of completion of a college success skills course was added, the

smallest cell contained 275 cases (registered late into an online class without earning a

successful grade despite having previously completed a college success skills course),

which is enough to detect a medium effect at an α level of .01. For question three, where

demographic characteristics were added as variables, the smallest cell ($N = 16$, as noted

above) contained too few cases to guarantee the detection of even a large effect at the .05

α level. However, because statistically significant effects were found for all three research

questions the issue of cell size was not especially pertinent, particularly since the analysis

was able to adhere to the generally accepted guideline that no cell should have five or

fewer cases.

Two more descriptive statistics were worth noting: the overall success rates of on-

time and late registrants and a chi-square analysis of the overall association between

registration timing and course success. These can be thought of as headline statistics in

that they provide an abbreviated, attention getting characterization of the study results;

accordingly, they should be treated with caution. The overall success rate for cases that

represented on-time registration was 70% while the success rate for late registrations was

only 56% (deduced from Tables 3 & 7). In some studies of late registration, no data

analysis was conducted beyond these headline rates, but those with an understanding of

evidentiary statistics will recognize that it would be premature to conclude that there is a

causal link between registration timing and student success. The success rates suggest

further exploration is warranted, but they fall short of being able to reliably indicate that

the differences are meaningful in any actionable sense because other factors may have

contributed to the difference in success rates.

Results from a chi-square analysis of the 95,458 cases on the overall effect of

registration timing upon student success in a class—that is, without accounting for the

influence of delivery mode, the completion of a college success skills course, and student

demographic characteristics—provided a secondary headline result (Table 10). The

assumptions of the chi-square (independence of observation and frequencies in each cell

of the contingency table > 5) were met. There was a statistically significant association

between the timing of registration (on-time or late) and course success, where success

was defined by grades of "A," "B," and "C" and non-success by grades of "D," "F," and

"W": χ^2 (1) = 737.279, $p < .001$. Based on the odds ratio, the odds that a student would

successfully complete the class were 1.84 times higher for on-time than for late

registrants. However, the value of phi was only .088 (Table 11), indicating an extremely

small effect size, which forestalled any inference that there was a meaningful relationship

between course success and registration timing.

In this instance, the chi-square should be viewed more like descriptive frequency

data than statistical testing data because with such a large data set there is a risk that the

chi-square analysis will yield an outcome that is statistically significant, but misleading

(Runkel, 2012). Indeed, it was a premise of this study that to credibly address the

relationship between course success and registration timing it is necessary to create a

more sophisticated statistical model, specifically the binary logistic regression analysis

reported in the next section.

Table 10

Chi-square Tests for Registration Timing by Course Success

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	737.279[a]	1	.000		
Likelihood Ratio	700.391	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	95458				

Note. a: No cells have expected count less than 5. The minimum expected count is

2770.91.

Table 11

Symmetric Measures of the Strength of the Association

		Value	Approx. Sig.
	Phi	.088	.000
Nominal by	Cramer's V	.088	.000
Nominal	Contingency Coefficient	.088	.000
N of Valid Cases		95458	

Addressing the Research Questions

A binary logistic regression was run on the 95,458 cases in the data set. The

regression is binary because the outcome variable—course success—is best approached

dichotomously. The five course grade categories of "A," "B," "C," "D," and "F" are not

numerous enough to properly be considered interval data, and the grade category of "W"

does not fit into an A-F scale. Previous research has indicated that the predictor variables

used in building the binary logistic regression model in this study—registration timing,

delivery mode, completion of a college success skills course, and student demographic

characteristics—are associated with student success outcomes; for this reason the forced

entry method of loading the predictors was employed with the following categories

chosen as baselines because of their presumed positive associations with success:

registered on-time; enrolled in an on-campus class; completed a college success skills

course; was female; was white, Asian or of unknown race/ethnicity; was nontraditional

aged ($\geq$ 22); and was enrolled full-time. The assumptions of binary logistic regression that

the cases were comprised of independent observations and that each cell had a five-count

minimum were met.

Research Question 1: What effect does time of registration (on-time or late)

and course delivery mode (on-campus class or online) have on student success in the

class? A logistic regression analysis was conducted to predict course success using

registration timing and course delivery mode as predictors. A test of the full model

against a constant only model was statistically significant, indicating that the predictors as

a set reliably distinguished between students who succeeded and students who did not

succeed (χ^2 = 1120.234 p < .001, df = 2).

The Wald criterion demonstrated that both registration timing ($p <$ .001) and

course delivery mode ($p <$ .001) made statistically significant contributions to the

prediction (Table 12). Based on the EXP(B) value, on-time registrants were 1.82 times

more likely than late registrants to succeed in the class and students in on-campus classes

were 1.56 times more likely than students in online classes to succeed in the class.

However, Nagelkerke's R^2_N of .016 indicated a very weak relationship between prediction

and grouping. Prediction success overall was 68.7%, compared to the 68.5% rate in the

constant only model (Tables 13-14).

Table 12

Variables in the Equation: Registration Timing and Delivery Mode

	B	S.E.	Wald	Sig.	Exp(B)
On Time Registration	.597	.023	686.949	.000	1.82
On-campus Class	.445	.021	430.653	.000	1.56
Constant	-.154	.028	29.647	.000	.857

Table 13

Classification Table for Model 0: Constant Only

Observed		Predicted		
		Course Success		Percentage
		N	S	Correct
Course Success	N	0	30078	.0
	S	0	65380	100.0
Overall Percentage				68.5

Note. N: Did not successfully complete the class with a grade of "A," "B," or "C." S: Successfully completed the class. Constant is included in the model. The cut value is .500.

Table 14

Classification Table for Model 1: Registration Timing and Delivery Mode

Observed		Predicted		
		Course Success		Percentage Correct
		N	S	
Course Success	N	722	29356	2.4
	S	503	64877	99.2
Overall Percentage				68.7

Note. N: Did not successfully complete the class with a grade of "A," "B," or "C." S: Successfully completed the class. The cut value is .500.

Research Question 2: What effect does time of registration (on-time or late) and course delivery mode (on-campus or online) have on student success in the class when holding constant the completion of a college success skills course? A logistic regression analysis was conducted to predict course success using registration timing, course delivery mode, and successful completion of a college success skills course as predictors. A test of the full model against a constant only model was statistically significant, indicating that the predictors as a set reliably distinguish between students who succeeded and students who did not succeed (χ^2 = 1438.12, p < .001 with df = 3).

Table 15

Variables in the Equation: Registration Timing, Delivery Mode, and Completion of a

College Success Skills Course

	B	S.E.	Wald	Sig.	Exp(B)
On Time Registration	.564	.023	608.339	.000	1.76
On-campus Class	.449	.021	436.552	.000	1.57
Complete College Success Skills	.277	.015	321.426	.000	1.32
Constant	-.326	.030	118.635	.000	.72

The Wald criterion demonstrated that registration timing, course delivery mode,

and completion of a college success skills course made statistically significant

contributions to the prediction ($p < .001$; Table 15). The EXP(B) value indicated that on-

time registrants were 1.76 times more likely than late registrants to succeed in the class,

that students in on-campus classes were 1.57 times more likely than students in online

classes to succeed, and that those who enrolled in and successfully completed a college

success skills course were 1.32 times more likely to succeed than those who did not enroll

in a college success skills course. Again, although Nagelkerke's R_N^2 of .021 indicated an

improvement upon Model 1, the relationship between prediction and grouping remained

very weak. Overall prediction success at 68.7% (2.4% for non-success and 99.2% for

success), can be compared to a prediction rate also of 68.7% in Model 1 and 68.5% in the

model before the addition of any coefficients (Tables 13, 14, & 16).

Table 16

Classification Table for Model 2: Registration Timing, Delivery Mode, and College

Success Skills Course

Observed		Predicted		
		Course Success NS or S		Percentage
		N	S	Correct
Course Success NS or S	N	722	29356	2.4
	S	503	64877	99.2
Overall Percentage				68.7

Note. N: Did not successfully complete the class with a grade of "A," "B," or "C." S:

Successfully completed the class. The cut value is .500.

Research Question 3: What effect does time of registration (on-time or late)

and course delivery mode (on-campus or online) have on student success in the class

when holding constant the completion of a college success skills course and

demographic characteristics (sex, race/ethnicity, age, and enrollment status)? A final

logistic regression analysis was conducted to predict course success using registration

timing, course delivery mode, successful completion of a college success skills course,

and student demographics of sex, race/ethnicity (white, Asian, unknown race/non-Asian

minorities), age (traditional age, 18-21/nontraditional age, $\geq$ 22), and enrollment status

(full-time/part-time) as predictors. A test of the full model against a constant only model

was statistically significant, indicating that the predictors as a set reliably distinguish

between students who succeeded and students who did not succeed (χ^2 = 3767.698, p <

.001 with df = 7).

The Wald criterion demonstrated that registration timing (p < .001), course

delivery mode (p < .001), completion of a college success skills course (p < .001), sex (p

< .001), race (p < .001), age (p < .001), and enrollment status (p < .001) made statistically

significant contributions to the prediction (Table 17).

Table 17

Variables in the Equation: Registration Timing, Delivery Mode, Completion of a College

Success Skills Course, and Student Demographics

	B	S.E.	Wald	Sig.	Exp(B)
On Time Registration	.481	.023	426.715	.000	1.62
On-campus Class	.555	.022	614.791	.000	1.74
Complete College Success Skills	.196	.016	149.335	.000	1.22
Female	.190	.014	173.340	.000	1.21
White/Asian/Unknown	.476	.015	1057.245	.000	1.61
Non-traditional Age	.328	.020	272.947	.000	1.39
Full-time Enrollment	.514	.017	965.615	.000	1.67
Constant	-1.122	.035	1003.029	.000	.33

From the EXP(B) values in Table 17 the following inferences can be made:

- On-time registrants were 1.62 times more likely to succeed in the class than late

  registrants when holding constant the other predictors.

- Students enrolled in on-campus classes were 1.74 times more likely to succeed in the class than students enrolled in online classes when holding constant the other predictors.

- Students who enrolled in and successfully completed a college success skills course were 1.22 times more likely to succeed in the class than those who did not enroll in a college success skills course when holding constant the other predictors.

