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Improving Student Success in Community Colleges: A Case Study of One Virginia Community College

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IMPROVING STUDENT SUCCESS IN COMMUNITY COLLEGES

A Case Study of One Virginia Community College

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by

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APPROVAL OF THE DISSERTATION

This dissertation, Improving Student Success in Community Colleges, has been approved by the Ed.D. Faculty of University of Lynchburg in partial fulfillment of the requirements for the Ed.D. degree.

Dr. Sally C. Selden, Chair

Dr. John C. Walker, Committee Member

Dr. John S. Capps, Committee Member

3-17-20
Date

DEDICATION

To my family

In memory of:

my parents, *Frank and Nancy,* who believed in my abilities and who challenged me to be an independent thinker, arriving at my own informed conclusions and expressing them with confidence.

In honor of:

countless extended family and friends who were interested in my progress and always believed in me.

my siblings, *Lesley, Chet, and Michael*, who, supporting me in all circumstances, give me strength, encouragement, and unconditional love.

my children, *Amanda and Ashton,* whose wit and wisdom challenge me to expand my thinking every day. Being your mother is the greatest gift.

my grandchildren, *Bradley, Britton, and Marlana*, whose bright and curious personalities bring light into the world and hold promise for the future.

my husband, *Billy*, who has walked this journey with me together, listening to me, encouraging me, and offering me unwavering support throughout my educational and professional development.

I love you all.

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ABSTRACT

Dr. Sally C. Selden, Chair

The Gates Foundation's Completion by Design Loss Momentum Framework (LMF) has been the catalyst for twenty-first century community college reform. This framework indicates the points in a student's college journey as: 1) Connection – from interest to application; 2) Entry – from enrolling to passing program gatekeeper courses; 3) Progress – from program entry to completion of program requirements; and 4) Completion – completion of credential of value for further market value or labor market advancement. The Completion by Design Loss Momentum Framework focuses on student success by using a Guided Pathways approach through which incoming students are given support to clarify goals for college and careers, choose a program of study, and develop an academic plan with predictable schedules (Completion by Design, 2018).

The success of students at one community college in Virginia as a result of the implementation of strategies from the Completion by Design Loss Momentum Framework was the focus of this study. Success was defined within each stage of the framework as indicated for cohorts of students entering the community college each fall for five years. An adaptation of the Completion by Design Loss Momentum Framework key performance indicators as applied within the Virginia Community College System (VCCS) performance-based funding model served as the measures upon which success was determined.

Once the research questions were defined in the context of the contemporary LMF theoretical framework, along with the identification of the longitudinal data that was used for the study, the single case study, embedded case design described by Yin (2009) was identified as the appropriate method. Case study research practices were employed to ensure the quality, validity, and reliability of this project.

There are multiple measures of success when considering college-level data, and it is difficult to determine which specific variables significantly impact student success. This study was designed to identify statistical significance for selected variables that aligned with one community college's LMF implementation and to identify funding priorities to support successful strategies during a time where resources are limited due to declining enrollment. This study identified the statistical significance of strategies that were positively associated with student success as defined in the LMF.

This study found statistically significant results for the eight strategies as positive predictors for enrollment, retention, and completion for: FAFSA completion, full-time enrollment, advising, college success skills course, college-level math and English success in four terms for developmental students, credit accumulation in first term, and college-level math and English success in three terms for college-ready students.

CHAPTER 1: INTRODUCTION OF THE STUDY

Community Colleges

Community colleges are an important part of the American higher education system. In 2017, 5.8 million students were enrolled in public two-year colleges (Community College Research Center, 2018). Community colleges are designed to provide access to higher education as open-enrollment institutions with a mission to provide educational opportunities to anyone who wants to pursue further education. Community colleges serve specific geographic regions and provide educational opportunities and job training to support economic growth and upward mobility for citizens. Two thirds of community college students attend part time while working or managing other responsibilities. These higher education institutions also strive to serve underrepresented populations who may otherwise not pursue higher education opportunities. Underrepresented populations include low-income, immigrant, first-generation, and ethnic minority students (Bailey, Jaggars, & Jenkins, 2015, p. 1).

Increasingly, student outcomes such as completion rates have become a common measure of student success. In recent years, student outcome reporting for community colleges has become more sophisticated and transparent. The U.S. Department of Education's College Navigator website provides college-specific information to the public about success rates of students (Bailey et al., 2015). This reporting strives to capture whether students graduate on time with an affordable, meaningful degree or credential as a measure of their success. Less than half of students who enter community college ever finish the requirements for their program of study within six years. The lack of student completion is a concern for community colleges because it indicates that many of the students they desire to serve are never achieving their educational or

career goals, which promote personal vitality. Students who earn a degree or certificate beyond high school earn higher wages (Community College Research Center, 2018).

Educating a workforce to promote economic growth is also a public concern. A study by Georgetown University's Center on Education and the Workforce found that two-thirds of jobs in the United States will require some form of education or job training beyond high school by the year 2020. STEM, health care professions, health care support, and community services will be the fastest growing occupations, and communication and critical thinking skills will be important as advanced manufacturing skills become more dominant (Carnavale, Anthony, Smith, Nicole, & Strohl, 2013).

These factors and many others have prompted a thorough review of how community colleges functioned during the first decade of the twenty-first century. Researchers began to identify and articulate barriers for community college students due to outdated and confusing practices. As a result, with funding from the Bill and Melinda Gates Foundation, the concept of redesigning community colleges in America emerged, and the Completion by Design Loss Momentum Framework (LMF) was created.

Completion by Design Loss Momentum Framework

Twenty-first century research has proven that navigating the current community college system is overwhelming and complicated (EAB, 2018). In the absence of a structured plan, students can make poor academic choices that result in wasted time and money, frequently dropping out before earning a degree or credential. To combat the problem, the Bill and Melinda Gates Foundation provided funding for the development of the Completion by Design (CBD) Loss Momentum Framework. Research-based strategies were identified, and a Completion by Design toolkit was developed by Sue Cleary, Elif Bor, Davis Jenkins, and Sung-Woo Cho. In

2011, nine community colleges in Florida, Ohio, and North Carolina set out to increase student success and completion by removing the barriers that stop students at each stage of their journey to credential completion using the CBD toolkit (Completion by Design, 2019). The participating colleges varied in size, and the populations they serve are diverse. Completion by Design has a simple vision: "community college faculty, staff, administrators, and students, working collaboratively, can create integrated institutional policies, practices, processes, and culture that together improve student performance and completion outcomes" (Completion by Design, 2018, para. 2).

The overall philosophy that serves to guide the Completion by Design process is the Loss Momentum Framework. This framework indicates the points in a student's college journey: 1) Connection – from interest to application; 2) Entry – from enrolling to passing program gatekeeper courses; 3) Progress – from program entry to completion of program requirements; and 4) Completion – completion of credential of value for further market value or labor market advancement. The Completion by Design Loss Momentum Framework focuses on student success by using a *Guided Pathways* approach through which incoming students are given support to clarify goals for college and careers, choose a program of study, and develop an academic plan with predictable schedules. Embedded advising, progress tracking, and individual feedback about progress are integrated into pathways leading to successful transfer or entry into the labor market (Completion by Design, 2010).

Using that framework, pilot colleges went about their work to strengthen access and remove barriers to student entry, progress, and completion. Best practices have emerged and community college systems like those in Virginia have begun implementing them within the framework and measuring the success of these initiatives.

Virginia Community College System (VCCS). The Virginia Community College System (VCCS) was created in 1966 to address Virginia's unmet needs in higher education and workforce training. The current system's strategic plan, Complete 2021, was launched in 2015 and contains a single goal: to triple the credentials students earn in academic and workforce areas (Virginia Community College System, 2018). Annually, progress toward the overall goal is measured using metrics such as enrollment, retention, and graduation rates that align with the Completion by Design Loss Momentum Framework.

The VCCS has been the recipient of grant funds from the Bill and Melinda Gates Foundation that are administered through Jobs for the Future to support the Completion by Design Loss Momentum Framework initiatives. Within the VCCS the framework is frequently referred to as *Guided Pathways*, *Pathways* or *Virginia Integrated Program of Planning, Advising for Student Success (VIP-PASS), and Navigate*. Using grant funds, the VCCS created a statewide student success center and a website that provides consistent guidance and resources for community colleges across Virginia. Professional development in the form of ongoing training for administrators, faculty, and staff also supports the implementation of these initiatives (Virginia Community College System Student Success Center, 2018).

In 2017, with state funding to support student success initiatives, the VCCS announced that:

> "VCCS has selected the EAB Navigate technology tool, to implement at scale, several components of our Virginia Integrated Program of Planning and Advising for Student Success (VIP-PASS) strategy. Navigate provides a structured onboarding experience using student-centered tools that help students develop clear academic plans, understand their time to degree completion, and

communicate with advisors. The tool also helps students create an academic course schedule that considers their ambitions, as well as their class, study, work, and personal commitments. The platform nudges students to take steps that will increase the likelihood that they will succeed. Additionally, EAB's advising and administrative tools help colleges improve advising supports and business processes." (Virginia Community College System Student Success Center, 2018, para. 1).

This tool serves as the technological support for the implementation of the Completion by Design Loss Momentum Framework strategies in Virginia. Each of Virginia's 23 community colleges has identified student success teams who represent their colleges. Team members benefit from local, state, and national professional development related to the Framework and serve as facilitators for change initiatives and the implementation of Navigate.

Central Virginia Community College (CVCC). CVCC is one of the 23 community colleges within the VCCS and operates under the same mission, giving everyone the opportunity to learn and develop the right skills so lives and communities are strengthened (VCCS, 2019). CVCC's current six-year strategic plan was launched in 2015 with a student success focus that adapted the Completion by Design Framework, which is illustrated in Figure 1.1.

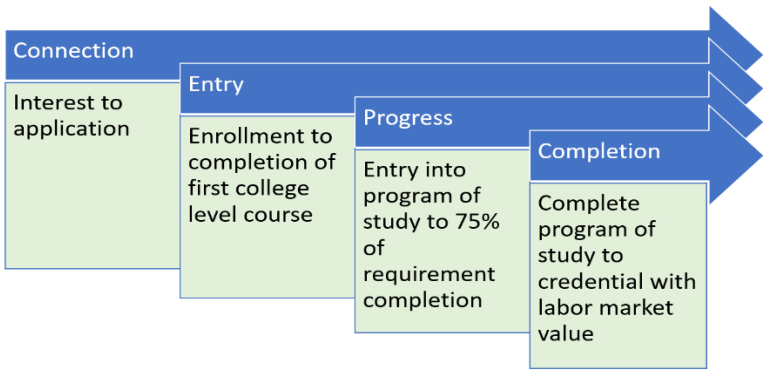

Figure 1.1: CVCC's Compete 2021 Strategic Planning Categories (CVCC, 2015, adapted from Bill and Melinda Gates Foundation, 2010)

Each category in Complete 2021 is supported by a series of strategies that engage internal and external stakeholders to promote student success and to meet the needs of the regional workforce. CVCC's institutional planning and budgeting processes are also linked to the Completion by Design framework. These processes ensure that institutional resource allocations occur per this framework to maximize services to students at each point in their college journey. Also, the state's performance-based funding model metrics are adapted from the key performance indicators within the Completion by Design Loss Momentum Framework. These key performance indicators include enrollment, retention rates, academic progress measures, as well as graduation rates. The fact that both the state system and the college utilize the Completion by Design Loss Momentum Framework as the basis for funding, budgeting, and strategic planning ensures that resources are allocated to maximize student success.

Statement of Problem

The purpose and value of higher education are under increased scrutiny (Mayhew et al., 2016). CVCC is the only public institution of higher education physically located within the area it serves. The service region includes the City of Lynchburg and the counties of Amherst, Appomattox, Bedford, and Campbell. The VCCS and CVCC have experienced declining enrollment and fewer degree completions since 2011 (VCCS, 2020). Data analysis indicates that Virginia's community colleges are not recruiting, retaining, or graduating students at a rate that will meet public demand for job training and employment in the state and region (Virginia Community College System Student Success Center, 2018). Reviewing business processes and implementing changes to improve them, where appropriate, may increase positive outcomes for students and Virginia's community colleges. These processes for review include application, enrollment, advising, and academic support services such as tutoring. The Completion by

Design Loss Momentum Framework (LMF) is serving as the framework to define opportunities for growth and change in Virginia.

There are multiple strategies for student success within the LMF and the Complete 2021 strategic plan. Reports are published annually by the VCCS that capture the progress of each of Virginia's community colleges within these measures as they align with the performance-based funding model. Colleges benchmark against each other, but due to the large numbers of variables that align with each category, this reporting does not differentiate between individual strategies to determine which ones effectively support each of the LMF categories. This study was designed to determine whether certain strategies implemented at CVCC demonstrate statistical significance in predicting student success in each of the LMF categories. CVCC needs to fully understand the impact of the strategies that have been implemented and to identify their relationship to student success. This understanding will support further enhancements to the programs and services that are identified as positive predictors of student success, while effectively allocating the resources to support them.