- Females were 1.21 times more likely to succeed in the class than males when holding constant the other predictors.

- Students categorized as white, Asian, or of unknown race were 1.61 times more likely to succeed in the class than students categorized as non-Asian minority when holding constant the other predictors.

- Nontraditional age students ($\geq$ 22 years old) were 1.39 times more likely to succeed in the class than traditional age students (18-21 years old) when holding constant the other predictors.

- Full-time students were 1.67 times more likely to succeed in the class than part-time students when holding constant the other predictors.

As above, because the value of Nagelkerke's R_N^2 (.054) is close to zero there seemed to be a very poor relationship between prediction and grouping. This inference is further supported by results reported in Table 18 where the rate of correctness of the overall prediction was 69% (8.2% for non-success and 97.0% for success), which is only

0.3 percentage points higher than for Models 1 and 2 and 0.5 percentage points higher

than for the model that did not include any predictors (Tables 13, 14, 16, & 18). In short,

although the predictive ability of Model 3 is statistically significant, it has little or no

practical meaningfulness. Furthermore, it must be reiterated that the model fails largely in

the inability to predict non-success in a class.

Table 18

Classification Table for Model 3: Registration Timing, Delivery Mode, College Success

Skills Course, and Student Demographics

Observed		Predicted		
		Course Success		Percentage
		N	S	Correct
Course Success	N	2480	27598	8.2
	S	1955	63425	97.0
Overall Percentage				69.0

Note. N: Did not successfully complete the class with a grade of "A," "B," or "C." S:

Successfully completed the class. The cut value is .500.

Summary

The purpose of this study was to test the claim that registration timing (on-time or late) is predictive of a student's success in the associated on-campus or online class. The data set used for the analysis was a census population of 95,458 cases representing all course enrollments in all community colleges in Virginia in the Spring 2010, Spring 2011, and Spring 2012 semesters by first time in college (FTIC) students aged 18-81 who either successfully completed a college success skills course in the fall semester prior to the spring semester from which their records were drawn or who did not enroll in a college success skills course either in the fall or spring semester.

A descriptive investigation of the data found that the frequency of late registration (9.2% of all course enrollments) generally aligned with findings from previous research. The data set was heavily skewed towards on-campus enrollments (89.2%) and enrollments by students who successfully completed a college success skills course (72%). In general, the data set approximated the distribution of sex, age, and race/ethnicity for all FTIC students in Virginia's Community Colleges in the Fall 2011 semester, but the study data set was more heavily skewed towards full-time students— 76.5% in the study data set but only 58.8% in the overall FTIC student population. It is essential to note that the demographic statistics from the study data set include duplicate students, but the data set from Virginia's Community Colleges only represented unduplicated headcount; therefore, any inferred similarity or dissimilarity between the two sets would be tenuous.

An additional descriptive view of the data included a chi-square analysis to generate a sense of the overall relationship between registration timing and success in the class, where success was defined by grades of "A," "B," and "C" and non-success by grades of "D," "F," and "W." Although statistical significance could be inferred from this test, the data must be treated with caution on two counts. First, the exceedingly low phi value of .088 forestalled an inference that the statistical significance held substantive meaning. Second, as demonstrated in a review of the literature, with such a large data set and a test that did not include predictor variables, the likelihood of discovering statistical significance was high without an accompanying promise of meaningfulness.

The main analysis focused on three research questions, each one tested by binary logistic regression modeling.

1. What effect does time of registration (on-time or late) and course delivery mode (on-campus class or online) have on student success in the class?

2. What effect does time of registration (on-time or late) and course delivery mode (on-campus or online) have on student success in the class when holding constant the completion of a college success skills course?

3. What effect does time of registration (on-time or late) and course delivery mode (on-campus or online) have on student success in the class when holding constant the completion of a college success skills course and demographic characteristics (sex, race/ethnicity, age, and full-time/part-time enrollment status)?

The results indicated that the predictors included in each question did improve upon a constant only model that did not include any predictors. Furthermore, as predictors were added into the model the predictive ability of the model increased. However, as with the phi values in the chi-square analysis, Nagelkerke's R_N^2 value close to zero in each regression model and the miniscule 0.5 percentage point increase in the correctness rate for the overall prediction from the model without any predictors through to the model with seven predictors belied any attempted inference that the predictors made a meaningful contribution to understanding the relationship between registration timing and student success.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Overview of the Problem

Community colleges have been a feature of higher education since the founding of

Joliet Junior College in 1901. The growth of community colleges was geometric at times,

gaining particular impetus after World War II and reaching its apogee in the 1960s when

on average a community college opened every week for 10 years (Andrews & Fonseca,

1998). Today, over 1,100 community colleges provide educational programs within

driving distance of every household in the United States (American, 2012b). Andrews

and Fonseca exclaimed that "the growth of community college enrollment has been no

less than phenomenal" (p. 3). The U.S. Bureau of Labor Statistics (2013) reported that

71% of 2012 high school graduates enrolled in college, and community colleges represent

about half of all college enrollments (AACC, 2012b). Together the data suggest that as a

sector of the economy community colleges can be considered a mature industry

(Hambrick, 1983; Palmer, 1989; Vasconcelos, 1989). In growing industries the focal

point tends to be expanding reach into current or new markets; mature industries tend to

focus on differentiation by controlling costs and focusing on quality. Present trends bear

this out as the room for growth by opening more colleges or campuses or by increasing

the percentage of individuals who become college enrollees is limited. Instead,

community colleges must rely increasingly on data driven decision-making and are

turning their attention to improving student success, learning outcomes, and graduation

and transfer rates (Arum & Roksa, 2011; Beach, 2011, Hendrick, Hightower, & Gregory, 2011).

In this context, community colleges have developed a culture of assessment and evidence (Lattuca & Stark, 2011). O'Banion (2007) championed the idea of "the Learning College" (p. 714), an institution that by focusing on its own learning advances the quality of learning of students. Colleges have begun to examine the institutional structures, policies, and behaviors that advance or impede learning. One target for improvement has been the practice whereby colleges allow students to register for classes after the semester has begun. Nearly 30 studies of late registration have been conducted in colleges and universities since Chilton's 1964 dissertation (see Appendix A). Based on that research, O'Banion (2007; 2012), Roueche & Roueche (1993; 1994) and others (Dunn & Mays, 2004) have concluded that late registration is inimical to student success. In fact, however, the research does not seem to support the strength of those claims. Taken together, the results and conclusions of the studies have been inconclusive and contradictory.

Furthermore, no publicly available study has specifically addressed the relationships among course delivery mode, the completion of a college success skills course, registration timing, and student success; however, recent research has indicated that student success outcomes are different for students enrolled in on-campus as opposed to online classes (Jaggars & Xu, 2010; Xu & Jaggars, 2011a) and for students who successfully completed a college success skills course as opposed to those who never

enrolled in such a course (Zeidenberg, Jenkins, & Calcagno, 2007). The present study

was designed to address that gap in the literature. Results have the potential to guide

policymakers and practitioners as they re-examine registration policies at their

institutions.

Purpose Statement and Research Questions

The purpose of the study was to advance researcher, policymaker, and practitioner

understanding of the phenomenon of late registration in terms of its relationship to

student success. Three research questions were used to guide the study:

1. What effect does time of registration (on-time or late) and course delivery

    mode (on-campus or online) have on student success in the class?

2. What effect does time of registration (on-time or late) and course delivery

    mode (on-campus or online) have on student success in the class when

    holding constant the completion of a college success skills course?

3. What effect does time of registration (on-time or late) and course delivery

    mode (on-campus or online) have on student success in the class when

    holding constant the completion of a college success skills course and

    demographic characteristics (sex, race/ethnicity, age, and full-time/part-time

    enrollment status)?

Review of the Methodology

The study was designed as an *ex post facto* quantitative investigation using a

causal comparative methodology where dependent and independent variables were clearly

identified and defined. The conceptual model for the study was drawn from student

involvement theories (Astin, 1999; Tinto, 1993). It was posited that the student behavior

of registering late may exert a negative influence on student success.

Data were drawn from 23 community colleges in the Fall 2010-Spring 2013 time

period. Specifically, the data set consisted of all course enrollments from the Spring 2011,

2012, and 2013 semesters for students who were identified as first time in college in the

previous fall semester (Fall 2010, 2011, 2012). Each case in the data set included student

enrollment behavior, student academic performance, and student demographic

characteristics.

The spring semesters were selected because of the need in the second research

question to account for the influence of a college success skills course on student

outcomes. To further isolate this influence, the study population was delimited to only

those who had successfully completed a college success skills course in the fall semester

prior to the spring semester from which their data were drawn or who did not enroll in a

college success skills course in either semester. Similarly the study population was

delimited to include only first time in college students (FTIC) in an attempt to bracket the

population off from the influence of other college experiences on their academic

performance and to create a relatively homogeneous data set.

On-time registration was defined as enrollment in a class before the first day of

classes for the spring semester; late registration was defined as enrollment into a class on

or after the start of the spring semester. On-campus classes were those where instruction

was delivered completely synchronously at a single location; online classes were those

where instruction was delivered completely asynchronously over the internet. The

demographic categories of students included in the data analysis were the characteristics

of sex, race/ethnicity, age, and enrollment status, as self-reported on the college

application. For this study, nine categories of race/ethnicity were grouped dichotomously,

with one category including whites, Asians, and those whose race/ethnicity was unknown

(because research indicated that membership in those categories has been associated with

student success) and the other category including all non-Asian minorities (Habley,

Bloom, & Robbins, 2012). Age was also grouped dichotomously, with the "traditional"

category including all students who were 18-21 years old in the spring semester from

which their data were drawn and the "nontraditional" category including all students 22

years of age or older. Students younger than 18 were not included in the data set in an

effort to minimize the influence of those students who were dual enrolled in high school

and college and to retain the focus in the traditional category on students who had

recently and permanently left high school. For enrollment status, students were classified

as full-time if they registered for 12 or more credits and classified as part-time if they

enrolled in fewer than 12 credits in the spring semester from which the data were drawn.

The cases consisted of all college credit courses that were offered for three or

more credits. This limitation was employed because three credits is the common

minimum for most college courses. In contradistinction, courses offered for only one or

two credits, while they may carry college credit, may be courses more frequently taken outside of a degree program.