Purpose of Research

The purpose of this study was to understand whether and how some best practices within the Completion by Design Loss Momentum Framework affect student enrollment and completion at Central Virginia Community College. The research examined the relationship of the selected independent variables against dependent variables associated with the students identified for the study. Dependent variables were aligned with the key performance indicators associated with the Completion by Design Loss Momentum Framework and included binary data for enrollment, fall-to-spring and fall-to-fall retention, and completion for students who entered a program of study for the first time. Independent variables included credit accumulation, college

readiness assessment type, success in college-level math and English for students placed in developmental and college-ready courses, the provision of financial and advising resources, and participation in a college success skills course within the first term of enrollment. In addition, student support interventions connected to Early Alerts raised by faculty during the first term of study were considered. Data analysis controlled for full- versus part-time enrollment and some basic demographic characteristics including age, gender, race, and socio-economic status.

Research Questions

The study was designed to address the following research questions:

1. How does a systematic student intake process impact applicants (connection)?
2. How do systematic student success interventions impact fall-to-spring retention for first-time-in-college students (entry)?
3. How do systematic student success interventions impact fall-to-fall retention for first-time-in-college students (progress)?
4. How do systematic student success interventions impact on-time completion?

Significance of Study

Community colleges are accountable for fulfilling their missions and serving the public by providing meaningful educational opportunities to promote economic growth and personal vitality. The Completion by Design Loss Momentum Framework is a recent research-based philosophy associated with redesigning community colleges in America. Ongoing research by participating institutions will help identify successful strategies that could be scalable to other community colleges or systems. Most community colleges have limited financial resources, so a study of this nature should identify successes that will support the targeted allocation of funding and personnel for further growth and improvement.

Summary of Methodology

Chapter 3 will explain the methodology that will be employed in this study with review of the research design and the key performance indicators used in the analysis. Case study research will be employed for this study based on methodology described by Yin (2009).

Limitations

One concern about case study research of a single institution is that it may not be generalizable to other institutions. Yin (2012, p. 54) provides the context to this concern by explaining that unlike traditional, scientific experimental research design, case studies that use a theoretical framework may be generalizable since the goal is to expand and generalize a theory. Because this study was based on the Completion by Design Loss Momentum Framework as the theoretical proposition, that is the context in which it should be considered for generalization purposes.

Delimitations

This study did not control or measure some variables that may influence the college-level dependent variables and student-level independent variables. These variables include environmental and external factors related to changes in financial or academic support due to personal situations. In addition, local, state, and federal initiatives may have an impact on student enrollment, retention, and completion, and they were not considered in this study; they are therefore recommended for consideration in future studies.

Summary

This chapter has provided a brief overview of the characteristics of this dissertation. The success of students at Central Virginia Community College as a result of the implementation of strategies from the Completion by Design Loss Momentum Framework was the focus of this

study. Success was defined within each stage of the framework: connection, entry, progress, and completion. An adaptation of the Completion by Design Loss Momentum Framework key performance indicators as applied within the VCCS performance-based funding model served as the measures upon which success was determined.

There are multiple measures of success when considering college-level data, but it is difficult to determine which variables significantly impact student success. This study was designed to identify statistical significance for selected variables that aligned with CVCC's LMF implementation and their priorities for funding during a time when resources are limited due to declining enrollment. This study is significant because it identifies the statistical significance of strategies that are positively associated with student success as defined in the LMF. This information supports decision making related to funding priorities and staffing that should further enhance student success at CVCC and may serve as an example for other community colleges. The following chapters provide more detailed information to include the supporting literature and the detailed methodology.

CHAPTER 2: REVIEW OF LITERATURE

The purpose of this chapter is to review the literature in relation to community colleges in the United States and their efforts to redesign the student experience to meet twenty-first century needs in the higher education and workforce training systems. This chapter is divided into two major sections.

The first section provides an overview of community colleges in the higher education system in the nation with a focus on twenty-first century reform. The *Guided Pathways* model for providing a clear path for student success is based on the Completion by Design Loss Momentum Framework (Gates Foundation, 2015). The stages in this new design are defined within the Loss Momentum Framework (LMF). LMF is designed to help colleges better understand student experiences through four main stages (Grossman et al., 2015). Those stages are (1) connection – from interest to application; (2) entry – from enrolling to passing program gatekeeper courses; (3) progress – from program entry to completion of program requirements; (4) completion – completion of credential of value for further market value or labor market advancement (Completion by Design, 2012). Research-based best practices for *Guided Pathways* reform are discussed (Bailey et al., 2015).

The second major section of this chapter focuses on review of work that discusses the elements of the student *Guided Pathways* experience during the connection, entry, and progress phases of the LMF (EAB, 2018). The connection phase is discussed as it relates to application and access (Roman, 2007), onboarding (EAB, 2018), readiness for college-level coursework (Sullivan & Nielsen, 2013; Bailey et al., 2015), and financial support (Habley & McClanahan, 2004). The entry phase describes improvements and the implementation of technology to enhance the Guided Pathways reform. Organizations such as Achieving the Dream (ATD)

describe an Integrated Planning and Advising for Student Success (iPASS) initiative and EAB Navigate offers a student success management system which, among other things, promotes early alert for enhancing communication between students, faculty, staff, and advisors. These enhanced communication programs are designed to expedite the process for connecting students with appropriate academic and nonacademic support services to keep them on track. For progress, seminal work for student retention is reviewed by Tinto from a four-year college perspective as it applies to community college students (Tinto, 1987). Intrusive academic advising is also discussed as a proactive approach to engaging students (Garing, 1993). Finally, a review of literature specific to the completion phases of the LMF is included, emphasizing the creation of clearer pathways to student success (Bailey et al., 2015). It will describe the role of state and federal reforms that affect the completion agenda for community colleges and the significance of accurately measuring the impact to quantify legitimate improvement (Brock, Mayer, & Rutschow, 2016).

The final section of this chapter reviews the progress of some institutions that have already incorporated best practices from the Completion by Design Loss Momentum Framework. These will include state-level influencers designed to support pathways (Bowling, Morrissey, & Fouts, 2014); the impact of well-defined transfer programs between community colleges and four-year institutions; job training that is supported by professional readiness training; apprenticeship; and career services support in community colleges (Rothwell, 2017).

The search process of this literature review began with an Educational Research Complete database search using the University of Lynchburg's library. Search terms included the following: (a) "community college reform," (b) "Gates Foundation Completion by Design," (c) "higher education retention," (d) "community college student success," (e) "college

admission," (f) "financial aid," (g) "community college advising," (h) "community college programs," (i) "community college workforce training," (j) "community college admission," (k) "community college application," (l) "community college retention," (m) "community college persistence," (n) "community college completion," and (o) "completion agenda". Additionally, resources were accessed by way of professional affiliations from EAB, the Community College Research Center, Achieving the Dream, Ruffalo Noel Levitz, and the Community College Survey on Student Engagement (CCSSE).

History of Community Colleges

This section provides an overview of community colleges in the higher education system in the United States of America from inception to the twenty-first century. As part of the review, community college redesign for the twenty-first century will be featured. The *Guided Pathways* model for integrating services and instruction will be discussed with specific attention to recommended reforms.

Community colleges, which may also be referred to as two-year colleges or junior colleges, emerged in the United States' higher education system around the turn of the twentieth century. At the time, only one quarter of Americans were pursuing education beyond high school (American Association of Community Colleges, 2018). The Morrill Act of 1864 (Morrill, 2004) promoted access to higher education for high school graduates, but many students did not want to leave their hometowns. By 1901 the first two-year college emerged in Illinois, and other communities began to provide preparation for completion of a bachelor's degree or training from jobs to support local economies (American Association of Community Colleges, 2018).

Community colleges were developed in Virginia in the 1960s and 1970s to fill a void in the higher education system by providing low-cost, quality educational opportunities as public,

open-enrollment higher education institutions. They were designed for convenience, unlike traditional four-year residential higher education institutions.

Since their inception, community colleges have served students who may not be well prepared for college-level coursework. Over 60% of new community college students take at least one remedial (developmental) course (Bailey et al., 2015, p. 134). The course offerings are described as "a cafeteria-style menu" with a variety of courses offered at different times to accommodate busy, complex schedules for students managing families, jobs, and other obligations. Community college students most frequently attend part time due to family and work commitments or financial constraints. Part-time students take only a few courses. Frequently, part-time students do not maintain continuous enrollment term after term due to their individual circumstances. This exiting and reentering the community college system is referred to as stopping-out. These students enroll when their other life obligations permit, often never completing a program of study at all (Bailey et al., 2015, p. 3). During their first 30 or so years in existence, community colleges in Virginia carved a niche in the higher education system and served diverse populations of students by maximizing enrollment and offering programs to support the workforce. Coursework also supported transfer to four-year colleges and universities.

By the late 1990s, the community college model began to face some challenges. Like four-year higher education institutions, community colleges are expected to demonstrate effectiveness. Higher education institutional effectiveness reflects the extent to which and the quality with which expectations are achieved (Brint & Clotfelter, 2016). According to Brint and Clotfelter, a focus on effectiveness leads to questions such as the following, which are relevant to community colleges:

- Are students being prepared adequately for the labor market?
- Is the system accessible to students from all backgrounds?
- How large are the gaps in success between students from different backgrounds?
- How much are students learning?

Public demands for improved institutional effectiveness and accountability raised questions like those stated above about policies and assessment strategies at community colleges (Terrey, 1998). Additionally, low-cost enrollment promoted job training opportunities that frequently led to the development of often disconnected courses, programs and support services to meet employer demands. Students were expected to navigate mostly on their own due to high student-to-advisor ratios. Students were confused by poorly explained program and transfer choices, and available programs often did not provide a clear path to success in further education and employment (Bailey et al., 2015).

As the application of *Guided Pathways* has taken place across America's community colleges, the effectiveness of these practices is being measured at institutional levels in the form of case studies that provide examples of implementation strategies that have proven successful within the *Guided Pathways* model.

Guided Pathways

A renewed focus on the value of community colleges led to significant research into the practices of community colleges that have become outdated. Current research was largely funded by the Bill and Melinda Gates Foundation beginning in 2009 and led to the publication of *Redesigning America's Community Colleges: A Clearer Path to Student Success* (Bailey, Smith-Jaggers, & Jenkins, 2015). The overall concept is commonly described as a *Guided Pathways* approach in community colleges. *Guided Pathways* is an umbrella term used to identify highly

structured student experiences that guide them on a pathway to the completion of a certification or degree. With this approach, students are given support to identify or clarify realistic goals for college and careers, choose a program of study, and develop an academic plan with predictable schedules. Best practices include embedded advising, progress tracking, and a method to provide feedback to students during various stages of their educational journey and to support their successful transfer or entry into the labor market (Bailey et al., 2015). Contemporary thinking about the student experience defines their progression through college in four phases: connection, entry, progress, and completion (Completion by Design, 2010).

Most references to the *Guided Pathways* initiative are linked to Bailey (2015). Examples of the significance of the *Guided Pathways* movement are emerging. Sutton (2017) described the creation of *Guided Pathways* for adult students as crucial to completion at Alamo Colleges. The development of pathways allowed for more focused advising and a reduction in non-transferable credits for students (Sutton, 2017). In *Understanding Equity in Community College Practice: New Directions for Community Colleges*, Castro (2015) devoted a chapter to what he described as "Pathways to Results (PTR)." PTR takes the *Guided Pathways* approach and emphasizes the use of data as a reminder to ensure that equity gaps do not emerge as a result of the initiatives, which would be counter to the mission of community colleges. In Illinois, Richland Community College's nursing program was studied and revealed processes and practices within the framework that warranted revision because there was limited access and completion for some students (Castro, 2015, p. 43-58). This served as justification for incorporating analysis that controls for certain equity-related demographic characteristics.

The *Guided Pathways* movement is the current focus for community colleges with well-documented research to support the need for improvements based on experiences and the data

that capture low student success rates. However, community colleges serve unique regions and diverse populations. To better understand the impact of these differences, researchers must study the individual institutions, their students, and their paths to improvement, which will further strengthen the philosophies supported by the stages in the *Guided Pathways* movement.

Connection (from interested to application). Community colleges provide access to all individuals and frequently attract recent high school graduates with limited knowledge, experience, and support related to the higher education system. Those students often become discouraged after completing the initial application because there are so many complicated steps that are not communicated well. Students who do enroll in community college do so without clear direction and most attend part time (Bailey et al., 2015).

In the reinvented perspective on Connection, high school students begin thinking about their desired career and educational path early in their high school career with the support of pre-career assessments and exploratory activities to determine areas of interest. When possible, high school coursework aligns with a chosen path, transferring upon graduation from high school and clearly aligning with a well-designed educational program of study within a specified time period to minimize time to completion and wasted credits (Bailey et al., 2015). Research has further defined the components of this process to strengthen the connection for not only high school students but also adult learners who never attended college, or those who have exited higher education and are returning. A reorganization of the design of these services into a one-stop shop, or single, central location has also proven to be an effective change (EAB, 2018).

Application and access. There is no cost to complete a community college application in Virginia (VCCS, 2018). Unlike traditional four-year colleges, community colleges may have students completing applications for the current term up until the day classes begin. Often, there

is little time for effective student intake, and that limits the information provided to the student about funding, appropriate course scheduling, and program options. Many of these students enroll, but nearly 20% of them exit the system before completing ten credit hours (Bailey et al., 2015). At most campuses, the current structure of support services does not facilitate access; the structure can even be an impediment to access. Critical support services such as financial aid and advising are often located far away from one another, requiring students to navigate an unfamiliar campus to accomplish basic functions like course enrollment (Community College Executive Forum, 2012). In the *Guided Pathways* model, student intake should include intentional support and advising to help students select and enter a program of study, track their progress, and provide frequent feedback with appropriate intervention when students get off track (Bailey et al., 2015).

Roman (2007) explains that students who apply to community college are frequently categorized as non-traditional students by four-year institution standards. It is common for the population of a four-year institution to attend full time with a primary focus on their studies. Most community college students possess a risk factor such as delayed enrollment, part-time attendance, financial independence, one or more children, single parenthood, or full-time employment. Community college applicants often know very little about what is required to get into college and to be successful there (Roman, 2007).

Considering these characteristics, Roman (2007, p. 20) asserts that community college "admission staff members need to be skillful in reaching out to these populations, bridging the cultural gap that may divide them, in order to encourage and educate them about the opportunities that a college education provides." This finding aligns with the Loss Momentum Framework, strengthening the initial connection with students to support the decision to enroll.

Onboarding. Community College student onboarding includes steps that take place for students from the time they apply to a community college and their first day of class (Virginia Community College System, VIP-PASS, 2016). A measure to support onboarding success is the application yield, which is the number of first-time-in-college students pursuing a program of study who enroll in and attend classes at the start of the term. In Virginia and at CVCC, less than half of the students who complete a community college application each fall make it to their first day of class (VCCS, 2018).

Community college onboarding is a daunting task with multiple barriers that prevent students from successfully enrolling in a program of study. Researchers from EAB identified these barriers by visiting community colleges across the nation and engaging in the application and enrollment processes at the institutions by posing as students. Their research technique is referred to as a secret-shopping experience because the status of these potential students as researchers is not known to the college employees delivering the information and services, resulting in an actual student experience (EAB, 2015).

The EAB researchers visited 20 community college campuses in 11 states as prospective students who intended to enroll in their fall 2014 term. Through their first-hand experiences, the researchers logged and defined the enrollment "pain points" that they faced during the onboarding processes at these colleges. Common themes were identified, and the following observations were noted for institutions considering a redesign of onboarding that include:

- Processes for accessing the resources that support enrollment such as placement testing, financial aid, payment options, and advising are difficult to navigate and create barriers.

- Acquiring a student ID number is often a first step in enrolling, but many institutions require up to 48 hours to receive the number.
- Online content is jargon filled and difficult, if not impossible, to follow.
- One-stop student services alone are not the ideal solution for removing barriers to student enrollment.

Despite the desire for a self-service experience, community college students are most likely to be successful in navigating the onboarding process with the support of dedicated individuals who can guide students through the processes and address any challenges that may derail their progress. The five strategies recommended as a result of this study are to implement an immediate ID provision; implement a technology-based appointment scheduling and advising solution in the form of a student success management system (which EAB markets); conduct a jargon reduction audit; design follow-up communication for various modalities; and hire registration case managers to provide individual support to students (EAB, 2015).

Redesigning onboarding requires identifying and communicating clear steps and the removal of barriers. This intentional work should increase application yield for community colleges and increase opportunities for students to achieve their goals.

College readiness. Nearly two thirds of entering community college students are ineligible to enroll in college-level coursework based on institutional standards (Bailey et al., 2015). Those students are required to take developmental math and/or English courses that do not count towards credit for a degree (Bailey et al., 2015). Redesigning to eliminate this barrier requires innovation and open-mindedness that support strategies such as remediation before entry into college-level programs while in high school, developing corequisite courses, or remediation in summer bridge programs (Bailey et al., 2015). Developmental education serves

as a diversion to entering a college path; redesigning the approach should reduce time to completion.

Alternatives to traditional placement testing are also a consideration. According to a study by Windham and colleagues (2006), close to half of all community college students leave before achieving their stated goals. The study considered certain demographic characteristics and placement methods as predictors of student retention (Windham et al., 2014). Results also showed that, while ethnicity/race and socio-economic status were not significant indicators of retention, gender, age, and ACT Compass Reading scores significantly predicted student retention (Windham et al, 2014; ACT, 2016). To remove barriers for students entering community college, in fall 2017 the VCCS implemented a new policy of multiple measures for placement testing to permit options for the establishment of college readiness outside of the traditional Virginia Placement Test (VPT) for Reading and Writing (VCCS Policy Manual, 2018). The policy provides guidelines for placement into college-level coursework for high school graduates based on high school grade point average or SAT and ACT scores.

Financial support. Paying for college is a challenge, especially if the student or family does not possess the means or the experience to access available funds. National surveys, student interviews, administrators, and retention experts identify financial distress as the primary reason that community college students fail to earn a credential. As a result, completion-driven colleges are focusing on financial aid, recognizing that high-quality financial assistance drastically improves student retention (Habley & McClanahan, 2004).

The EAB Community College Executive Forum (2010) conducted a study of six community colleges that had successfully restructured financial services and payment to work cohesively. These institutions offered complete support for students to access available funds,

starting with completion of the Free Application for Federal Student Aid (FAFSA), which is a required step in the intake process (EAB, 2010). The researchers discussed organizational structure, customer service, and wait time for in-person, phone, and electronic interaction. EAB's (2010) research found that most institutions housed financial aid in the student affairs division to improve the integration of student services within the college. Additionally, good customer service in financial aid generally involved creating a positive experience for students while processing applications as quickly and accurately as possible. Institutions often used student satisfaction surveys, wait times, and anecdotal evidence to assess service quality. These surveys consistently revealed that a good customer service experience was negatively impacted if wait times were unreasonable (EAB, 2010). This study led to recommendations that financial aid offices can significantly reduce wait times and expedite processing by improving the triage process in offices and increasing automation. Skilled frontline staff can recognize and redirect students who do not need to see a financial aid specialist, reducing the volume of students in line. Automation of small tasks (e.g., scanning applications) can result in substantial time savings for staff, allowing staff to meet with more students and reduce wait times further (EAB, 2010).

Entry (from enrolling to passing program gatekeeper courses). Once students have successfully navigated the community college onboarding process and arrived in their classes ready to learn with all necessary resources, they are considered to have begun the second phase of the LMF, which is entry. In this phase, a series of intentional student support services is administered within the *Guided Pathways* framework. The goal in entry is to make sure students choose and enter a program of study as quickly as possible. Many students seeking degrees drop out after only one or two terms. To combat those challenges, colleges need to understand how

students get from their initial enrollment in the college to the point of passing their first college-level courses in their chosen program of study (Completion by Design, 2019).

Strategies recommended to support this phase included the following: diagnostic assessment and placement tools, aggressive financial aid application support, mandatory or "intrusive" advising, life skills courses with attendance requirements, defined courses of study linked to career pathways, and course and program review and redesign for efficiency and relevancy in a program of study (Completion by Design, (2019). These strategies serve to prepare a student to manage barriers to their success that they may encounter by providing realistic expectations about the process to enroll in courses and what is required to successfully complete them.

One practice that is supported is technology to provide "early alerts" for at-risk students. Early alert systems allow college employees, most often faculty, to initiate alerts for students exhibiting at-risk behaviors to prompt an intervention that will prevent student attrition (Tampke, 2013). This is a proactive approach that is supported by further retention research (Tinto, 2012).

IPASS/SSMS/early alert. Community college reform is also discussed with the support of technological tools such as *Integrated Planning and Advising for Student Success* (iPASS Initiative), which provides an integrated advising and interactive student support system (Achieving the Dream, 2012). EAB provides a student support management system (SSMS) called *Navigate*, a technology platform that promotes guided pathways and integrated student services such as early alert. Early alerts are initiated by faculty members or counselors in a technology platform, expediting the communication of information to direct a student to the resources available to increase success (Navigate, 2012).

Dwyer (2017) conducted research on an early alert program across Virginia community colleges in 2013-14. The findings suggested that early alert had the greatest positive impact on developmental math students. Overall the value of an early alert system is a worthwhile addition to a comprehensive retention plan (Dwyer, 2017).

Student success courses. Another promising practice involves a required Student Success Course (SSC). Previously, SSCs were not always required courses in community college programs. This course usually introduces higher education to students by assisting them as they transition from high school to college and by providing them with guided overviews of college policies, procedures, and curricular offerings (Kimbark, Peters, & Richardson, 2017).

Kimbark (2017) studied SSC participants and non-participants at one mid-sized community college in Texas and found that a relationship exists between completing an SSC and persistence, retention, academic achievement in English and mathematics, and student engagement. Study participants also indicated that taking the SSC not only altered their perceptions of the importance of the course, but their social and study skills as well (Kimbark et al., 2017).

Hatch (2018) recently completed a study on SSC course design, demonstrating that the SSC course requirement alone will not positively impact student success. In the study, the most successful courses incorporated required activities that promoted interaction with other students, faculty, and college personnel associated with support services. These activities increased awareness about processes for accessing these resources and the significance of using them. Community college students were usually unfamiliar with the college environment and the transition was made easier by practicing engagement on a community college campus (Hatch et al., 2018, p. 117). Based upon these findings, requiring meaningful onboarding steps and

requiring a student success course in the first term of enrollment should reduce time to completion by ensuring student goals are identified early in the process.

Progress (from program entry to completion of program requirements). The concept of community college student progress is not unique to the LMF or the Guided Pathways framework. In the book *America's Community Colleges*, student progress is defined in the context of outcomes related to retention, credit accumulation, progression through development coursework, and success in gateway courses (Cohen et al., 2014, p. 391). Measures of student progress include a college's ability to retain students from term to term (Cohen et al., 2014, p. 392). Consistent with this definition, each stage within the LMF is accompanied by a series of key performance indicators to aid community colleges in measuring progress toward achieving goals specific to student success and ultimately completion. The stages of entry and progress are supported by the persistence of students to remain on their educational pathway from term one to term two (for entry) and from year one to year two (for progress) (Completion by Design, 2017). Measuring student entry and progress in this way is frequently referred to as student retention. In the community college system, term one to term two is considered fall-to-spring retention and year one to year two is fall-to-fall retention.

Retention. The calculation of retention rates for community colleges is evolving. Initially, community college retention was measured in the same way as four-year college retention, which was simply whether a student who was enrolled in a fall term either graduated or returned in the following spring or fall term. This method does not consider the transient populations of students that community colleges serve and assumed full-time enrollment. Because community colleges are mostly non-residential and community college students attend part time rather than full time, calculating retention using the same methodology as four-year

institutions is an inequivalent comparison. A recommended retention number within the LMF follows the progress of cohorts of first-time-in-college (FTIC) students who are program placed in an associate degree or diploma program of study (Completion by Design, 2012). These entering students are identified each fall. This practice is consistent with retention reporting for the National Center for Education Statistics, College Navigator (NCES, 2018). Using this methodology, only one half of community college students persist to completion of a credential within six years (Juskiewicz, 2015).

Student retention in higher education is a concern for all stakeholders, and several models have been developed to predict whether students will continue their path in higher education. Tinto (1975) introduced the theory of retention, which suggests that students progress through stages as they make the transition from being a FTIC student to being a mature student. These stages are influenced by academic and social integration. Both academic and social factors combine and lead to the student's decision of whether to continue in college.

Bean (1990), another retention expert, is known for his psychological model of retention (student attrition model), which suggests that the individual background and experiences are additional variables that influence the way a student interacts in a higher education setting. Bean's (1990) theory adds environmental variables and student intention as factors that predict student retention.

In addition, Astin (1991) is well known for his input-environment-outcome model. According to Astin, outputs (degrees earned, number of graduates, etc.) must always be evaluated in terms of inputs (college readiness, gender, age, major, etc.). Input and output data are of limited usefulness by themselves. The educational environment related to variables such

as courses, programs, facilities, faculty, and student activities complete the model. Assessing student outcomes accurately requires input, output, and environmental data (Astin, 1991).

These important studies focus on the retention of four-year colleges, but Fike and Fike (2008) analyzed predictors of fall-to-spring and fall-to-fall retention for 9,200 first-time-in-college students who enrolled in a community college over a four-year period. Developmental education in math and reading is offered in community colleges, and it is common for students to enroll in these courses as they begin the educational journey. Fike and Fike's (2008) study found that success in development reading is the strongest predictor of success using regression models. Students who took placement tests and qualified for college-level English courses were equally successful, indicating that strong reading skills have an impact on student success. Other categories that were positively associated with retention were receiving financial aid, taking an online course, credit hour accrual in the first term and participating in student support services. Negative correlates were student age and dropping credit hours during the first semester. Ethnicity and parent education level were not consistently associated with student retention (Fike & Fike, 2008).

Each of the retention models discussed attempts to describe the ways in which the student and the institution interact with one another. The theoretical principles convey the importance of having knowledge of student attributes and activities. Except for Fike and Fike (2008), these theories are based on research regarding student retention in a four-year residential university setting, but all this research is reflected in the design of the LMF and applies to community colleges. Using elements of these retention models and twenty-first century data collection methods and analysis, agencies such as Ruffalo Noel Levitz and the University of Texas at

Austin's Student Surveys of Student Engagement collect and compile information annually to identify the perceptions of today's college students.