Course success for the classes into which students enrolled on-time or late that were the focus of the investigation was also defined dichotomously. Students were classified as successful if they earned grades of "A," "B," or "C," and were classified as unsuccessful if they earned grades of "D," "F," or "W." For the college success skills course, success was defined dichotomously as above with the addition that "P" (pass) grades were included in the successful category and "U" (unsatisfactory) grades were included in the unsuccessful category.

Critique of the Study Design

The design of this study improves upon the uneven quality of research on late registration (Summers, 2000) with respect to the target study population, data collection methods, data analysis, and results. The study population was clearly defined and exhibited a degree of homogeneity because of the focus on FTIC students in three spring semesters over a time period (2011-2013) both recent enough and short enough to inspire a degree of confidence in its appropriateness. Similarly, although data were drawn from 23 colleges, the stability and reliability of the data set was enhanced by use of a uniform student data tracking system and the methods for defining student data. Furthermore, community colleges in Virginia share uniform course descriptions for the college success skills courses (see Appendix D).

The data set of 95,458 cases represented a census population large enough to yield cell sizes that allowed for meaningful analysis, even when disaggregated among seven independent variables and one dependent variable. The chosen variables—registration timing, successful class completion, class delivery mode, successful completion of a college success skills course and the demographic variables of sex, race/ethnicity, age, and full-time/part-time enrollment status—have been well established in the literature as pertinent (Habley, Bloom, & Robbins, 2012).

Focusing on FTIC students in their second semester enhanced the study because it allowed for isolating the influence of a college success skills course because students had an opportunity to complete that in their first semester. Also importantly, Johnston (2006) suggested that focusing on students beyond the first semester increased the likelihood that the data set would include what can be thought of as "true" late registrants. Some students would have registered late in the first semester due to inexperience with how to enroll in college, a phenomenon well documented in the literature (Belcher & Patterson, 1990; Chilton, 1964; Keck, 2007; Morris, 1986; Zottos, 2005). For example, most of the 23 community colleges in this study began the academic year two weeks before public high schools, so some college students arrived late to campus because they were unaware that the start of classes was imminent or underway. For most students, the enrollment process is both daunting and baffling; it is difficult to apply, take placement tests, receive counseling, register for classes, pay for classes, get a parking pass, and purchase books in a single day. One process in particular typically takes weeks or months to complete and

therefore can considerably impede an individual's attempt to register—financial aid,

especially in the first semester when the individual cannot draw on previous data and

experience to successfully negotiate the financial aid process from application to award.

Thus, in order to discount the effect of students whose timely registration was inhibited

by novice ignorance or error, the study population consisted only of students who had

already navigated the enrollment process as evinced by their persistence into a second

semester of college. As well, Mendiola-Perez (2004) found that only 8.3% of students

enrolled late in more than one semester; therefore, the exclusion in this study of first

semester students created the opportunity to focus on the academic performance of

students more likely to enroll late by a greater degree of volition than volition that was

driven primarily by inexperience. Also important, focusing on students in their second

semester allowed for the effect of a college success skills course to be included in the

analyses.

The study included investigations in two areas not included in any previous

research on late registration: (1) differences in student success in on-campus and online

classes and (2) the influence of a college success skills course on the success of students

in other classes into which they registered on-time or late. The logistic regression

analyses included three models; the final model incorporated seven predictors. The

inclusion of demographic categories related to sex, race/ethnicity, age, and full-time/part-

time enrollment status was supported by previous research related to student success in

general and to the success of late registrants in particular.

It is also worth noting the difference in treating registration timing as a continuous variable or a dichotomous categorical variable. The former focuses on the relative value of registration timing (more or fewer days before or after the start of the semester), while the latter treats registration timing as absolute in order to elucidate the specific phenomenon of registering for a class after the semester is underway. Hiller (2006) argued for the importance of treating registration timing as a categorical variable: "There is no theoretical reason to measure date of registration as a continuous variable except to simplify the estimation technique" (p.6). That probably overstates the case—or perhaps Hiller meant it only in reference to his study—because there is value in learning about registration timing as a relative rather than absolute phenomenon (Summers, 2000), but Street (2002) demonstrated the benefits of modeling registration timing as a dichotomous variable.

The present study also obviously improved upon the handful of previous studies with counterintuitive definitions of late registration, such as Cornille's 2009 dissertation in which students enrolling two weeks before the start of the semester were lumped in as late registrants along with students who enrolled as much as three weeks after the start of the semester. In sum, the study design aligned with previous research, extended the bounds of that research, and drew upon a very large data set, which created the opportunity to include many predictors while still ensuring that results would be defensible and meaningful.

By going beyond a simple comparison of success percentages or a chi-square

analysis of the overall relationship between registration timing and student success, the

study yielded more sophisticated, more accurate, and more meaningful results than some

previous studies. The choice of the binary logistic regression method is more defensible

than a chi-square test, as noted above, or an Analysis of Variance (ANOVA) test which

treated class grades as interval data when they are more properly conceived of as

categorical data. Grouping grades dichotomously created the condition for testing the

most salient feature of student performance—a grade that would allow for maintaining

academic eligibility, for a class to be counted towards program graduation requirements,

or for transfer of credits to another institution. The current study seems to be the only

publicly available examination of the link between the time of registration into a class and

the grade in that class that employed a binary statistical methodology, which is clearly an

improvement upon Sova's simple comparison of the percentages of students who

successfully did/did not complete the course and arguably more appropriate than the

multiple regression analyses used by Hale (2007), Keck (2007), and Zottos (2005), which

require that the outcome variable be continuous. Additionally, by directly examining the

relationship between registration timing for a class and the student's performance in the

class the study held the potential for better isolation of the link between registration

behavior and student outcome than those studies which looked at semester and/or

cumulative GPA, such as Perkins (2002). Concomitantly, the study used cases that

represented individual class enrollments rather than students' on-time or late enrollment

into all classes in a semester because the presumed negative effects of late registration are

between that behavior for a specific class and the student's performance in that class.

The above observations, comments, and claims should be read as a critique, not a

censuring of previous research because most strengths of this study were derived from or

influenced by the work of earlier researchers and because this study too contained

weaknesses in design. For example, the definition of late registration as an enrollment

after the first day of classes for the semester, while clear and common to most other

studies, allowed for the possibility that a student may have enrolled after the first day of

the semester but before the first meeting of a particular class. It is possible that there are

differences in performance attendant to the each method of defining late registration.

The study included multiple cases from single students. This allowed for the

isolation of the relationship between registration timing and success in individual classes,

but because many students were represented multiple times it was not possible to create

an accurate summary of the demographic characteristic of a late registrant, and those

students represented by multiple cases would have had a disproportionate impact on the

study results.

While Johnston (2006) was among those researchers demonstrating that student

demographics were a mitigating factor when examining registration timing and student

success, this also points to a problem pervasive in social science research, including this

study. Identifying immutable personal characteristics of sex and race/ethnicity as possible

predictor variables risks reification of deficit models with regard to some groups. For

those populations on the negative side of that equation—males and most racial/ethnic

minorities—the repetition of negative findings creates a kind of cultural zeitgeist that

conflates birth with academic ability and performance, which is odious. Furthermore,

findings about the associations between sex or race on one hand and student success on

the other are useless in practice; one has little ability to change status with regard to these

categories.

In contrast, the categories of age and enrollment status, because they are mutable,

have the potential to be more useful. It could be actionable to tailor registration policies

based on whether a student is enrolled full-time or part-time. Similarly, if future research

supports the assumption, it may be worthwhile to craft late registration policies with

respect to a student's academic progression (e.g. total number of credits earned to date or

total semesters enrolled in college to date) and cumulative grade records. It is worth

repeating: although demographic characteristics of sex and race/ethnicity have been

shown to be associated with student academic performance, and while it is important

from a sociological perspective to understand differential effects on subpopulations, there

is a danger that association is viewed as causation and that the effect of immutable traits

is mistaken for more powerful and real effects of mutable characteristics such as students'

motivation or their performance in high school (Habley, Bloom, & Robbins, 2012).

Summary of Major Findings

The intended outcome of the study was credible evidence to address the three research questions. This goal was achieved, although upon initial inspection the results of the study may appear inconclusive.

Descriptive Statistics. The cases were analyzed for trends among the major categories and, where appropriate and feasible, compared to other data available about the student population in the 23 community colleges. Of most note was the finding that 9.2% of the cases in the study consisted of late registrations because that roughly aligned with the average frequency documented in other studies (see Appendix E). The overall success rate for the study population in the classes that were included in the study approached 70%. Nearly three quarters of the cases (72.6%) were associated with students who successfully completed a college success skills course, and cases in the study overwhelmingly consisted of enrollments into on-campus classes (89.2%).

When comparing the study population to the FTIC and/or the overall headcount population in the 23 colleges during the same time period covered by the study, the two sets seemed to align very well for the most part; however, it is essential to reiterate that in the study a single student was sometimes responsible for the inclusion of multiple cases (if they registered for more than one class) while the comparison population among the overall population of the 23 colleges only included an unduplicated headcount.

Two other sets of descriptive statistics, referred to in Chapter Four as headline results, were generated from the data set. The first showed that the success rate for cases

that represented on-time enrollments (70%) was 14 percentage points higher than the success rate for cases representing late enrollments (56%). The second headline statistic came from the results of the chi-square analysis of the overall association between registration timing and student success in a class, which showed statistical significance, and seemed to support an assumption that the differences in the percentage success rates were meaningful. However, a more thorough investigation of the data showed that the chi-square revealed a very weak relationship between the dependent and independent variables.

The Three Research Questions. A binary logistic regression model was developed to address the three research questions, and the results were nearly identical for the three questions. The first research question was "What effect does time of registration (on-time or late) and course delivery mode (on-campus class or online) have on student success in the class?" A statistically significant result was produced ($p < .001$), indicating that on-time registrants were 1.82 times more likely than late registrants to succeed in the class and students in on-campus classes were 1.56 times more likely than students in online classes to succeed in the class. However, the effect size was very small, accounting for about 1.6% of the variation in success rates. Prediction success overall was 68.7%, which is a miniscule improvement over the 68.5% rate in the constant only model. Furthermore, while the predication rate for success was an admirable 99.2%, the prediction rate for non-success was only 2.4%. Johnston (2006) came to a similar

conclusion, finding that the multiple regression models he created were much more

effective when predicting persistence than attrition.