The Community College Survey of Student Engagement (CCSSE) provides benchmarking data related to retention such as active and collaborative learning, student effort, academic challenge, student-faculty interaction, and support for learners (CCSSE, 2018). Student engagement recently has become an increasingly prominent part of community college discussions about effective educational practice and student success. CCSSE was established in 2001 as part of the Community College Leadership Program at the University of Texas at Austin. With initial funding from The Pew Charitable Trusts and the Lumina Foundation for Education, the survey also has been co-sponsored by the Carnegie Foundation for the Advancement of Teaching and the Pew Forum on Undergraduate Learning. CCSSE is affiliated with the National Survey of Student Engagement (NSSE), developed for four-year colleges and universities, and CCSSE staff members collaborate with NSSE colleagues at Indiana University (McClenney, 2007). Through their nationwide collection of data from participating institutions, CCSSE reports information that informs the relationships between student engagement categories and student retention (CCSSE, 2019).

Ruffalo Noel Levitz provides a series of assessments that may be offered across various points during a student's college experience. Recent findings include that 69% of first-year students want help with the most effective ways to take college exams; 67% want to talk with someone about career qualifications; 67% want help in improving study skills; and 65% want help obtaining a scholarship (Ruffalo Noel Levitz, 2018).

Increasingly students face non-academic challenges that serve as barriers to their progress. Forty-three percent of college students work full-time jobs while attending a two-year

or four-year college (NCES, 2018). Community college students living at home often support families and encounter other financial barriers related to responsibilities such as childcare, food insecurity, or transportation. A recent survey of 26 four-year colleges and eight community colleges across 12 states reveals that "students must meet their basic needs before they can focus on academic success and personal wellness. This concept is grounded in Maslow's Hierarchy of Needs and illustrated by the many stories from students facing basic needs insecurity. These students are making constant trade-offs in decisions such as the choice between buying a textbook and buying a meal, and in how they spend their time" (O'Connor, 2018, p. 14). Furthermore, a 2017 study of financial hardship for Virginia revealed that poverty in Central Virginia Community College's region exceeds the state average of 39%. CVCC's service region (city of Lynchburg and the counties of Amherst, Appomattox, Bedford, and Campbell) includes 41% of households that are living with income levels below federal poverty or as ALICE: Asset Limited, Income Constrained, Employed (O'Connor, 2018; United Way, 2017).

Many factors differentiate a community college student's experience from that of a four-year student. The original design of community colleges often offered too many choices and not enough guidance to achieving goals. Limited communication about program options, stigma associated with developmental coursework that slows progress, and life events outside of academics that seem to create insurmountable barriers for students to support their success and progression (Bailey et al., 2015).

Advising. Community colleges have traditionally allowed self-advising and scheduling that frequently led to unnecessary courses and excess credits for students. Failed courses and poor course sequencing can quickly derail students from progressing and ultimately achieving their educational and career goals (Saltiel, 2011).

Community college reform supports an academic advising model that provides opportunities for intervention when situations occur that potentially slow down a student's progress. This approach is effective for at-risk students and is referred to as intrusive advising. In intrusive advising models, academic advisors proactively reach out to students, understand students' backgrounds and challenges, and recommend appropriate resources (EAB, 2012). A complete review of the advising structure, including the addition of a caseload management system, has proven effective in successful advising models (EAB, 2012). Frequently a combination of para-professional advisors, professional advisors, and faculty are engaged in advising depending on the program and the phase of the educational process for the student.

Donaldson (2016) conducted a qualitative study that identified themes from interviews with 12 community college students who participated in intrusive advising. Benefits of intrusive advising programs included required advising, an assigned advisor, individual support, and academic program planning. This study cautions that effective implementation of intrusive advising plans requires training and the consistent availability of advisors to ensure adequate student support. To maximize effectiveness using tools for career planning and course scheduling supports the process (Donaldson, McKinney, Lee, & Pino, 2016).

Completion (completion of credential for transfer or employment). In October 2010, the White House, concerned about joblessness, held a Community College Summit at which President Obama emphasized the role community colleges could play in training job-seeking workers. He announced a $1 billion, five-year program linking community colleges to corporations such as McDonald's, Gap, PG&E, and United Technologies (Gonzalez, 2010). The Gates Foundation responded with further support and offered scholarships to promote the Completion by Design Loss Momentum Framework (Completion by Design, 2010). These

political and economic decisions shifted the focus to completion. That shift led to reform at the state and local levels for community colleges, which represents this fourth and final phase of the LMF.

Completion agenda. As public attention has increased toward an aging workforce and untrained replacements in crucial jobs, community colleges are viewed as the primary provider of the kind of training that is needed for jobs of the next century, yet less than half of students who enroll in a community college earn an award or credential within six years (CCRC, 2018).

Georgetown University's *Job Growth and Education Requirements through 2020* (Carnavale et al., 2013) study provides important research that illuminates the need for education beyond high school to meet the needs of the U.S. workforces. By 2020 two thirds of job openings will require some education or job training beyond high school (Carnavale et al., 2013). Community colleges are a natural catalyst for providing affordable access to quality job training and educational opportunities for personal vitality and economic growth and are promoted as such in many national, state, and local initiatives.

Despite the need for education beyond high school, less than half of the students who enter a community college with the goal of earning a credential complete a program of study within six years (Bers, 2013). Griffiths (2011) developed a model that estimates potential earnings increases based on educational attainment. The model predicts that those completing some college would benefit from a 3.23% annualized earnings growth over 30 years; those with an associate's degree should expect to earn 3.25% more in the same time period; and those continuing to earn bachelor's degrees should earn 4.25% more annually (Griffiths, 2011).

The Completion by Design model supported by the Loss Momentum Framework is designed to identify and address the barriers that prevent student progress and ultimately lead to

completion of a meaningful credential, which should increase lifetime earnings potential and support America's economy. The LMF provides the structure and relevant measures that promote increases in student completion.

Phillips (2014) published *The College Completion Agenda: Practical Approaches to Achieving the Big Goal*, which is divided into seven chapters with each chapter devoted to one of the common themes that emerges throughout recent research about redesigning community colleges. Jenkins (2014), one of the authors of *Redesigning America's Community Colleges* (Baily et al., 2015), co-authors a chapter that is devoted to *Guided Pathways*. In Chapter 2, Phillips (2014) discusses in detail the significance of data analysis by individual colleges in order to fully understand the barriers that students encounter that prevent them from earning a credential. Even when the data are collected and available, the use of it by institutions may be limited, and it becomes insignificant if administrators, faculty, and staff are not using the information to make improvements that promote student progress and completion. Simply implementing strategies for improvement and collecting data will not lead to the type of improvement intended. Analyzing, summarizing, and sharing the data in meaningful ways will create the greatest positive impact when working toward increasing completion (Phillips et al., 2014, p. 17-24).

Many states, including the Commonwealth of Virginia, have implemented a performance-based funding model in response to increased scrutiny for failure to meet higher completion rates (Fain, 2017). Virginia's model is adapted from the LMF key performance indicators, creating a well-defined system of accountability. Those measures, as defined in the framework, include the following (Completion by Design, 2015):

Connection/Entry

- ↓ % of students coming directly from high school that place below college-level
- ↑ Credit accumulation during student's first term
- ↑ % of attempted credits completed during student's first term
- ↑ % of students persisting from term 1 to term 2
- ↑ % of developmental education students completing developmental education coursework within 1 year
- ↑ % of students completing college-level math and English on first attempt within 1 and 2 years

Progress

- ↑ % of students persisting from year 1 to year 2
- ↑ % of students earning 12 and 24 college credits in years 1 and 2, respectively
- ↑ % of students entering a program of study within 1 and 2 years

Completion

- ↑ % of students completing/transferring within 5 years.
- ↓ % of students earning excess college credits beyond 2-year degree

Time to completion. These research-based strategies are designed to reduce time to completion, which also leads to a cost savings and less risk of unnecessary coursework for students. Appropriate placement in program pathways and on-time completion are important because the public also wants to ensure that students are not using public funds for unnecessary courses or accumulating excessive student debt during a time when student debt and default rates on student loans have risen since 2000 (NCES, 2018).

Implementation and Progress in Action

Since the development of the Completion by Design Loss Momentum Framework (2010), best practices have emerged at various institutions across the nation. Those best practices are supported by the corresponding metrics that indicate achievement within the framework. Research-based models specific to Completion by Design to date are frequently linked to the institutional or organizational change at institutions. Those changes support

improvements within the framework that is measured using basic descriptive statistics or key performance indicators of student success at connection, entry, progress, and completion. Other research-based studies on individual strategies within the framework are emerging. This study may support that body of knowledge.

The researcher considered snapshots of success provided by Completion by Design (2018) on their website. These studies were written based on in-depth interviews with more than 100 higher education experts and leaders to identify key themes for successful changes in higher education. Ten models of transformational change surfaced that are leading to noticeable results for institutions and students. The series of snapshots highlights colleges and universities—such as Franklin and Marshall College, Georgia State University, Lipscomb University—that are embracing this framework to create real and lasting change for students and for the future of higher education (Completion by Design, 2018).

A white paper by Completion by Design (2014) reviewed how five case study colleges have succeeded in creating a culture of student success with effective systematic change. The change focused on practices and processes related to strategies specific to developmental education, advising, and course and program placement. The success of the changes is credited to a transformation by the faculty and staff members who embraced the revised practices.

Edgecombe and Bickerstaff (2018) studied reforms related to developmental education and addressing the needs of the academically underprepared. Their conclusion is that support for the academically underprepared is often measured by the success at the developmental and college-level math or English course level. When considering the overall completion agenda, the rate at which underprepared students complete a program of study has not changed significantly.

The needs of the underprepared college student should be considered throughout their academic careers to realize success at all levels of the framework (Edgecombe & Bickerstaff, 2018).

CVCC's redesign work within their current strategic plan aligns with the Gates Foundation's Loss Momentum Framework and EAB research due to relationships or affiliations at the state level that promote them. This study will provide evidence of the impact of their recommendations. To remove barriers for students entering community college, in fall 2017 the VCCS implemented a new policy of multiple measures for placement testing to permit options for the establishment of college readiness outside of the traditional Virginia Placement Testing (VPT) for Reading and Writing (VCCS Policy Manual, 2018). The policy provides guidelines for placement into college-level coursework for high school graduates based on high school grade point average or SAT and ACT scores. In addition, CVCC began participating in a VCCS pilot study for waivers to placement testing for adult learners that launched in spring 2018 (CVCC, 2018).

In spring 2017 the VCCS acquired EAB's Navigate technology to provide a technological overlay for improvements to services (VCCS, 2017). This technology supports a triage approach by offering a kiosk where students sign in for in-person visits to student support services offices. Navigate technology also includes enhanced early alert capabilities that CVCC launched in spring 2019. CVCC had used a previous platform for early alerts (Hobson's Starfish). Both platforms are designed to trigger responses for intervention and connect students to appropriate resources to include financial, advising, tutoring, or other college services (VCCS, 2018). CVCC has implemented additional staff, business process improvements, and technology upgrades to increase efficiency for advising and financial services to students (CVCC, 2018).

Literature Review Summary

This chapter provides an overview of community colleges, current challenges, and strategies for student success and completion as outlined in the Completion by Design Loss Momentum Framework.

The problem of declining community college enrollment, retention, and completion is well documented and developed throughout the literature reviewed, and the solution varies depending on the characteristics of an institution, the student population, the culture and climate of the community, and the geographical location. Institutions that are developing a research-based approach to increasing student success must consider the reforms as implemented at institutions with similar characteristics when success is already documented.

Chapter 3 presents the methodology within the context of the Completion by Design Loss Momentum Framework to establish the basis for this research, which studies one mid-sized community college in Virginia that has engaged in the implementation of strategies within the LMF. Its progress will be captured by using an adaptation of the LMF key performance indicators as applied within Virginia's performance-based funding model for community colleges.

CHAPTER 3: RESEARCH METHODOLOGY

In this chapter, the research methodology and project design will be explained along with the research questions. Independent and dependent variables will be identified along with control variables for the purpose of this study.

Yin (2009) explains that every research method can be used for exploratory, descriptive, and explanatory research. There are three conditions to consider when determining the appropriate research method. They are: (a) the type of research questions, (b) the extent of control an investigator has over behavioral events, and (c) whether the events that are the focus of the study are contemporary or historical (Yin, 2009). The five components of research design that are important are the study questions, propositions, units of analysis, logic linking the data to the propositions, and the criteria for interpreting the findings (Yin, 2009).

Case Study Research Design

This case study focused on connection, entry, progress, and completion within the Bill and Melinda Gates Foundation Completion by Design Loss Momentum Framework (Completion by Design, 2018) for one institution. Central Virginia Community College defined and implemented a series of strategies specific to the Completion by Design Loss Momentum Framework. Student-level data were collected for cohorts of first-time students entering each fall between 2014 and 2018 using an embedded single-case design. Data collection occurred at each point in the defined processes starting with connection (application yield, advising, financial, course placement method). For applicants who enrolled, data for entry (fall-to-spring retention, advising, course placement method, financial, student success course completion, credit accumulation, early alert intervention) and progression (fall-to-fall retention, advising, course placement method, financial, student success course completion, credit accumulation,

early alert intervention, and successful completion of college-level math and English courses for students who were placed as college-ready or developmental) were collected. Finally, data for on-time completion (completion of associate's degree within three years, advising, course placement method, financial, student success course completion, credit accumulation, successful courses attempts, Early Alert intervention, successful completion of college-level math and English courses for students who were placed as college-ready or developmental) for first-time, program-placed students were compiled.