The second research question was "What effect does time of registration (on-time

or late) and course delivery mode (on-campus or online) have on student success in the

class when holding constant the completion of a college success skills course?" Again, a

statistically significant result was found ($p < .001$). On-time registrants were 1.76 times

more likely than late registrants to succeed in the class, students in on-campus classes

were 1.57 times more likely than students in online classes to succeed, and that those who

enrolled in and successfully completed a college success skills course were 1.32 times

more likely to succeed than those who did not enroll in a college success skills course.

Yet again, the model was very poor in that it only accounted for 2.1% of the variance in

student success. Overall prediction success at 68.7% (2.4% for non-success and 99.2%

for success) reflects no improvement over the previous model and a minimal

improvement over a model before the addition of any coefficients (Tables 13, 14, & 16).

Again the model could predict student success in a class very well but was impotent when

predicting non-success.

The final research question was "What effect does time of registration (on-time or

late) and course delivery mode (on-campus or online) have on student success in the class

when holding constant the completion of a college success skills course and demographic

characteristics (sex, race/ethnicity, age, and full-time/part-time enrollment status)?" As

with the previous two models Model 3 yielded a statistically significant result ($p < .001$)

with little practical significance given that the model only explained a little over 5% of

the variation in student success, improved upon the predictive accuracy of the base model

by a mere 0.5 percentage points, and was particularly inept at predicting non-success in a

class.

Findings Related to the Literature

The motivation for undertaking this study was the importance of using data to

drive decision-making with the ultimate goal of improving student outcomes. Late

registration is thought by some community college leaders to be low-hanging fruit, that is,

a practice that can easily be eliminated to yield a substantial, positive effect on student

success; however, research to date has yielded incomplete, contradictory, and sometimes

untrustworthy results (see Chapter Two and Appendix A). By creating a study design that

reflected lessons learned from previous studies, it was hoped that the results would

contribute meaningfully to evidence about the relationship between registration timing

and student success. That overall goal was achieved.

In terms of the descriptive statistics the study adds very little that is new. For

example, it is not surprising that on-campus classes comprised the vast majority of cases

(Xu & Jaggars, 2010). While all almost all public community colleges offer online

classes, their primary service is to students on-campus (Xu & Jaggars, 2011a).

Additionally differential success rates by sex, age, enrollment status, and completion of a

college success skills course have been well documented in other research (Habley,

Bloom, & Robbins, 2012). One of the most useful findings of the current study was that

9.2% of cases represented late registrations because this aligned with the general trend in

the literature (see summary table in Appendix E).

The chi-square results implied an early confirmation of the confusion and

contradiction among results from previous studies; provided support for a claim that

results from other studies which seemed to have shown a significant negative impact of

late registration on academic performance may have been overstated, misinterpreted, or

anomalous; and suggested where the issues among previous studies may have stemmed

from (Schmidt, 2004; Street, 2000). Specifically, the chi-square results indicated that late

registration had a statistically significant negative association with success in the class. At

this point, it may be tempting to conclude that the one behavior negatively affects the

other. However, further analysis of the chi-square showed that the results were not

practically meaningful given that the effect size was extremely small. This presaged

findings from the binary logistic regression.

As with the chi-square, the logistic regression models developed for the three

research questions indicated statistical significance without substantive meaningfulness

and confirmed findings of the five previous studies where results were reported for the

success rate of students who registered late for a particular class. Sova (1986) was the

only one who reported a clear negative association between late registration and

successful completion of the class; Zottos (2005) and Hale (2007) reported no significant

relationship, and Angelo (1990) reported the counterintuitive finding that late registrants

were *more likely* to successfully complete the class, a result echoed in Keck's dissertation

(2007) for students who registered late for five or six classes in a semester. When student

outcomes were examined by grades, rather than dichotomously by success or non-

success, other researchers reported mixed results. In brief, Keck (2007) and Safer (2009)

found a negative relationship between late registration and grades in the class while

Angelo (1990) and Diekhoff (1992) could not confirm an association, and Sova (1986)

reported bifurcated results where late registrants were more likely to earn "F" grades but

also more likely to earn "A" grades. Taken together the findings of the present study that

success in a class could not be meaningfully predicted by a student's registration

behavior, even when six other factors were considered, corresponded with most research

that looked at registration timing and student outcomes for a particular class.

The study improved upon previous research by including factors of course

delivery mode and completion of a college success skills course in the logistic regression

model; these factors have been shown to be associated with student success to some

degree (Xu & Jaggars, 2011a & 2011b; Zeidenberg, Jenkins, & Calcagno, 2007). Yet the

amount of variation in student success explained by the models ranged from a mere 1.6%

to an unimpressive 5.4%, even when as many as seven predictors were accounted for. The

true significance here is that the complexity of students and their behaviors cannot easily

be captured in a statistical model. Take for example the finding that the models could

reliably predict success, but the ability to predict the percentage of students who would

experience non-success was in the single digits. Therefore, those predictors of student

success are chimeric; they are proxies for other untested predictors. For example,

previous research has demonstrated that high school grade point average and a student's

locus of control are two of the better predictors of college success (Gifford, Briceño-

Perriott, & Mianzo, 2006; Grimes, 1997; Habley, Bloom, & Robbins, 2012; Kalechstein

& Nowicki, 1997). Less mutable characteristics, such as being a first-generation college

student or being part of a low socio-economic stratum, have also been associated with

student success. It is therefore reasonable to conclude that the present study contributes

important support for the proposition that **late registration is not of itself, or even in**

combination with several other factors, a good predictor of student success. It would

also seem that further research on this topic is unlikely to yield compelling results that

point down the right road to policy change; therefore, it may be better for future

researchers to explore areas of student behavior and performance that are more

meaningful and more immediately actionable.

Implications for Policy, Practice, and Research

The quality of the data set and data analysis suggested that results from this study

can be put to good use in policy and practice. The data analysis yielded a statistically

significant result for a negative association between late registration and student success,

but the effect size was miniscule as was the ability of the three logistic regression models

to improve upon a constant only model that did not include any of the coefficients.

Perhaps, then, one should conclude, as Angelo (1990) did in the first published study of

late registration, that institutions "no longer need concern themselves that [late

registration] is endangering the academic success of...students" (p. 327).

On the other hand, Roueche and Roueche declared that "the first days of any course are the most important learning experiences that a student will have" (p.7). While probably hyperbolic, the claim nevertheless pointed to the importance of expert opinion. Nowhere in the literature does a researcher, practitioner, or policymaker argue that colleges should encourage more instances of late registration as a strategy to positively affect student outcomes. Indeed, it is reasonable to assume that the implied supposition that has motivated research on the topic is that late registration has a deleterious effect on student success. One consistent thread in the research literature across decades is what Horvath described as "a general 'feeling' among faculty and staff that [late registrants do] not perform as well academically" (qtd. in Angelo, 1990, p. 318; Mendiola-Perez, 2004; Weiss, 1999). Thus there is some evidence that experts in the field of practice believe late registration undermines student success, in part due to Roueche and Roueche's observation that the start of the semester is an important time for the acclimation of and acculturation to college by students.

Additionally, late registration is disruptive to the smooth operation of institutions, drawing down personnel and other resources that might be better directed at practices which increase student success. Although some colleges may have mistaken some negative findings about late registration as definitive proof that the practice is inimical to student success (Dunn & Mays, 2004; O'Banion, 2012), it would nevertheless tax credulity to argue that Valencia College's Start Right initiative, of which the elimination of late registration is one part (Aspen, 2013), does not have a rational basis. Instead, the

main problem in the discussion about late registration is that it diverts attention away

from more important drivers of student success.

As shown in this study, the factors that positively or negatively influence student

success are many, and their interaction to yield a particular outcome is highly complex.

Singling out late registration can be thought of as low-hanging fruit because it is clearly

definable, it makes intuitive sense, it addresses an apparent irritant in the work of faculty

and staff, and it would seem that remedial action would be easy to implement. Indeed, as

Johnston noted it is an implicit or declared premise of most research on late registration

that

> Enrollment patterns are based on more general patterns of behavior that can be
>
> changed. Certainly gender and ethnicity cannot be easily changed. Age is a factor
>
> that will change but not likely to be of immediate benefit at an individual level.
>
> Socio-economic status for which financial aid may be a proxy can be influenced
>
> by financial aid, but it may be that earlier effects may be less malleable. In short,
>
> changing when a student enrolls may be one of the few variables over which
>
> institutions may have any control whatsoever if they wish to influence student
>
> success. (p. 34)

Johnston's observation points to two significant weaknesses in the current and most

previous studies. First, because categories of sex and race/ethnicity are fixed at birth and

rarely modified thereafter a finding that males are more likely to register late and less

likely to succeed risks substituting a proxy for the cause. It is unlikely—and repugnant to

argue—that a genetic determinism of maleness leads to these behaviors; instead, males tend to be more greatly affected by some unknown number and kind of hidden factors that are the actual drivers of the outcomes. In that sense, then, the observation about performance by sex category is not actionable and potentially ossifies stereotypes. Even more to the present point, in contrast to the implied optimism of Johnston's claim that late registration behavior can be controlled, doing so of itself is not likely to change the student success equation. First, the registration behavior is not the actual driver of student success; therefore, altering that input variable is unlikely to affect the output variable. Second, there is no evidence that actualizing the good behavior of on-time registration through compulsion leads to change in the underlying traits and behaviors that influence academic performance.

The practice of late registration is so firmly rooted in the culture and structure of some colleges that extirpating it would be a complex undertaking that could negatively affect student access and institutional revenues with no practical effect on the core responsibility of higher education—student success. Although Sinclair Community College reported no drop in enrollments when late registration was eliminated (Dunn & Mays, 2004), that was during a period of general enrollment growth and so it is probable that any negative effects on enrollment were obscured, a supposition supported by the decline in enrollment when Milwaukee Area Technical College prohibited late registration (Wang & Pilarzyk, 2007) and by Tincher-Ladner's finding that late registrants added 2.5% full-time equivalent students to Mississippi Gulf Coast Community College's

enrollments in the 2002-2004 time period. The central point is not that colleges should

avoid eliminating late registration; instead, the elimination of late registration by itself is

unlikely to produce desired results. To substantially improve student success colleges

should, as Valencia College has done, focus first on a theory of change and then

implement a comprehensive change program (Puyanna & Shugart, 2001), of which the

elimination of late registration may be one component.

Furthermore, a blanket ban on late registration for most colleges is not realistic.

Beyond the unrealized revenues from potential students who would be shut out of classes

for the semester, a portion of late registrations represent students for whom a class change

is necessary, perhaps because they were advised improperly by a member of the staff or

because once in class it was determined that their skill level was too advanced or not

advanced enough for the class. In such circumstances, Keck (2007) argued that it would

be unjust and would undermine the goal of college completion to prevent individuals

from registering late for a different class.

Lost in the data is the lived experience of students. Each late registration enrollment

represents a choice by an individual that is prompted by the unique motivations and

aspirations in each life. Johnston (2006) observed that the policy of late registration may

represent "specialized needs that are being met" (p. 33). Researchers have identified over

a dozen reasons students cited for late registration (Belcher & Patterson, 1990; Bryant,

Danley, Fleming, & Somers, 1996; Chilton, 1964; Keck, 2007, Morris, 1986; Parks,

1974). Importantly, the majority of these are beyond the student's control. First there are

institutional practices, such as broken processes or a natural error rate when serving

students during the busy application and registration phase of the semester; second are

life circumstances such as health emergencies and changes in employment. Above all is

this critical consideration: students have defended their choices to register late because

they take into account "their individual backgrounds, strengths, academic abilities, and

determination to complete a course" (p. 126) when making decisions about late

registration. They view late registration as both a "viable and *critical* option," and they

are overwhelmingly satisfied with their late registration decisions (Keck, 2007, p. 132,

emphasis added). As Zottos (2005) concluded, allowing late registration "within a

reasonable timeframe" (p. 101) effectively serves students.

The results of this study coupled with previous research suggested that further

research on late registration is unlikely to yield substantially different or more meaningful

results. The attempt to reduce the complex interactions that lead to student outcomes,

especially non-success as opposed to success, by focusing on late registration is probably

misplaced. One conclusion from the present study, then, is that researchers should explore

areas that have the potential to yield more unique and actionable results. For example,

theoretical constructs proposed by Tinto (1993) Astin (1993: 1999), and Bean and

Metzner (1985) and studies outside the field of late registration which show a connection

between psychological/personality characteristics and academic performance,

procrastination behaviors in particular (Grimes & David, 1999; Senécal, Koestner, &

Vallerand, 1995) suggest that this is where researchers should focus their attention.

However, for those interested specifically in the topic of late registration there are still niche areas that can be explored. A replication of this study's focus on on-campus and online courses and on students' previous experience in a college success skills course would be one possibility. There has also been little research that investigated possible differences in student performance by program of study or by the subject matter of the course. As well, since a particular weakness in most research on late registration, repeated in this study, is defining late registration as enrollment after the start date of the semester, a better target would be enrollments after the first time a class meets. Similarly, it might be useful to separate students who register late for all classes from students who register late for a single class as they may have different characteristics and multiple late or on-time enrollments may be pulling the outcome in one direction or another. Finally, individual researchers and college leaders can follow the advice proffered by Angelo (1990) and enacted by Sinclair Community College, Valencia Community College, and Tarrant Community College (Dunn & Mays, 2004; Black & Wells, 2011) to conduct research at the local level, given empirical findings that late registration behaviors and associations with student outcomes vary among colleges, academic disciplines, and student groups. However, a practical difficulty with these approaches is that the available data sets would likely be too small to bear sophisticated, multi-variable study designs.

In terms of policy and practice, as already noted, rather than addressing late registration in isolation, colleges should recognize the link between registration policies and other institutional structures and procedures as part of a comprehensive review and

strategy for improving student success (Jenkins, 2011). Because late registrants may be at risk not necessarily because of registering late but because of other factors, colleges should target support services to meet the particular needs of these students. One strategy here would be what is called intrusive advising—a program whereby an academic advisor is proactive in contacting students on a regular basis and provides advising services beyond information sharing (Smith, 2007). A second support strategy could focus on tutoring services, such as supplemental instruction where tutors are embedded in the classroom (Zaritsky & Toce, 2006). A third option, about which there seems to be no documentation in the literature on late registration, would be to funnel late registrants into particular sections of a course and thereby create a student cohort or a learning community, which when implemented with attendant strategies has shown some promise for improving student success (Jenkins, 2011).

A way to elide the problem of late registration would be for larger colleges with student populations that allow for economies of scale to move to flexible scheduling. For-profit colleges such as the University of Phoenix and Colorado College offer rolling schedules where classes start every few weeks, thereby eliminating late registration not so much by prohibition as by ensuring a class is almost always imminently available for students whenever they register (Bugay, 2000; Jacobs, 2012). This strategy is obviously more practical at larger colleges, but even smaller colleges may find that they are able to offer a section or two of the most heavily enrolled classes, such as psychology or college composition, that begin a week or so after the traditional start of the regular semester.

Concluding Remarks

Researchers are motivated to find answers to questions. Scholar-practitioners are specifically motivated to investigate questions to which the answers prove actionable. A central question facing individual researchers and a discipline of scholars is when to stop researching and turn to action.

The present study grew out of the current push by community college leaders like Terry O'Banion, former president of the League for Innovation in the Community College, to eliminate late registration based on claims that the research on the topic is definitive when in fact the research has been contradictory and inconclusive. The overall goal of the present study was to build upon the good work of previous researchers and to fill in some gaps, such as by using a very large data set, focusing specifically on the relationship between the time of registration into a class and the likelihood of success in that class, and by including variables never examined in relationship to late registration, namely course delivery mode and a student's previous experience in a college success skills course. As ever, gaps remain and weaknesses were apparent in the study. Yet one thread can be traced through nearly 50 years of the literature on late registration: researchers have not been able to persuasively demonstrate that late registration itself is a practice that negatively affects student success. Instead, the face validity of identifying late registration as a substantial contributor to the problem of poor student success has been essentially a distraction from areas of research that hold much more promise for providing information that can lead to substantial improvements in student achievement.

In this regard, the present study was not without purpose or merit; however, its

unconscious teleology, only apparent when the results were analyzed, was the end of its

particular species of research.

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APPENDICES

Appendix A

SUMMARY OF PUBLICLY AVAILABLE LATE REGISTRATION STUDIES

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Angelo 1990, J	LR & grades and persistence	LR into each class "after the close of the first week of instruction" (p. 321)	1CC, 390 OTR & 387 LR class enrollments randomly selected; initial registration only (class switches excluded)	SP1988	Class enrollment	• 10.06% of all class enrollments • 1C-Completion more likely • No Sig. effect on class grade

Note. Studies which examined registration timing as a continuous variable without discriminating between on-time and late registration were excluded from this summary table (e.g., Ford, Stahl, Walker, & Ford, 2008; Free-Weiss, 2005; Johnston, 2006; Wetstein, Nguyen, & Hays, 2008). See Appendix B for key to table abbreviations. Some reported percentages will not add up to 100 due to rounding or because survey respondents could choose multiple answers.

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Belcher & Patterson, 1990, UIR	LR frequency, student characteristics and reasons; effect of LR fee	After the first day of a class meeting up to 10 days after semester started; seemed to define LR into all classes (also looked at students who registered the week before classes, but on this table LR refers to after first class meeting)	1CC (50,461 Fall 1990 HC); 6,278 LR, census population	Fall 1990	Student	• 12% of students registered after semester began • Higher average LR than OTR not pursuing degree (24% vs. 13%); lower average LR than OTR associate of arts students; similar average for associate of science & certificate • Higher average LR than OTR of former students who decided to reenter the college (16% vs. 9%) • Higher average LR than OTR of PT (79% vs. 63%), non-traditional age (49% vs. 36%), male (44% vs. 41%), and black (25% vs. 18%); lower average Hispanic (51% vs. 56%); similar average for all immigration statuses • 33% did not know classes had already started; 58% registered for classes that had already met; 9% registered after semester started but before the first meeting of their LR class • Reasons: decided late (26%), just moved to town (17%), procrastinated (16%), didn't know classes had started (11%), uncertain finances (11%), waiting for financial aid (10%) • If $25 fee was charged for LR 74% would register early, 14% would not register at all • If LR was banned 80% would register on-time, 20% would not register at all

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Bryant, Danley, Fleming, & Somers, 1996, J	Student reasons for LR	Unclear; seemed to be students who registered just before and after the semester began	1 Regional U; 203 late admitted students; census population (demographic data) and random sample (interviews)	SP1994	Student	• Most common reasons: health problems, personal issues, financial difficulties, paperwork obstacles • Positive reasons: career aspirations and family support/inspiration • LR more likely socially marginalized • LR students who AC-withdrew commonly cited job, personal, financial, and relocation reasons; also cited lack of time to study, conflict with sleep, uncertainty about attending college

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Chilton, 1964, D	LR student characteristics and performance	LR into all classes within first 12 days of semester	1CC; FT students; 325 OTR & 325 LR sample matched by personality, sex, and classification (freshman/sopho more); subset of 104 was used for personality test part of study	1955-62	Student	- LR more likely to be male, lower HS grades, transfers from other colleges - No Sig. LR and age, marital status, veteran status, college honor roll, scholarship recipient - No Sig. LR and OTR on tests of personal, social, and total adjustment - LR women had higher Total Adjustment and Personal Adjustment scores on personality test than OTR[1] - Neg. Sig. effect on AC-Withdraw rate - No Sig. effect on C-Withdraw - Neg. Sig. effect on credit hours dropped - No Sig. effect on absence rate - Neg. Sig. academic probation and discipline problems - Pos. Sig. to join college social clubs if eligible - Neg. Sig, SGPA - Neg. Sig. SGPA for LR freshman, but not sophomores and for males but not females - Higher GPA for LR in days 1-6 vs. LR in days 7-12 - Documentation issues, illness, finances, and employment most common reasons for LR

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[1] Chilton noted that the sample sizes were small so caution must be exercised in drawing conclusions about differences in adjustment based on the tests.