Panel analysis. This single case study focused on evaluating outcomes associated with variables that are the strategies implemented at CVCC over time. A panel study allows for the collection of data for a number of students at two or more points in time (Kessler & Greenberg, 1981). This research design matched some of the measures for the Completion by Design Loss Momentum Framework implementation by tracking those key performance indicators associated with the progress of students who enter CVCC each fall for 2014, 2015, 2016, 2017, and 2018. Student-level statistical analysis was used to predict the relationship between student success and the specific strategies captured in the study, while also controlling for certain demographic characteristics.

Research Questions and Hypotheses

The research questions and hypotheses for this study included the following:

RQ_1: How does a systematic student intake process impact applicants (connection)?

H_{1a}: Students who met with an advisor or navigator will be more likely to enroll in classes.

H_{1b}: The placement method will be associated with whether students enroll in classes.

H_{1c}: Students who complete the FAFSA are more likely to enroll.

H_{1d}: Students who are awarded financial aid are more likely to enroll.

RQ_2: How do systematic student success interventions impact fall-to-spring retention for first-time-in-college students (entry)?

H_{2a}: Students who meet with an advisor or navigator will be more likely to be retained fall to spring.

H_{2b}: The placement method will be associated with whether students are retained fall to spring.

H_{2c}: Students who complete the FAFSA are more likely to be retained fall to spring.

H_{2d}: Students who are awarded financial aid are more likely to be retained fall to spring.

H_{2e}: Students who complete a student success course in the first term are more likely to be retained fall to spring.

H_{2f}: Students who are successful in more attempted courses (percentage) in the first term are more likely to be retained fall to spring.

H_{2g}: Students who receive positive feedback through Early Alert in the first term are more likely to be retained fall to spring.

H_{2h}: Students who receive negative feedback through Early Alert in the first term are more likely to be retained fall to spring.

RQ_3: How do systematic student success interventions impact fall-to-fall retention for first- time-in-college students (progress)?

H_{3a}: Students who meet with an advisor or navigator will be more likely to be retained fall to fall.

H_{3b}: The placement method will be associated with whether students are retained fall to fall.

H_{3c}: Students who complete the FAFSA are more likely to be retained fall to fall.

H_{3d}: Students who are awarded financial aid are more likely to be retained fall to fall.

H_{3e}: Students who complete a student success course in the first term are more likely to be retained fall to fall.

H_{3f}: Students who are successful in more attempted courses (percentage) in the first term are more likely to be retained fall to fall.

H_{3g}: Students who receive positive feedback through Early Alert in the first term are more likely to be retained fall to fall.

H_{3h}: Students who receive negative feedback through Early Alert in the first term are more likely to be retained fall to fall.

H_{3i}: Students who are placed in developmental education courses and complete college-level math and English in their first four semesters (fall, spring, summer, fall) are more likely to be retained fall to fall.

H_{3j}: Students who are placed in college-ready courses and complete college-level math and English in their first three semesters (fall, spring, summer) are more likely to be retained fall to fall.

RQ_4: How do systematic student success interventions impact on-time completion?

H_{4a}: Students who meet with an advisor or navigator will be more likely to complete a degree within three years of their first fall enrollment.

H_{4b}: The placement method will be associated with whether students are more likely to complete a degree within three years of their first fall enrollment.

H_{4c}: Students who complete the FAFSA are more likely to complete a degree within three years of their first fall enrollment.

H_{4d}: Students who are awarded financial aid are more likely to complete a degree within three years of their first fall enrollment.

H_{4e}: Students who complete a student success course in the first term are more likely to complete a degree within three years of their first fall enrollment.

H_{4f}: Students who are successful in more attempted courses (percentage) in the first term are more likely to complete a degree within three years of their first fall enrollment.

H_{4g}: Students who receive positive feedback through Early Alert first term are more likely to complete a degree within three years of their first fall enrollment.

H_{4h}: Students who receive negative feedback through Early Alert in the first term are more likely to complete a degree within three years of their first fall enrollment.

H_{4i}: Students who are placed in developmental education courses and complete college-level math and English in their first four semesters (fall, spring, summer, fall) are more likely to complete a degree within three years of their first fall enrollment.

H_{4j}: Students who are placed in college-ready courses and complete college-level math and English in their first three semesters (fall, spring, summer) are more likely to complete a degree within three years of their first fall enrollment.

Because this study focused on "how" forms of research questions and contemporary events for a single community college, the case study research design was appropriate, and case study research methodology was used. This method was selected because it explains the causal links in complex, real-life student success interventions. The explanations linked program implementation with program effects (Yin, 2003).

Study propositions. The Completion by Design Loss Momentum Framework provided the theoretical background and associated measures to determine success. Further study was needed to determine the impact of these strategies specific to CVCC and the students served in the region. In addition to the measures of success associated with the LMF, this study was designed to determine whether full-time enrollment status and the demographic characteristics of age, race, gender, and socioeconomic status were associated with the dependent variables. These findings supported CVCC in targeting resources to make significant impact on student success rates.

Units of Analysis and Measurement

The study's unit of analysis was students. Dependent variables were initial enrollment as measured by credit application yield, fall-to-spring and fall-to-fall retention, and on-time completion. These variables are associated with the key performance indicators in the LMF, the VCCS performance-based funding model metrics, and the CVCC strategic plan.

Dependent, independent, and control variables included in this analysis were:

Table 3.1

Central Virginia Community College Case Study Dependent Variables

Dependent Variables (Y)	**Construct**	**Measurement**	**Source**
Connection	First-time-in-college program-placed applicants	0 = not enroll 1 = enroll	Student Information System
Entry	Fall-to-Spring Retention in first term	0 = not retained 1 = retained	Student Information System
Progress	Fall-to-Fall Retention in first year	0 = not retained 1 = retained	Student Information System
Completion	On-time graduation	0 = did not earn an associate degree in three years 1 = earned an associate degree in three years.	Student Information System

Table 3.2

Central Virginia Community College Case Study Independent Variables

Independent Variables (X)	**Construct**	**Measurement**	**Source**
Advising	Appointment on CVCC Campus or at an off-site center or high school	0 = not advised 1 = advised	Counseling and Navigate records
Placement Method	Instrument used to establish ability to succeed in college-level coursework	Virginia Placement Test: 0 = No, 1 = Yes High School GPA: 0 = No, 1 = Yes SAT/ACT Score: 0 = No, 1 = Yes Informed Self Placement: 0 = No, 1 = Yes	Student Information System
FAFSA	FAFSA Application Completed	0 – No FAFSA 1 – FAFSA Completed	Student Information System
Financial Aid	Federal Aid Disbursed	0 = No Award 1 = Awarded	Student Information System
Student Success Course	Successful completion of a student success course	0 = Not Completed 1 = Completed	Student Information System
Credits Completed in first term	Attempted credits completed in first term	Percent of attempted credits completed in first term	Student Information System
Early Alert	Flag(s) raised by faculty or staff for student success intervention	0 = no 1 = yes	SAILS/Navigate
Early Alert Negative	Flag raised by faculty or staff to communicate concern and initiate intervention during first term.	0 = no 1 = yes	SAILS/Navigate

Independent Variables (X)	Construct	Measurement	Source
Positive Early Alert Intervention	Kudo issued by faculty or staff to communicate encouragement during first term.	0 = no 1 = yes	SAILS/Navigate
Developmental Math	If placed in developmental math course, successfully completed college-level math in four semesters (fall, spring, summer, fall).	0 = not completed 1 = completed	Student Information System
Developmental English	If placed in developmental English course, successfully completed college-level English in four semesters (fall, spring, summer, fall).	0 = not completed 1 = completed	Student Information System
College-Ready Math	If placed in college-ready math course, successfully complete college-level math in three semesters (fall, spring summer).	0 = not completed 1 = completed	Student Information System
College-Ready English	If placed in college-ready English course, successfully completed college level English in three semesters (fall, spring, summer).	0 = not completed 1 = completed	Student Information System

Table 3.3

Central Virginia Community College Case Study Label and Control Variables

Control Variables (C)	Construct	Measure	Source
Age	Age of student at start of each term	Age rounded to year	Student Information System
Term	First Term of Enrollment	2144 = Fall 2014 2154 = Fall 2015 2164 = Fall 2016 2174 = Fall 2017 2184 = Fall 2018	Student Information System
Gender	Student self-identified gender at time of application	0 = Male 1 = Female	Student Information System
People of Color	Student self-identified race at time of application	0 = White 1 = Non-White	Student Information System
Socioeconomic Status	Pell Eligibility	0 = No Pell Eligible 1 = Pell Eligible	Student Information System
Full Time/Part Time	Full- or part-time enrollment status	1 = Full time (12 or more credits) 2 = Part time (Less than 12 credits)	Student Information System
Program Type	Transfer or Career and Technical (CTE)	1 = Transfer 2 = CTE	Student Information System

Logic Linking Data to Framework

This was be a single-case study design, but the study examined four dependent variables. The rationale for the single-case study design was based on the longitudinal nature of the data to be analyzed in the study. CVCC's data were analyzed for cohorts of students who enrolled for the first time in five fall terms to measure the impact that certain conditions had over time. In this case, the conditions were the implementation of the Completion by Design Loss Momentum Framework strategies. The units of analysis included the individual student data.

Sample. First-time-in-college program-placed students entering CVCC each fall for 2014, 2015, 2016, 2017, and 2018 were included in the sample. Student data were coded to align with the key performance indicators to measure progress as defined by Virginia's performance-based funding model in association with the Loss Momentum Framework. This case study focused on a purposive sample that included those students. The sample consisted of approximately 5,490 applicants for the Connection analyses and 2,947 enrolled students for the Entry, Progress, and Completion analyses. This study collected and analyzed student-level data specific to the independent, dependent, and control variables. Results were reported in aggregate and no personally identifiable information about students was included in the data set or analysis.

Data collection. Data collection occurred through normal onboarding and enrollment processes at the community college. General demographic information was captured in the college's online application. College readiness, program placement, credit accumulation, course success and enrollment, and financial information were recorded in the student information system (SIS), PeopleSoft. Advising appointments, early alert, and other interaction on campus were retrieved from the colleges' appointment, SAILS, and *Navigate* systems. These data were mined, joined, coded, and analyzed using SIS Query, Excel, SAS, and SPSS.

Participants were identified as part of standard educational research at an educational institution. The researcher is an employee of the institution and has access to the data as part of ongoing job duties. When using information protected by Family Educational Rights Privacy Act (FERPA), proper disclosure avoidance techniques and proper methods for de-identification and suppression of students' personally identifiable information from education records was used.

Each fall CVCC and the VCCS identify students who are first time in college and program placed. Formerly dual enrolled and students who enrolled for the first time in the summer preceding the fall enrollment are also considered first time in college. They are identified as part of a "group" within the PeopleSoft student information system (SIS) and "tagged" in *Navigate* since its launch in summer 2018. These students were used in data analysis for five years, 2014, 2015, 2016, 2017, and 2018.

Quantitative Analysis

The raw data for the students included in the sample were first exported into Microsoft Excel (2017) from CVCC's Student Information System (SIS) and college-maintained SAS files. Data from CVCC's files were then imported into IBM Statistical Package for the Social Sciences (SPSS) Graduate Pack version 25. SPSS was used to analyze quantitative data through binomial logistic regression. The impact of the independent variables (advising, financial aid, success in courses, early alert, and placement method) on the dependent variables (enrollment, retention, and completion) was analyzed. Hypotheses for binary (dummy) variables were tested using logistic regression models to understand which among the independent variables were related to the dependent variables, and to explore the forms of these relationships. The analyses controlled for the student the demographic characteristics of age, race, gender, full-time enrollment, and socioeconomic status. The binary logistic regression is an appropriate statistical analysis when the purpose of research is to assess if a set of independent variables predict a dichotomous dependent variable (Stevens, 2009).

Quality, validity, and reliability. Consistent with case study research, quality, validity, and reliability was ensured as follows:

- Construct validity was determined by identifying the appropriate unit of measure for the analysis being conducted. A key informant who is an expert in the community college system serves as a member of this research committee and reviewed this case study report for construct validity.
- Internal validity was ensured through data analysis pattern matching and by developing logic models within the framework. The data collection occurred at consistent times during each enrollment cycle to reflect the census dates for actual enrollment for the terms included in this study.
- External validity was established by generalizing to theory and not to other case studies.
- Reliability was ensured by using appropriate case study protocol and by establishing a case study database.

Methodology Summary

The process for determining the appropriate methodology for this study included the development of a plan and research questions. Once those questions were defined and the context of a contemporary theoretical framework, along with the longitudinal data to be used for the study, the single case study, embedded case design described by Yin (2009) emerged as the appropriate method. Case study research practices were employed to ensure the quality, validity, and reliability of this project.

CHAPTER 4: ANALYZING AND PRESENTING THE RESULTS

This chapter presents results in two sections. First, the descriptive statistics are disclosed as they relate to the student-level data in the sample. Second, tables and narratives are presented that summarize the results from the statistical analyses. This section is divided into subsections based on the LMF categories used in the analyses for Connection, Entry, Progress, and Completion. An examination of the research questions as they relate to the data collected is conducted, indicating whether each was supported or not supported in the study.

Descriptive Statistics

First-time-in-college, program-placed students entering CVCC each fall for 2014, 2015, 2016, 2017, and 2018 were included in the sample. Student data were coded to align with the key performance indicators to measure progress according to the Loss Momentum Framework. As shown in Table 4.1, the sample consisted of approximately 5,490 applicants for the Connection analyses and 2,947 enrolled students included in the Entry, Progress, and Completion analyses. This study collected and analyzed student-level data specific to the independent, dependent, and control variables as described in the following tables. Seventy-five percent of entering students returned for a second term (fall-to-spring retention), compared to 49% persisting into their second academic year (fall-to-fall retention). Overall, 17% of students entering in the fall of 2014, 2015, or 2016 completed their associate degree within three years of entering. Three years or 150% time to completion is considered a standard measure of time for a student to complete a two-year associate degree program (NCES, 2020).

Table 4.2 represents descriptive statistics for independent, dependent, and control variables. Fifty-four percent of students were females, the average age for the entering students was 19.89, 52% were Pell Grant recipients, and 56% were enrolled full time which is defined as

12 credit hours or greater. Twelve credit hours is the minimum full-time academic load as defined by VCCS Policy 5.6.4 (VCCS, 2020).

Table 4.1

Number and Percent for Categories

	N	**%**
Connection (Applied *N* = 5490)	2947	53.7
Entry (Retained Fall to Spring)	2224	75.5
Progress (Retained Fall to Fall)	1432	48.6
Completion (Graduated within three years *N* = 1871*)	326	17.4

*Completion rates are only available for cohorts entering in fall of 2014, 2015, and 2016.

Table 4.2

Descriptive Statistics for Enrolled (*N* = 2947)

	Mean	***Std. Deviation***
Fall-to-Spring Retention	0.75	0.43
Fall-to-Fall Retention	0.49	0.50
Graduation On time*	0.17	0.38
Age**	19.89	4.72
Gender – Male (0); Female (1)	0.54	0.50
People of Color	0.33	0.47
PELL Grant Recipient	0.52	0.50
Full Time	0.56	0.50
Financial Aid Application Completed	0.81	0.39
Federal Financial Aid Disbursed	0.57	0.50
Student Success Skills Course Completion	0.50	0.50
Credits Completed in First Term	7.15	4.95
Credits Accumulated at end of First Term	10.85	10.29
Credits Attempted in First Term	10.58	3.87
Credits Attempted Success (%)	0.70	0.59
Cumulative GPA at end of First Term	2.33	1.22
Advising	0.48	0.50
Placement Method – Virginia Placement Test	0.94	0.23
Placement Method – High School GPA	0.02	0.13
Placement Method – SAT/ACT	0.04	0.19
Early Alert – Positive	0.76	1.51
Early Alert – Negative	0.83	1.19
Early Alert – Total	1.58	1.86
Developmental – Math Completed	0.05	0.21

	Mean	***Std. Deviation***
Developmental – English Completed	0.02	0.13
College-ready – Math Completed	0.24	0.43
College-ready – English Completed	0.49	0.50
College Transfer Program	0.72	0.45

*Completion *N* = 1871
**Age minimum = 18; Age Maximum = 58

Results and Findings

Connection. RQ_1: How does a systematic student intake process impact applicants (Connection)?

A binomial logistic regression was performed to ascertain the effects of advising, placement method, financial aid application, and financial aid disbursed on the likelihood that applicants will enroll. The logistic regression model was statistically significant, $\chi 2(5) = 3496.00$, $p < .001$. The model explained 62.9% (Nagelkerke R2) of the variance in enrolling and correctly classified 83.2% of cases. Sensitivity was 76.6%, specificity was 90.8%, positive predictive value was 90.6%, and negative predictive value was 77%. Of the five predictor variables, two were statistically significant: advising and financial aid application completed. The odds of students who were advised enrolling were 6.66 times greater than that of students who did not receive advising (Exp(B)=6.66). The odds of students completing their financial aid application enrolling were 1.96 times that of applicants who did not complete the paperwork (Exp(B)=1.96).

Table 4.3

Logistic Regression Predicting Likelihood of Enrolling after Applying for the First Time

	B	*S.E.*	*Wald*	*df*	*p*
Constant	-1.49	0.06	701.70	1	0.000
Advising	1.90	0.09	430.59	1	0.000
Placement Method – High School GPA	20.05	4501.05	0.00	1	0.996
Placement Method – SAT/ACT	20.33	3162.29	0.00	1	0.995
Financial Aid Application Completed	0.68	0.08	76.56	1	0.000
Federal Financial Aid Disbursed	21.29	919.84	0.00	1	0.982

- H_{1a}: Students who met with an advisor or navigator will be more likely to enroll in classes. **(Supported)**

  A binomial logistic regression was run to understand the effects of meeting with an advisor or navigator on enrolling for the first time. Meeting with an advisor or navigator was a statistically significant predictor of enrollment ($p < .001$). An applicant who met with an advisor was more likely to enroll than an applicant who did not.

- H_{1b}: The placement method will be associated with whether students enroll in classes. **(Not supported)**

  A binomial logistic regression was run to understand the effects of placement method on enrolling for the first time. Ninety-four percent (94%) of students were placed using the Virginia Placement Test (VPT), 2% were placed by high school grade point average (GPA), and 4% by SAT/ACT. Placement method was not a statistically significant predictor of enrollment ($p > .05$).

- H_{1c}: Students who complete the FAFSA are more likely to enroll. **(Supported)**

  A binomial logistic regression was run to understand the effects of completing the FAFSA on enrolling for the first time. Completing the FAFSA was a statistically significant predictor of enrollment ($p < .001$). An applicant who completed a FAFSA was more likely to enroll than an applicant who did not.

- H_{1d}: Students who are awarded financial aid are more likely to enroll. **(Not Supported)**

  A binomial logistic regression was run to understand the effects of awarding financial aid on enrolling for the first time. Disbursing financial aid to an applicant was not a statistically significant predictor of enrollment ($p > .05$). The data captured only financial aid funds if disbursed. Applicants who did not enroll did not have any disbursed financial aid funds.

Entry. RQ_2: How do systematic student success interventions impact fall-to-spring retention for first-time-in-college students (Entry)?

A binomial logistic regression was performed to ascertain the effects of advising, placement method, financial aid application, financial aid disbursed, successful completion of the student success skills course by the end of the first term, percent of attempted credits successfully completed, early alert raised (positive), early alert raised (negative), age, people of color, full-time enrollment, gender, program type, and Pell eligibility on the likelihood that applicants will return in the spring following their first fall enrollment. The logistic regression model was statistically significant, $\chi2(15) = 655.25$, $p < .001$. The model explained 29.7 (Nagelkerke R2) of the variance in enrolling and correctly classified 80.5% of cases. Sensitivity was 93.6%, specificity was 40.2%, positive predictive value was 82.82%, and negative predictive value was 67.21%. Of the predictor variables, seven were statistically significant in predicting

the likelihood of a student to return in the spring following their first fall enrollment: advising, financial aid application completed, successful completion of the student success skills course, percent of attempted credits successfully completed, early alert (positive), age, and full-time enrollment. Increasing age and early alerts (positive) were negatively associated with fall-to-spring retention. The odds of students who were advised were 1.914 times more likely to return in the spring compared to students who did not receive advising (Exp(B)=1.914). The odds of students receiving an early alert (positive) returning in spring were 0.913 times fewer than that of applicants who did not receive an early alert (positive) (Exp(B)=0.913). The odds of students who enrolled full-time returning in the spring were 2.485 times than that of students who did not enroll full time (Exp(B)=2.485).

Table 4.4 presents the results for the logistic regression predicting the likelihood of students returning in spring after their first fall term.

Table 4.4

Logistic Regression Predicting Likelihood of Returning in Spring after First Fall Term

	B	*S.E.*	*Wald*	*df*	*p*
Constant	-0.55	0.26	4.34	1	0.037
Advising	0.65	0.10	41.35	1	0.000
Placement Method – High School GPA	0.80	0.56	2.07	1	0.150
Placement Method – SAT/ACT	-0.05	0.28	0.03	1	0.853
Financial Aid Application Completed	0.38	0.15	6.89	1	0.009
Federal Financial Aid Disbursed	-0.02	0.18	0.02	1	0.898
Student Success Skills Course Completion	0.97	0.11	83.23	1	0.000
Credits Attempted Success (%)	0.01	0.00	114.06	1	0.000
Early Alert – Positive	-0.09	0.03	8.93	1	0.003
Early Alert – Negative	0.07	0.04	2.40	1	0.122
Age	-0.03	0.01	7.62	1	0.006
People of Color	-0.13	0.11	1.53	1	0.215
Full Time	0.91	0.10	77.41	1	0.000
Gender	-0.01	0.10	0.00	1	0.958
PELL Grant Recipient	0.33	0.17	3.57	1	0.059
College Transfer Program	-0.18	0.12	2.31	1	0.129

- H_{2a}: Students who met with an advisor or navigator will be more likely to be retained fall to spring. **(Supported)**

  A binomial logistic regression was run to understand the effects of meeting with an advisor or navigator on retaining a student from fall to spring. Meeting with an advisor or navigator was a statistically significant predictor of fall-to-spring retention ($p < .001$). Students who met with an advisor were more likely to return in the spring after their first fall than students who did not.

- H_{2b}: The placement method will be associated with whether students are retained fall to spring. **(Not Supported)**

  A binomial logistic regression was run to understand the effects placement method on fall to spring retention. Ninety-four percent (94%) of students were placed using the Virginia Placement Test (VPT), 2% were placed by high school grade point average (GPA), and 4% by SAT/ACT. Placement method was not a statistically significant predictor of fall-to-spring retention ($p > .05$).

- H_{2c}: Students who complete the FAFSA are more likely to be retained fall to spring. **(Supported)**

  A binomial logistic regression was run to understand the effects of completing the FAFSA on retaining a student from fall to spring. Completing the FAFSA was a statistically significant predictor of fall-to-spring retention ($p = .009$). Students who completed the FAFSA were more likely to return in the spring after their first fall than students who did not.

- H_{2d}: Students who are awarded financial aid are more likely to be retained fall to spring. **(Not Supported)**

  A binomial logistic regression was run to understand the effects of being awarded financial aid on fall-to-spring retention. Being awarded financial aid was not a statistically significant predictor of fall-to-spring retention ($p > .05$).

- H_{2e}: Students who complete a student success course in the first term are more likely to be retained fall to spring. **(Supported)**

  A binomial logistic regression was run to understand the effects of completing a student success course on retaining a student from fall to spring. Completing a student success

course was a statistically significant predictor of fall-to-spring retention ($p = .001$). Students who completed a student success course were more likely to return in the spring after their first fall than students who did not.

- H_{2f}: Students who are successful in more attempted courses (percentage) in the first term are more likely to be retained fall to spring. **(Supported)**

  A binomial logistic regression was run to understand the effects of successful completion of attempted courses (percentage) on retaining a student from fall to spring. The percentage of courses completed was a statistically significant predictor of fall to spring retention ($p < .001$). On average, students completed 70% of the courses attempted. Students with a higher percentage of successful courses completed were more likely to return in the spring after their first fall than students who did not.

- H_{2g}: Students who receive positive feedback through early alert in their first term are more likely to be retained fall to spring. **(Not Supported)**

  A binomial logistic regression was run to understand the effects of feedback (positive) through early alert on retaining a student from fall to spring. Student feedback (positive) through early alert was a statistically significant predictor of fall-to-spring retention ($p = .003$) with a negative result ($B = -.09$). Students who received feedback (positive) were less likely to return in the spring after their first fall than students who did not.

- H_{2h}: Students who receive negative feedback through early alert in the first term are more likely to be retained fall to spring. **(Not Supported)**

  A binomial logistic regression was run to understand the effects of student feedback (negative) through early alert on fall-to-spring retention. Student feedback (negative)

through Early Alert was not a statistically significant predictor of fall-to-spring retention ($p > .05$).

Progress. RQ_3: How do systematic student success interventions impact fall-to-fall retention for first- time-in-college students (Progress)?

A binomial logistic regression was performed to ascertain the effects of advising, placement method, financial aid application, financial aid disbursed, successful completion of the student success skills course by the end of the first term, percent of attempted credits successfully completed, early alert raised (positive), early alert raised (negative), successful completion of college-level math and English by developmental students in four semesters, completion of college-level math and English by college-ready students in three semesters, age, people of color, full-time enrollment, gender, program type, and Pell eligibility on the likelihood that applicants will return in the fall a year after their first fall enrollment. The logistic regression model was statistically significant, $\chi 2(19) = 522.25$, $p < .001$. The model explained 22% (Nagelkerke R2) of the variance in enrolling and correctly classified 67.1% of cases. Sensitivity was 64%, specificity was 70%, positive predictive value was 66.8%, and negative predictive value was 67.3%. Of the predictor variables, nine were statistically significant: advising, high school GPA placement, successful completion of the student success skills course, early alert (positive), college-level math and English course completion by developmental students, college-level math and English course completion by college-ready students, and full-time enrollment. The odds of students who were advised were 1.642 times more likely to return in the fall compared to students who did not receive advising (Exp(B)=1.642). The odds of students who were placed using Placement Method – GPA returning in fall were 2.519 times that of students who were not placed using Placement Method – GPA (Exp(B)=2.519). The odds of

students who completed the Student Success Course returning in the fall were 1.783 greater than that of students who did complete the Student Success Course (Exp(B)=1.783). The odds of developmental students who completed college-level math coursework in their first four semesters returning in the fall were 7.269 times greater than developmental students who did not complete college-level math coursework in the first four semesters (Exp(B)=7.269). The odds were 4.141 times greater that developmental students who completed college-level English coursework in four semesters would return in the fall than that of developmental students who did not complete college-level English coursework in four semesters (Exp(B)=4.141).