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Cornille, 2009, D	LR and persistence	LR into all classes 14 days *before* classes until 21 days after classes start	1 CC (44,000 HC); 7,317 FTIC, first year FT and PT students in credit courses; census population	FA2005, FA2006, FA2007	Student	• 15.5% of all program-placed enrollees LR into all classes • LR more likely traditional age ($\leq$25); Asian, Black, Hispanic; vocational/occupational programs; part-time status • Less likely White or Indian/Alaskan Native; transfer program • No Sig. for sex • Slight Neg. Sig. effect on AC-Completion, but less important than age (traditional age lower AC-Completion); LR more likely to complete 100% of classes • Neg. Sig. S-Withdraw, but not practically meaningful; LR completed semester at high rate • Neg. Sig. effect on persistence
Diekhoff, 1992, J	LR and class absences, first exam score, final class grade, and attrition	Not listed on each class roll on first day and missed at least two classes because of LR	1U (5,500 HC); 1,513 students in 50 introductory psychology classes: 123 LR and 123 randomly selected from OTR	14 yrs.	Class enrollment	• 8.10% rate of LR into classes in the study (5% overall LR rate at the university) • No Sig. on exam grade • No. Sig. on class grade • No Sig. effect on LR-Withdraw in classes without an attendance policy • Neg. Sig. effect on LR-Withdraw in classes with restrictive attendance policy • Fewer absences (Neg. Sig.) in classes with restrictive attendance policy • More absences in classes without attendance policy

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Goodman, 2010, D	LR and persistence	LR into all classes on or after first day of semester for all classes	16 CCs in state system (11,000 HC); 2,159 FTIC, first-year, FT, transfer degree students; census population	FA2008	Student	• 4% LR for all classes • Neg. Sig. effect on persistence
Hale, 2007[2], D	ER, OTR, & LR and performance	Not specifically defined for this study but refers to common practice of first 2 weeks of semester	3 rural CC (3,000-4,000 HC); 171,400 enrollment cases, census population	FA-SP 2001-02 & 2002-03	Each class enrollment	• LR ~9.4% of all class enrollments • LR more likely male; more likely Asian; non-Pell grant; mixed results for African American, Hispanic, American Indian, and age; LR less likely for vocational programs • Unclear effect on class grade • Regression models for registration timing and for grades explained only .052-.085 amount of variation • No Sig. for 1C-Completion ("D" or above) for LR compared to OTR; Neg. Sig for 1C-Completion compared to ER

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[2] The summarization of Hale's findings presented challenges because of possible issues with clarity and data inconsistencies in the dissertation. The reader is therefore encouraged to refer to the original text itself.

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Hiller, 2005, UIR	OTR vs. LR student characteristics	LR into all classes on or after semester start date	1 large CC (6,663 HC); 8,618 cases, census population	FA2003, FA2004	Student	• LR = 4.2% of students and 3% of contact hours • No Sig. on LR likelihood for remedial students; PT students more likely LR; non-transfer and undecided students more likely LR (model explained only 4% of variance) • Neg. Sig. effect on SGPA, but remedial status and sex had larger effect • Not always a Sig. predictor of persistence; other factors often mattered more
Keck, 2007, D	LR and performance; LR student views	LR for each class "the day after a class begins" (p. 10) for each class	1 CC; 712 LR & 712 randomly selected OTR registered for at least 1 class	FA/SP 2005-06	Each class enrollment	• Pos. Sig. FT, traditional age, male, black, Hispanic; Neg. Sig. white, Asian/Pacific Islander • Reasons: financial aid and other financial issues; documentation issues; transfer needs; problems with academic advising; consideration of family, employment, and other life decisions; class cancellations; schedule adjustments due to changed life circumstances; procrastination • Higher LR than OTR rate in arts and humanities, math and science, social sciences • Neg. Sig. effect on class grade • Mixed, but mostly Neg. Sig. effect on 1C-Completion ("C' or above); LR into 5 or 6 courses associated with higher 1C-Completion • Neg. Sig. effect on LR-Withdraw • Most LR were successful in class • Students satisfied with LR decision • Course subject affected class completion • LR said less likely to register late for unfamiliar course subject or online class

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Mannan & Preusz, 1976, J	LR and performance	LR into all classes "six days after school started" (p. 376)	1 urban U; randomly selected study and control groups of 257 ea.	SP1975	Student	• Neg. Sig. effect on SGPA • LR are more likely PT
McWaine, 2012, D	LR and African American male performance	"Registering for a class on or after the first day of the semester" (p. 14) [3]	1 suburban CC (30,000 HC); 5,389 African American males (422 LR); census population	SP2007-FA2009	Student	• LR 7.8% of students • Weak correlation (Neg. Sig. effect) with class success; • Weak correlation (Neg. Sig. effect) with SGPA; • No Sig. effect on persistence
Mendiola-Perez, 2004, D	ER, OTR, & LR and performance	On or after first day of semester for all classes	1 CC (6,600 HC); 975 FTIC, no dual enrollment; census population; longitudinal study	FA2001-SP2003	Student	• 1.6-3.3% LR for all classes • LR more likely female, black, Hispanic, non-traditional age ($M = 23.5$) • Most LR do not continually LR each semester • No Sig. effect on SGPA in 2 of 3 semesters studied • No Sig. effect on AC-Completion ("C" or above) in 2 of 3 semesters • No Sig. effect on AC-Withdraw in first semester • No Sig. effect on AC-Withdraw compared to OTR in 2 of 3 subsequent semesters • Adjusted for CGPA and semester hours enrolled
Moore &	LR student	LR into ≥ 20%	109 campuses of	1999-	Student	• LR rate for students: 24% of their classes

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[3] Although McWaine indicated that late registration was defined as registering late for "a class," the reported analysis

suggested, but did not definitively state, that McWaine tracked students who registered late for all classes.

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Shulock, 2007, R	characteristics and performance	of classes after the first day of the semester	the California Community College (CCC) system; census population of 260,214 degree-seeking students	2000 cohort tracked through 2004-2005;		• Small/no difference in LR rate by age, sex • Blacks LR more often (31% of classes) • For high LR ($\geq$ 20%) no difference from OTR in persistence rate into following semester or following year • High LR AC-Complete less often (59% vs. 63%, "C" or above), worse AC-Complete rate for LR younger students; small/no difference by sex, race • LR Neg. Sig on 6-year graduation/ transfer rate, but effect was small (.15% decrease in completion for each 1% increase in LR rate) and effect was less than for attendance (FT vs. PT), "continuous enrollment, and excessive course dropping" (p. 17) • For students under 20 years old: High LR transfer/graduate less often than low LR (30% vs. 23%). Difference in High LR vs. Low LR graduation/ transfer rate was small for students over age of 19; effect was similar for males and females • Difference in High LR vs. Low LR AC-Completion and graduation/ transfer rate was smallest for blacks • Statistical models adjusted for sex, socio-economic status, and full-time enrollment status
Neighbors, 1996, D	ER, OTR, & LR and performance	LR into all classes during first three days of semester	1public U (8,000 HC), 1 private U (6,500 HC) & 1 CC (4,000 HC); stratified random sample of 441 early, regular, and LR from the three schools	SP1996	Student	• LR more likely for males • Neg. Sig. effect on SGPA • No Sig. effect on AC-Withdraw rates

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Parks, 1974, D	LR student characteristics and performance	LR into all classes on the first through twelfth day of classes	1U; 158 FT LR census population & 393 randomly selected OTR	FA1973	Student	• LR have lower HS rank, more discipline infractions, attended more colleges; No Sig. veteran status, marital status, age (except for juniors) • No Sig. for class absences • Neg. Sig. on SGPA: LR freshman lower SGPA than others; seniors higher GPA than others • No Sig. effect on SGPA by degree of lateness • Female OTR and LR higher SGPA than males • Neg. Sig. effect on academic probation • Neg. Sig. effect on S-Withdraw • Neg. Sig. effect on AC-Withdraw rates • Neg. Sig. on AC-Complete ("D" or above) • Finances, application documentation problems, and decision to enter late most common reasons for LR

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Perkins, 2002, D	LR student characteristics and performance	LR into all classes during first week of semester	1 CC (5,000 HC); 959 program-placed students enrolled in > 5 course credits; initial registration only (class switches excluded) census population	FA2000, FA2001	Student	5.8-15.7% LR for initial enrollment into one or more classes for the semester - LR more likely male and PT; No Sig. ethnicity, age, remedial status - No Sig. SGPA - No Sig. AC-Completion ("C" or above) - No Sig. persistence - Administrators and staff - Surprised that age and remedial status were No Sig. - Believe LR instructor shop - Some LR are reverse transfer who did not like their original school of choice - Problems getting an advising appointment lead to LR - Some LR did not have the CC as one of their initial college options - LR end up with less desirable classes - Erroneously believe that LR do not perform well academically - LR success may be due to caring faculty
Peterson, 1986, UIR	LR class completion and semester withdrawal rates (did not compare to OTR)	Implied definition: LR into all classes after the first day of semester	1CC; 99 LR, census population	Spring 1986	Student	- Low S-Withdrawal rate - S-withdrawals were all in liberal arts; 0 LR in vocational programs withdrew from school - LR registered for 3-9 credits more likely to complete; LR >11 credits "almost invariably" were unsuccessful in at least one class (p. 4) - LR completed 152 of 214 classes attempted (71%)

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Safer, 2009, J	LR and performance	LR into each class "on or after the first official day of class" (p. 1382)	U (37,000 HC, 2009); 812 LR & 6,388 OTR in math classes	FA2007, SP2008, FA2008, SP2009	Each class enrollment	• LR more likely male, upperclassmen, small classes • Neg. Sig. relative class grade; effect greater for males, upperclassmen, & students in large classes • Neg. Sig. effect on LR-Withdraw in large classes only • Sex No Sig. for LR rate • Academic level No Sig. for LR rate
Schmidt, 2004, D	LR and completion rates	LR into all classes "after classes have begun" (p. xv)	1 CC (3,800 HC): FTIC FT financial aid students	FA2003	Student	• 16.8% LR into all classes • Neg. Sig effect on AC-Completion ("D" or higher)
Sinclair CC, ca. 2005, UIR	ER, OTR, & LR and success rates	LR into each class (implied definition) after start of semester	1 CC (2010-2011 enrollment 40,000 HC)	FA2001	Each class enrollment (implied definition)	• Non-success rate[4]: LR 35%, OTR 31%, ER, 26%

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[4] "Non-success rate" was not defined as to whether it applied to each course or to all courses, and at what grade level non-success was set.