Table 4.5 presents the results for the logistic regression predicting the likelihood of students returning in fall after their first academic year.

Table 4.5

Logistic Regression Predicting Likelihood of Returning in Fall after First Academic Year

	B	*S.E.*	*Wald*	*df*	*p*
Constant	-1.03	0.24	18.29	1	0.000
Advising	0.50	0.09	34.39	1	0.000
Placement Method – High School GPA	0.92	0.32	8.42	1	0.004
Placement Method – SAT/ACT	0.32	0.22	2.06	1	0.152
Financial Aid Application Completed	-0.17	0.13	1.797	1	0.180
Federal Financial Aid Disbursed	-0.08	0.15	0.28	1	0.594
Student Success Skills Course Completion	0.58	0.09	46.66	1	0.000
Credits Attempted Success (%)	0.00	0.00	3.79	1	0.052
Early Alert – Positive	-0.11	0.03	14.93	1	0.000
Early Alert – Negative	0.05	0.04	1.65	1	0.199
Developmental – Math Completed	1.98	0.29	48.50	1	0.000

	B	*S.E.*	*Wald*	*df*	*p*
Developmental – English Completed	1.42	0.34	17.88	1	0.000
College-ready – Math Completed	.48	.11	20.26	1	0.000
College-ready – English Completed	.63	.09	46.31	1	0.000
Age	-0.01	0.01	.74	1	0.390
People of Color	-0.03	0.09	.10	1	0.752
Full Time	0.45	0.09	27.30	1	0.000
Gender	-0.08	0.09	0.93	1	0.335
PELL Grant Recipient	0.03	0.14	0.03	1	0.854
College Transfer Program	-0.08	0.10	0.71	1	0.398

- H_{3a}: Students who met with an advisor or navigator will be more likely to be retained fall to fall. **(Supported)**

  A binomial logistic regression was run to understand the effects of meeting with an advisor or navigator on retaining a student from fall to fall. Meeting with an advisor or navigator was a statistically significant predictor of fall-to-fall retention ($p < .001$). Students who met with an advisor were more likely to return in the fall after their first fall than students who did not.

- H_{3b}: The placement method will be associated with whether students are retained fall to fall. **(High School GPA – Supported; SAT/ACT – Not Supported)**

  A binomial logistic regression was run to understand the effects of placement method on fall-to-fall retention. Ninety-four percent (94%) of students were placed using the Virginia Placement Test (VPT), 2% were placed by high school grade point average (GPA), and 4% by SAT/ACT. The high school GPA placement method was a statistically significant predictor of fall-to-fall retention ($p = .004$). The SAT/ACT

placement method was not a statistically significant predictor of fall-to-fall retention ($p > .05$). Students who were placed based on high school GPA were more likely to return in the fall after their first fall than students who were placed by the Virginia Placement Test.

- H_{3c}: Students who complete the FAFSA are more likely to be retained fall to fall. **(Not Supported)**

  A binomial logistic regression was run to understand the effects of completing the FAFSA on retaining a student from fall to fall. Completing the FAFSA was not a statistically significant predictor of fall-to-fall retention ($p > .05$).

- H_{3d}: Students who are awarded financial aid are more likely to be retained fall to fall. **(Not Supported)**

  A binomial logistic regression was run to understand the effects of being awarded financial aid on fall-to-fall retention. Having financial aid disbursed was not a statistically significant predictor of fall-to-fall retention ($p > .05$).

- H_{3e}: Students who complete a Student Success Course in the first term are more likely to be retained fall to fall. **(Supported)**

  A binomial logistic regression was run to understand the effects of completing a student success course on retaining a student from fall to fall. Completing a student success course was a statistically significant predictor of fall-to-fall retention ($p < .001$). Students who completed a student success course were more likely to return in the fall after their first fall than a student who did not.

- H_{3f}: Students who are successful in more attempted courses (percentage) in the first term are more likely to be retained fall to fall. **(Not Supported)**

A binomial logistic regression was run to understand the effects of successful completion of attempted courses (percentage) on retaining a student from fall to fall. Successful completion of attempted courses (percentage) in the first term was not a statistically significant predictor of fall-to-fall retention.

- H_{3g}: Students who receive positive feedback through early alert first term are more likely to be retained fall to fall. **(Not Supported)**

  A binomial logistic regression was run to understand the effects of feedback (positive) through early alert on retaining a student from fall to fall. Student feedback (positive) through early alert was a statistically significant predictor of fall-to-fall retention ($p < .001$) with a negative result (B = -.11). Students who received feedback (positive) were less likely to return in the fall after their first fall than students who did not.

- H_{3h}: Students who receive negative feedback through early alert in the first term are more likely to be retained fall to fall. **(Not Supported)**

  A binomial logistic regression was run to understand the effects student feedback (negative) through early alert on fall-to-fall retention. Student feedback (negative) through early alert was not a statistically significant predictor of fall-to-fall retention ($p > .05$).

- H_{3i}: Students who are placed in developmental education courses and complete college-level math and English in their first four semesters (fall, spring, summer, fall) are more likely to be retained fall to fall. **(Supported)**

  A binomial logistic regression was run to understand the effects of successful completion of college-level math and English in the first four semesters by students placed in developmental courses on retaining a student from fall to fall. Successful completion of

college-level math and English courses in the first four semesters by students placed in developmental courses was a statistically significant predictor of fall-to-fall retention ($p < .001$). Students who placed in developmental courses and successfully completed college-level math and English course(s) in their first four semesters were more likely to return in the fall after their first fall than a student who did not.

- H_{3j}: Students who are placed in college-ready courses and successfully complete college-level math and English in their first three semesters (fall, spring, summer) are more likely to be retained fall to fall. **(Supported)**

  A binomial logistic regression was run to understand the effects of successful completion of college-level math and English courses by college-ready students in the first three semesters (fall, spring, summer) on retaining a student from fall to fall. Successful completion of college-level math and English courses by college-ready students was a statistically significant predictor of fall-to-fall retention ($p < .001$). College-ready students who successfully completed college-level math and English course(s) were more likely to return in the fall after their first fall than students who did not.

Completion. RQ_4: How do systematic student success interventions impact on-time completion?

A binomial logistic regression was performed to ascertain the effects of advising, placement method – SAT/ACT, financial aid application, financial aid disbursed, successful completion of the student success skills course by the end of the first term, percent of attempted credits successfully completed, early alert raised (positive), early alert raised (negative), successful completion of college-level math and English by developmental students in first four semesters, completion of college-level math and English by college-ready students in three

semesters, age, people of color, full-time enrollment, gender, program type, and Pell eligibility on the likelihood that applicants will complete an associate's degree or diploma within three years of enrolling. The logistic regression model was statistically significant, $\chi 2(18) = 502.47$, $p < .001$. The model explained 39% (Nagelkerke R2) of the variance in enrolling and correctly classified 83.9% of cases. Sensitivity was 33.1%, specificity was 94.6%, positive predictive value was 56.25%, and negative predictive value was 87%. Of the predictor variables, nine were statistically significant: advising, successful completion of the student success skills course in the first term, early alert (positive), successful completion of college-level math and English by developmental students, successful completion of college-level math and English by college-ready students, full time enrollment, and program type. The odds of students who were advised were 1.510 times greater to complete compared to students who did not receive advising (Exp(B)=1.510). The odds of students who completed the student success course completing on time were 1.917 times greater than that of students who did complete the student success course (Exp(B)=1.917). The odds of developmental students who completed college-level math coursework in four semesters were 5.732 times greater to complete than that of developmental students who did not complete college-level math coursework in the first four semesters (Exp(B)=5.732). The odds of college-ready students who completed college-level math coursework in three semesters completing on time were 6.670 times greater than that of college-ready students who did not complete college-level math coursework in three semesters (Exp(B)=6.670). The odds of developmental students who completed college-level English coursework in four semesters completing on time were 3.538 greater than that of developmental students who did not complete college-level English coursework in four semesters (Exp(B)=3.538). The odds of college-ready students who completed college-level math

coursework in three semesters completing on time were 3.236 times greater than that of students who did not complete college-level English coursework in three semesters (Exp(B)=3.236).

Table 4.6 presents the results for the logistic regression predicting the likelihood of students completing an associate degree on time (within three years).

Table 4.6

Logistic Regression Predicting Likelihood of On-time Completion

	B	*S.E.*	*Wald*	*df*	*p*
Constant	-4.28	0.48	78.18	1	0.000
Advising	0.41	0.16	6.77	1	0.009
Placement Method – SAT/ACT	0.28	0.37	0.54	1	0.460
Financial Aid Application Completed	-0.13	0.20	0.42	1	0.518
Federal Financial Aid Disbursed	0.13	0.26	0.26	1	0.609
Student Success Skills Course Completed	0.65	0.16	16.05	1	0.000
Credits Attempted Success (%)	0.00	0.00	0.88	1	0.349
Early Alert – Positive	-0.15	0.08	4.15	1	0.042
Early Alert – Negative	0.08	0.06	1.71	1	0.192
Developmental – Math Completed	1.75	0.25	47.84	1	0.000
Developmental – English Completed	1.26	0.47	7.13	1	0.008
College-ready – Math Completed	1.90	0.17	122.58	1	0.000
College-ready – English Completed	1.17	0.22	28.32	1	0.000
Age	0.02	0.02	1.31	1	0.252
People of Color	-0.26	0.18	2.06	1	0.152
Full Time	0.90	0.18	24.76	1	0.000
Gender	0.14	0.16	0.86	1	0.355
PELL Grant Recipient	-0.41	0.25	2.60	1	0.107
College Transfer Program	-0.90	0.17	29.90	1	0.000

- H_{4a}: Students who met with an advisor or navigator will be more likely to complete a degree within three years of their first fall enrollment. **(Supported)**

  A binomial logistic regression was run to understand the effects of meeting with an advisor or navigator on a student completing a degree within three years of their first fall enrollment. Meeting with an advisor or navigator was a statistically significant predictor of completing a degree within three years of their first fall enrollment ($p = .009$). Students who met with an advisor were more likely to complete a degree within three years of their first fall enrollment than students who did not.

- H_{4b}: The placement method will be associated with whether students are more likely to complete a degree within three years of their first fall enrollment. **(Not Supported)**

  A binomial logistic regression was run to understand the effects of placement method on a student completing a degree within three years of their first fall enrollment. Ninety-four percent (94%) of students were placed using the Virginia Placement Test (VPT), 2% were placed by high school grade point average (GPA), and 4% by SAT/ACT. Placement method was not a statistically significant predictor of completing a degree within three years of the first fall enrollment ($p > .05$). The addition of high school GPA as an alternative to placement testing was implemented by the VCCS in 2017. There were no completers who were placed by high school GPA, so that variable was excluded from this phase of the analyses.

- H_{4c}: Students who complete the FAFSA are more likely to complete a degree within three years of their first fall enrollment. **(Not Supported)**

  A binomial logistic regression was run to understand the effects of completing the FAFSA on a student completing a degree within three years of their first fall enrollment.

Completing the FAFSA was not a statistically significant predictor of completing a degree within three years of the first fall enrollment ($p > .05$).

- H_{4d}: Students who are awarded financial aid are more likely to complete a degree within three years of their first fall enrollment. **(Not Supported)**

  A binomial logistic regression was run to understand the effects of being awarded financial aid on a student completing a degree within three years of their first fall enrollment. Having disbursed financial aid was not a statistically significant predictor of completing a degree within three years of the first fall enrollment ($p > .05$).

- H_{4e}: Students who complete a student success course in the first term are more likely to complete a degree within three years of their first fall enrollment. **(Supported)**

  A binomial logistic regression was run to understand the effects of completing a student success course on a student completing a degree within three years of their first fall enrollment. Completing a student success course was a statistically significant predictor of completing a degree within three years of the first fall enrollment ($p < .001$). Students who completed a student success course were more likely to complete a degree within three years of their first fall enrollment than students who did not.

- H_{4f}: Students who are successful in more attempted courses (percentage) in the first term are more likely to complete a degree within three years of their first fall enrollment. **(Not Supported)**

  A binomial logistic regression was run to understand the effects of successful completion of attempted courses (percentage) on students completing a degree within three years of their first fall enrollment. The percentage of courses completed was not a statistically

significant predictor of completing a degree within three years of the first fall enrollment ($p > .05$).