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Sova, 1986, UIR	LR vs. OTR and performance	LR into college writing (ENG 110) or basic skills (ENG 090) classes on or after first day of semester; did not include students who switched class sections	1CC (4,800 FTEs); census population (N = 1673) of students in non-credit ENG 090 (Basic Language Skills) and college credit ENG 110 (Written Expression I) courses	Fall 1985	Each class enrollment	• LR less likely 1C-Completion ("D" or higher) • LR "F" grade rate higher than OTR in ENG 110 but comparable in ENG 090 • LR-Withdraw rates comparable for LR and OTR in ENG 110, but higher for LR in ENG 090 • LR higher "F" rates than "W" rates; OTR higher "W" rates than "F" rates
Stein, 1984, UIR	LR new students vs. all students and grades & persistence	LR into all classes 3 days before classes to eight days after semester start	1CC; 175 LR *new students* compared to all other students, census population	Winter 1984	Student	• 54.9% of LR registered for 1-7 credits, 10.3% for 8-11 credits, 16.6% for > 12 credits, 18.3% did not pay fees/follow through with registration • 35% of actual LR earned SGPA < 2.0 • Higher proportion of LR than OTR 0.0 SGPA (31% vs. 21%) • Higher proportion of LR than OTR earned 4.0 SGPA (28% vs. 18%) • LR much lower persistence rate than OTR (~29% vs. 37-65%)[5]

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[5] This conclusion is based on a comparison of 1984 LR data to 1973, 1976, and 1979 OTR data.

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Street[6], 2000, D	ER. OTR, & LR and performance	LR into all classes during first 8 days of class	1 CC (4,600 HC); 251 randomly selected ER, OTR, & LR new and returning students	FA1998	Student	• Males; blacks, and Hispanics overrepresented in LR group • No Sig. effect on new student SGPA (adjusted for age & # of hours taken) • Neg. Sig. effect on returning student SGPA; (adjusted for age & # of hours taken) • No Sig. effect on new student AC-Completion (adjusted for age & # of hours taken) • Neg. Sig. effect on returning student AC-Completion (adjusted for age & # of hours taken) • Neg. Sig. effect on new and returning student AC-Withdraw (adjusted for age & # of hours taken) • Neg. Sig. effect on new and returning student persistence

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[6] This study was also the foundation for a journal article (Smith, Street, & Olivarez, 2002)

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Summers, 2000, D	Registration timing, student characteristics and performance	LR into all classes after first day of semester	1 rural CC (2,800 HC); 1,365 FTIC, FT program placed students; census population	FA1994, FA1995, FA1996	Student	- Females, whites, transfer, and non-financial aid students register on average earlier (> # of days before the semester starts) - LR lowered SGPA - LR lowered AC-Completion ("D" or above) - More added classes increased SGPA & AC-Completion - More dropped classes lowered SGPA & AC-Completion - No Sig, effect of total number of schedule changes on SGPA and AC-Completion - No Sig. effect of total number of class section changes on SGPA and AC-Completion
Tincher-Ladner, 2006, UIR	LR student characteristics and performance	LR into all classes during first five business days of semester (Tincher-Ladner, 2006; MGCCC 2013); only students whose *initial* registration occurred during LR period	1 CC, census pop (N=31,702); excluded students who added or switched classes during LR period	FA2002, FA2003, FA2004	Student	4.6% of students recorded initial registration during LR period - Neg. Sig. GPA (unclear if this is SGPA or CGPA) - LR higher AC-Withdraw rate in first six weeks - LR more likely to leave college with unpaid fees - Non-LR more likely to persist into subsequent semester 39% registered on first day of LR, 30% on second day, 17% on third day, 14% on fourth day, none on last day

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Wang & Pilarzyk, 2007, J	Effect of setting an application deadline on enrollment and student success	Late applicants: one week before term begins up to 13th day of the term (conflated late application and LR)	1CC (53,000 HC; 13,000 FTEs); 12,878 program applicants only, census population	Fall 2004 & Fall 2005	Student	• Sig. more likely older, non-recent HS graduates, PT, financial aid applicants; No Sig. sex, ethnicity • 66-70% of late applicants followed through with registration • Neg. Sig. SGPA • Neg. Sig. AC-Completion • Neg. Sig. good academic standing • Neg. Sig. Persist rate • Early registration associated with earlier financial aid applications, awards and registration • LR Neg. Sig. on FTE generation (i.e. total credits registered) • Banning LR reduced FTEs

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Weiss, 1999, J	Advisor perceptions of LR students[7]	Late admissions 1 week before term begins (seemed to conflate late admission and LR)	17 advisors at 3 schools (may include CCs and U)[8]	Not given	Student advisors	• Advisors reported LR are "characteristically different" (p. 31) from other students • LR less family understanding, knowledge, and support; lower confidence; more negative attitudes; weaker communication and organizational skills; lower motivation; less well informed about college processes • View selves as customers who should be served on demand • Advisors split on whether LR have weaker academic skills • Some do not know they are late • Traditional age LR have weaker goals and commitment and exhibit less forethought than nontraditional age LR • Most advisors believed LR was necessary for access and to support student momentum

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[7] Weiss refers to these as students admitted late to the college, but also makes clear that they are admitted and registered late.

[8] In text, Freer-Weiss identifies the institutions as community colleges, but in a table, two are described as "2-year branch campuses" (p. 30) and one is described as a master's granting university.

Author/Yr/ Source	Focus	LR Definition	Sample Pop	Time	Unit of Analysis	Major Findings (for LR only)
Zottos, 2005, D	LR student characteristics and performance	LR into each course after "the first day of classes for each course" (p. 66)	1 large urban CC (9 campuses); 4,676 randomly sampled FT and PT program placed students in credit courses	SP2001	Student	• 54% registered late for at least one class; 27% of all class enrollments are LR • LR Sig. more likely male, lower HS GPA, lower CGPA; less likely for whites; No Sig. for program placed, ESL, first generation, sense of belonging • Most students register late for at least one class during college career • LR not associated with worse outcomes • No Sig. effect on SGPA • No Sig effect on 1C-Completion ("D" or above) • Minimal Neg. predictive effect on CGPA, but less effect than traditional age, lower HS GPA, and being Hispanic • Neg. predictive effect on AC-Completion, but less effect than traditional age, lower HS GPA, African American race • Neg. predictors of LR were ESL, African American, male, or lower HS GPA

Appendix B

ABBREVIATION KEY FOR APPENDIX A

Source

D: Doctoral dissertation/Thesis

J: Journal

R: Published report

UIR: Unpublished institutional research

Institution

HS: High school

CC: Community College

U: University

Semester

FA: Fall semester

SP: Spring semester

Student

FTIC: First time in college

FT: Full-time

PT: Part-time

FTE: Full-time equivalent students

HC: Headcount

Registration

ER: Early registration/registrant

LR: Late registration/registrant

OTR: On-time or regular registration/registrant

Grades

SGPA: Semester GPA

CGPA: Cumulative GPA

1C-Completion: Pass rate for each class

AC-Completion: Rate of passing all courses

Retention/Persistence

Persistence: Registration into next semester

AC-Withdraw: Withdrawal rate for all classes

C-Withdraw: Withdrawal from college

LR-Withdraw: Withdrawal from LR class(s)

S-Withdraw: Withdrawal from all classes in a semester (in some cases this may be the same as C-Withdraw)

Statistics

More Likely: Measured by raw number or percentage; not tested for statistical significance

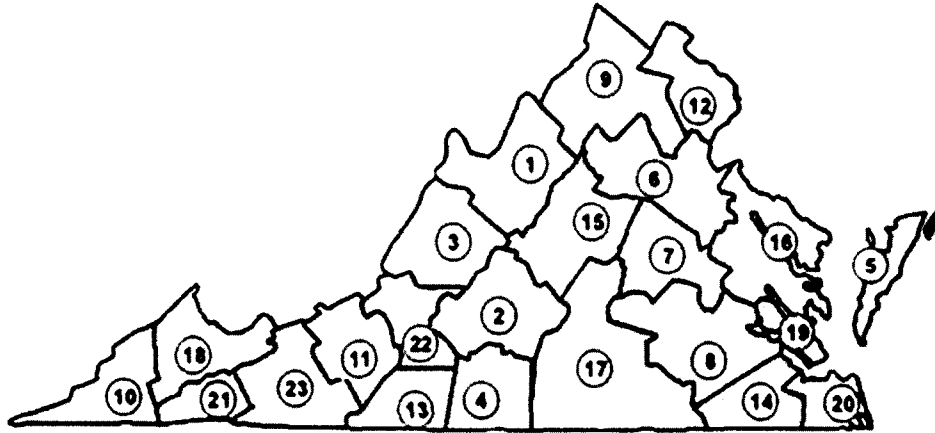**Neg. Sig.:** Negative statistically significant difference

Pos. Sig.: Positive statistically significant difference

No Sig.: No statistically significant difference

Appendix C

MAP OF VIRGINIA'S COMMUNITY COLLEGES WITH KEY

Key:

1. Blue Ridge Community College
2. Central Virginia Community College
3. Dabney S. Lancaster Community College
4. Danville Community College
5. Eatsern Shore Community College
6. Germanna Community College
7. J. Sargeant Reynolds Community College
8. John Tyler Community College
9. Lord Fairfax Community College
10. Mountain Empire Community College
11. New River Community College
12. Northern Virginia Community College
13. Patrick Henry Community College
14. Paul D. Camp Community College
15. Piedmonth Virginia Community College
16. Rappanghannock Community College
17. Southside Virginia Community College
18. Southwest Virginia Community College
19. Thomas Nelson Community College
20. Tidewater Community College
21. Virginia Highlands Community College
22. Virginia Western Community College
23. Wytheville Community College

Appendix D

STUDENT LEARNING OUTCOMES FOR SDV 100, 101, AND *108*[9]

AREA	TOPIC	LEARNING OUTCOME(S)
1. Career Exploration and Development* *Provides students with an overview of career options*	1.1 Career Exploration**	Students will articulate three potential careers based on their interests, values, and abilities. *Note: Students will utilize the Virginia Education Wizard to accomplish this task.*
	1.2 Career Planning	Students will select or confirm their preferred program of study based on their career exploration.
		Students will articulate the step(s) they need to take in order to achieve their career goal(s).
2. College Resources *Provides students with an overview of general college resources*	2.1 Student Web Portal	Students will activate their student username and password.
	2.2 Student Information System	Students will demonstrate competence in using the student information system by: a) accessing the student information system;

[9] Source: Virginia's Community Colleges. (2013b). Courses and programs. Retrieved from http://courses.vccs.edu/

AREA	TOPIC	LEARNING OUTCOME(S)
		b) accessing the student center c) setting user preferences; d) searching for classes e) accessing financial statement f) printing class schedules
	2.3 Instructional Technology / Services	Students will activate their college email accounts.
		Students will access Blackboard
	2.4 College Catalog	Students will identify where they can access the College Catalog in print and / or electronic format.
	2.5 Student Handbook	Students will identify where they can access the Student Handbook in print and / or electronic format.
	2.6 Library Resources	Students will identify three resources / services available in the college library.
	2.7 Student Services	Students will identify and describe three offices / services that are available to them (e.g. tutoring, disability services, financial aid, etc.).
3. College Policies *Provides students with an overview of important college policies*	3.1 Academic Integrity / Student Conduct / Classroom Etiquette	Students will identify three of their responsibilities as members of the college community.
	3.2 Student Rights & Responsibilities	Students will identify at least two policies that affirm their rights as

AREA	TOPIC	LEARNING OUTCOME(S)
		members of the college community (e.g. Student Grievance / Appeals; Statement of Rights and Responsibilities, etc.).
	3.3 Academic Standing	Students will articulate the College's criteria for good academic standing.
4. Academic Planning* *Provides students with information related to academic programs and how students can achieve their academic goals*	4.1 Curricular Offerings**	Students will be able to distinguish between university parallel/transfer and applied programs.
		Students will select the appropriate curriculum and electives within that curriculum based on their career goal(s).
	4.2 Course Offerings	Students will identify all courses required for completion of program and understand both course and program prerequisites.
	4.3 Academic Plan	Students will develop academic plan.
5. Academic Skills* *Provides students with an overview of information related to optimal academic performance*	5.1 Learning Styles**	Students will review multiple learning styles and identify their preferred learning style.
	5.2 Classroom Skills	Students will review two note-taking strategies and identify their preferred method of note-taking.
		Students will identify three strategies for test taking.
	5.3 Academic Preparation	Students will identify their optimal

AREA	TOPIC	LEARNING OUTCOME(S)
		time, place, and setting for studying.
		Students will identify three memory strategies.
		Students will identify three strategies for managing reading.

	5.4 Critical Thinking Skills	Students will articulate three aspects of critical thinking such as:
		  a. Identifying faulty logic
		  b. Problem-solving
		  c. Asking questions / Probing
		  d. Etc.

6. Life Management* *Provides information on how to manage various aspects of their lives.*	6.1 Time Management	Students will review two strategies and tools for managing time and will articulate their preferred method.
	6.2 Financial Literacy**	Students will articulate the benefits and risks of the three aspects (e.g. credit, savings, and budgeting) of money management.
		Students will develop a personal budget.
	6.3 Goal Setting	Students will articulate the steps in developing and implementing personal goals.
7. Social / Interpersonal* *Provides information on how to effectively interact with others*	7.1 Diversity	Students will articulate three ways individuals are diverse and how diversity impacts society.
	7.2 Communication Skills**	Students will identify three elements of

AREA	TOPIC	LEARNING OUTCOME(S)
		effective communication (e.g. active listening, verbal and non-verbal messages, etc.).
8. Wellness* *Provides information on how to maintain a healthy lifestyle.*	8.1 Stress Management**	Students will identify three techniques/strategies for managing anxiety / stress.
	8.2 Decision Making	Students will identify three challenges to making healthy life decisions and develop three to five strategies on how to manage each challenge.
	8.3 Mental Health	Students will identify symptoms of distress and mental illness and articulate two to three resources that can access for assistance.
	8.4 Physical Health	Students will identify three strategies to achieve and / or maintain a healthy (physical) lifestyle.

Appendix E

ESTIMATES OF THE FREQUENCY OF LATE REGISTRATION[10]

Source	LR Estimate	Notes	School
Center for Community College Student Engagement (2012)	11% LR into at least one class	• 2011 Promising Practices survey data from 435 community colleges	CC
McWaine (2012)	7.8% LR into all classes; African American males only		CC
Goodman (2010)	4% LR into all classes		CC
Cornille (2009)	15.5% LR into all classes	• LR definition included some registrations before semester began; included only transfer and vocational enrolled students	CC
Hale (2007)	9.4% LR as percent of all class enrollments		CC

[10] *Note:* CC: Community college; U: University; LR: Late registration/registrant: N/A

Not applicable.

Source	LR Estimate	Notes	School
Keck (2007)	N/A	• Of all LR, 59.3% registered late for one class; 6.2% registered late for four or more classes	CC
Moore & Shulock (2007)	24%: average percent of courses students registered late for		CC
Tincher-Ladner (2006)	4.6% of all students recorded initial registration during LR period	• Excluded LR who added or switched classes	CC
Hiller (2005)	4.2% of students; 3% of contact hours		CC
Zottos (2005)	54% LR into at least one class; 27% of all class enrollments are LR	• "Many students occasionally register late" for a class (p. 66)	CC
Mendiola-Perez (2004)	1.6-3.3% LR into all classes	• Only 8.3% of students LR in more than one semester	CC
Schmidt (2004)	16.8% LR into all classes		CC
Perkins (2002)	5.8-15.7% LR into all classes		CC
Street (2000)	12% LR into all classes		CC
Neighbors	10% LR into all		1 CC &

Source	LR Estimate	Notes	School
(1996)	classes		2 U
Diekhoff (1992)	5% of all students; 8.10% rate in 50 introductory psychology classes	• Disproportionate rate in first-year courses	U
Angelo (1990)	10% of class registrations	• Only included initial registration, not class adds	CC
Belcher & Patterson (1990)	12% LR into all classes		CC
Parks (1974)	2.6% LR into all classes	• Freshman had highest rate at 3.8%; juniors had lowest at 1.8%	U
Chilton (1964)	N/A	• Of 325 LR, 20 registered late for all classes in two semesters, and one student registered late in three semesters	CC

Appendix F

DESCRIPTION OF DATA VARIABLES FOR THE STUDY

Data Point	Type	Description
Sex	Demographic information/ Independent Variable	The sex that a student recorded on their college application.
Age	Demographic information/ Independent Variable	The age in years from the date of a student's birth to the date of the start of the spring semester during which the class being studied was offered. VCCS categories are <17, 18-21, 22-24, 25-34, 35-44, 45-59, and >60.
Race/ethnicity	Demographic information/ Independent Variable	The race/ethnicity a student indicated on their college application grouped dichotomously: (1) white, Asian, and unknown, and (2) non-Asian minority.

Enrollment status	Demo Demographic information/ Independent Variable	Full-time or part-time enrollment defined by class load. A class load of 12 or more credits was full-time.
Registration timing	Independent variable	On-time registration (OTR): Registration before the start of the 15 or 16-week session of the semester. Late registration (LR): Registration on or after the first day of the semester.
College success skills course completion	Independent variable	A grade of "A," "B," "C," "P" (Pass), or "S" (Satisfactory) in SDV 100, 101, or 108 in the fall semester before the spring semester during which the student registered for a class included in this study will be counted as a completers and dummy coded as 2. Students who never enrolled in SDV 100, 101, or 108 were counted as non-completers. Cases where grades of "I" (Incomplete) or X (audit) were reported were eliminated from the data set.

Course delivery mode	Independent variable	On-campus: Classes which met for the full length of the 15- or 16-week semester where over half of instruction was delivered in a face-to-face setting. Online: Asynchronous or synchronous classes where no face-to-face classes meetings were required. (Hybrid classes, where 50%-99% of instruction was delivered online, were not included in this study). The State Council of Higher Education in Virginia definitions, which VCCS colleges adhere to when reporting data, were used to delimit this variable.
Student Success	Dependent Variable	Success or non-success as determined by final class grades. Grades of "A," "B," or "C," were counted as success. Grades of "D," "F," or "W" were counted as non-success. Enrollments where grades of "I" (Incomplete) or "X" (audit) were reported were excluded.

VITA

Recent Professional Experience
Dean of Communications, Humanities, and Social Sciences (2013–present), Thomas Nelson Community College, Hampton VA.

Associate Professor, Department of English (1993 – 2013). John Tyler Community College, Midlothian VA.

Formal Education
Ph.D. in Community College Leadership, Old Dominion University, 2013.

M.F.A. in Creative Writing Virginia Commonwealth University: Richmond VA, 1990.

M.A. in English Iowa State University: Ames IA, 1988.

B.A. in English; B.A. in Philosophy Villanova University: Villanova PA, 1986.

Recent Special Assignments
Re-Engineering Task Force, Virginia's Community Colleges, 2009–present.

Faculty Evaluation Workgroup, Virginia's Community Colleges, 2011–present.

Chancellor's Faculty Advisory Committee Chair, Virginia's Community Colleges, 2009-2013.

Developmental Education Task Force, Virginia's Community Colleges, 2008-2009.

Recent Publications and Presentations
"A Comparative Analysis of SafeAssign and Turnitin Plagiarism Software," co-author with Jared Hunt, scholarly article, *Inquiry*, forthcoming in 2014.

Late Registration, Bane or Benefit: What the Research Says, New Horizons Conference, 2013.

Faculty Evaluations, panel participant, New Horizons Conference, 2013.

Re-Engineering II: Measuring Success, Embracing New "Big Ideas," panel participant at various peer conferences of Virginia's Community College, 2012.

Recent Honors
Chancellor's Faculty Fellowship, Virginia's Community Colleges, 2012-13.

Outstanding Nine-Month Teaching Faculty, John Tyler Community College, 2011.

Dana B. Hamel Award for Leadership in Service to the Mission of Virginia's Community Colleges, 2011.