- H_{4g}: Students who receive positive feedback through Early Alert first term are more likely to complete a degree within three years of their first fall enrollment. **(Not Supported)**

  A binomial logistic regression was run to understand the effects of student feedback (positive) through early alert on students completing a degree within three years of their first fall enrollment. Student feedback (positive) through Early Alert was a statistically significant predictor of completion of a degree within three years of the first fall enrollment ($p < .05$) with a negative result (B = -.15). Students who received positive feedback through Early Alert were less likely to complete a degree within three years of their first fall enrollment than students who did not.

- H_{4h}: Students who have negative feedback through Early Alert in the first term are more likely to complete a degree within three years of their first fall enrollment. **(Not Supported)**

  A binomial logistic regression was run to understand the effects of student feedback (negative) through early alert on students completing a degree within three years of their first fall enrollment. Student feedback (negative) through early alert was not a statistically significant predictor of completion of a degree within three years of the first fall enrollment ($p > .05$).

- H_{4i}: Students who are placed in developmental courses and complete college-level math and English in their first four semesters (fall, spring, summer, fall) are more likely to complete a degree within three years of their first fall enrollment. **(Supported)**

A binomial logistic regression was run to understand the effects of successful completion of college-level math and English in the first four semesters by students placed in developmental courses on a student completing a degree within three years of their first fall enrollment. Successful completion of developmental education courses was a statistically significant predictor of the completion of a degree within three years of the first fall enrollment (Math – $p < .001$; English – $p = .008$). Developmental students who successfully completed college-level math and English course(s) were more likely to complete a degree within three years of their first fall enrollment.

- H_{4j}: Students who are placed in college-ready courses and successfully complete college-level math and English in their first three semesters (fall, spring, summer) are more likely to complete a degree within three years of their first fall enrollment. **(Supported)**

  A binomial logistic regression was run to understand the effects of successful completion of college-level math and English courses by college-ready students in the first three semesters (fall, spring, summer) on students completing a degree within three years of their first fall enrollment. Successful completion of college-level math and English courses in the first three semesters was a statistically significant predictor of completion of a degree within three years of the first fall enrollment ($p < .001$). College-ready students who successfully completed college-level math and English course(s) in the first three semesters were more likely to complete a degree within three years of their first fall enrollment than students who did not.

Conclusion

For this study ten variables were tested at the appropriate point in each of the four stages identified in the LMF. The analysis controlled for six additional demographic or categorical

variables for the sample of students from CVCC. As shown in Table 4.7, four strategies positively predicted two or more appropriate stages of the LMF (connection, entry, progress, and completion). The four strategies were advising, a student success course, and college-level math and English success for developmental and college-ready students. Three additional categories positively predicted at least one phase of the LMF: FAFSA completion, placement by high school GPA, and percent of credits successfully completed in the first term. Early alert intervention did not positively predict student retention and completion. Contrary to the study's hypotheses, positive early alerts in the form of "Kudos" indicated a negative relationship with entry and completion.

Of the six demographic and categorical variables measured, full-time enrollment was the only category that had a statistically significant result that positively predicted entry, progress, and completion. Increasing age was associated with a reduction in the likelihood of returning in spring after the first fall. Transfer program placement was also negatively associated with completion, indicating transfer students may leave before earning an associate degree at CVCC. These results are shown in Table 4.7 and Table 4.8.

Table 4.7

Categories Supported by Statistical Significance

	Connection	Entry	Progress	Completion
Advising	+	+	+	+
FAFSA Completed	+	+		
FA Awarded				
Placement Method – HSGPA, SAT/ACT			+ (HSGPA)	
% Credits Successfully Completed		+		
Student Success Course		+	+	+
Developmental Course Success			+	+
College-level Math and English Success				+
Early Alert Kudo (Positive)		-		-
Early Alert (Negative)				

+Indicates positive association; - Indicates negative association

Table 4.8

Demographic Categories Supported by Statistical Significance

	Connection	Entry	Progress	Completion
Full Time		+	+	+
Age		-		
People of Color				
Gender				
PELL				
College Transfer Program				-

+Indicates positive association; - Indicates negative association

CHAPTER 5: SUMMARIZING AND DISCUSSING RESULTS

Introduction

This final chapter discusses the results and conclusion of this study. This chapter also presents a summary of the study, which includes the research problem and purpose along with a review of the methodology. Additionally, the research findings, discussion, and recommendations for action and further study are presented. The chapter concludes with implications for future actions.

Purpose of the Study

The purpose of this study was to understand whether and how some best practices within the Completion by Design Loss Momentum Framework affect student enrollment and completion at Central Virginia Community College. The research examined the relationship of the selected independent variables against dependent variables associated with the students identified for the study. Dependent variables were aligned with the key performance indicators associated with the Completion by Design Loss Momentum Framework and included binary data for enrollment, fall-to-spring and fall-to-fall retention, and completion for students who entered a program of study for the first time. Independent variables included credit accumulation, college readiness assessment type, successful completion of college-level math and English by students placed in developmental courses and successful completion of college-level math and English by students who were placed in college-ready courses, whether financial and advising resources were provided, and participation in a college success skills course within the first term of enrollment. In addition, student support interventions connected to Early Alerts raised by faculty during the first term of study were considered. Whether a positive or negative alert was raised was included in the analysis. Data analysis controlled for full-time enrollment, program

placement, and some basic demographic characteristics including age, gender, race, and socioeconomic status.

Overview of the Problem

More and more colleges are held accountable within required data-reporting processes at the federal, state, and local levels. Funding is often directly connected to the required data reporting. Finding ways to ensure those data are meaningful and significant at an institutional level is necessary to create an environment that promotes growth, improves student success, and enhances overall institutional effectiveness. Even when the data are collected and available, the use of them by institutions may be limited, and it becomes insignificant if administrators, faculty, and staff are not using the information to make improvements that promote student progress and completion. Simply implementing strategies for improvement and collecting data will not lead to the type of improvement intended. Analyzing, summarizing, and sharing the data in meaningful ways will create the greatest positive impact when working toward increasing student success and completion (Phillips et al., 2014, pp. 17-24).

Many states, including the Commonwealth of Virginia, have implemented a performance-based funding model in response to increased scrutiny for failure to meet higher completion rates (Fain, 2017). Virginia's model is adapted from the LMF key performance indicators, creating a well-defined system of accountability. Central Virginia Community College (CVCC) defined and implemented a series of strategies specific to the Completion by Design Loss Momentum Framework (LMF) as part of a six-year student-success-focused strategic plan, Complete 2021, which was launched in July 2015. This case study focused on connection, entry, progress, and completion within the Bill and Melinda Gates Foundation

Completion by Design Loss Momentum Framework (Completion by Design, 2018) as implemented at CVCC.

There are multiple strategies for student success within the LMF and the Complete 2021 strategic plan. Annual publications by the Virginia Community College System (VCCS) report the progress of each of Virginia's Community Colleges within these measures. Colleges benchmark against each other, but due to the large numbers of variables that align with each category, this reporting does not differentiate between individual strategies to determine which ones support each of the LMF categories. This study was designed to determine whether certain strategies implemented at CVCC demonstrate statistical significance in predicting student success in each of the LMF categories. CVCC needs to fully understand the impact of the strategies that have been implemented and to identify their relationship to student success. This understanding will support further enhancements to the programs and services that are identified as positive predictors of student success, while effectively allocating the resources to support them.

Review of methodology. This single case study focused on evaluating outcomes associated with variables that are aligned with the strategies implemented at CVCC over time. As a panel study this case study allowed for the collection of data for students at two or more points in time (Kessler & Greenberg, 1981). This research design matched some of the measures for the Completion by Design Loss Momentum Framework implementation by tracking those key performance indicators associated with the progress of students who entered CVCC each fall for 2014, 2015, 2016, 2017, and 2018. Student-level statistical analysis was used to predict the relationship between student success and each of the specific strategies captured in the study, while also controlling for certain categorical and demographic characteristics.

For this study, student-level data was collected for first-time students entering between 2014 and 2018 using an embedded single-case design. Data collection occurred at each point in the defined processes during 1) connection (application yield, advising, financial aid, course placement method), 2) entry (fall-to-spring retention, advising, course placement method, financial aid, student success course completion, credit accumulation, Early Alert intervention), 3) progression (fall-to-fall retention, advising, course placement method, financial aid, student success course completion, credit accumulation, Early Alert intervention, successful completion of college-level math and English by developmental and college-ready students), and 4) on-time completion which is completion of associate's degree within three years (advising, course placement method, financial aid, student success course completion, credit accumulation, Early Alert intervention, successful completion college-level math and English by developmental and college-ready students).

The raw data for the students included in the sample were first exported into Microsoft Excel (2017) from CVCC's Student Information System (SIS) and college-maintained SAS files. Data from CVCC's files were then imported into IBM Statistical Package for the Social Sciences (SPSS) Graduate Pack version 25. SPSS was used to analyze quantitative data through binomial logistic regression. The impact of the independent variables (advising, financial aid, success in courses, Early Alert, and placement method) on the dependent variables (enrollment, retention, and completion) was analyzed. Hypotheses for binary (dummy) variables were tested using logistic regression models to understand which among the independent variables were related to the dependent variable and to explore the forms of these relationships. The analyses controlled for the student the demographic characteristics of age, race, gender, full-time enrollment, and socioeconomic status. Binary logistic regression was the appropriate statistical analysis for this

study because the purpose of this research was to assess if a set of independent variables predict the various dichotomous dependent variables (Stevens, 2009).

Major Findings

For this study ten variables were tested at the appropriate point in each of the four stages identified in the LMF. The analysis controlled for six additional demographic or categorical variables for the sample of students from CVCC. Figure 5.1 illustrates the eight categories (in blue) that were supported as positively predicting a stage (in green) of the LMF (connection, entry, progress, and completion). They were advising, FAFSA completion, a student success course, full-time enrollment, college-level math and English success by developmental students in four semesters, percent of credits attempted that were successfully completed, and successful completion of college-level math and English by college-ready students in three semesters.

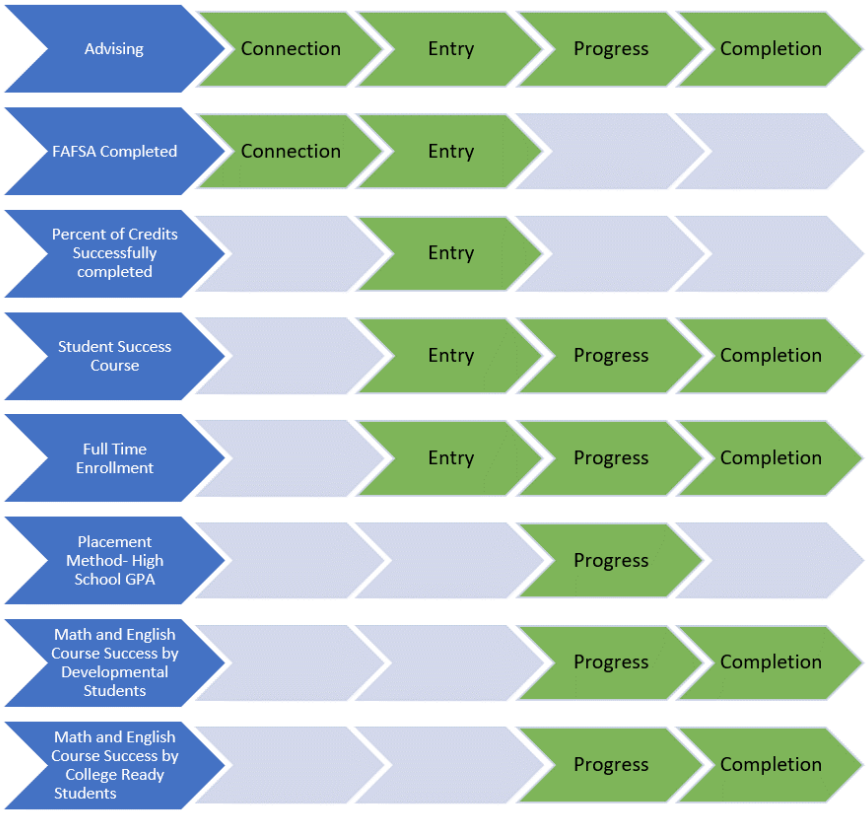

Figure 5.1. Statistically Significant Predictors (Blue) Specific to LMF Phases (Green)

Results that were consistent with research.

Onboarding (connection). This student-level study supports expansion of programs and services at CVCC to strengthen financial and academic advising during onboarding. EAB Research indicated that, despite the desire for a self-service experience, community college students are most likely to be successful in navigating the onboarding process with the support of dedicated individuals who can guide them through the processes and address any challenges that may derail their progress. Strategies supported by EAB's research included the implementation of a technology-based appointment scheduling and advising solution in the form of a student success management system (which is sold by EAB) and the recommendation to hire registration case managers who provide individual support to students (EAB, 2015).

CVCC's current planning priorities include the implementation of the EAB Navigate student success management system (SSMS) and the addition of "navigators" who serve as academic advisors and provide individual support to students beginning at the time of application. CVCC began the implementation of the SSMS in spring 2017, hired navigators in fall 2018, and simultaneously launched the SSMS.

Historically, a measure of success related to onboarding has been captured in the form of overall application yield. The application yield is calculated as the number of first-time enrolled students divided by the number of first-time applicants. CVCC benchmarks their application yield against the VCCS average for all institutions. In fall 2018 CVCC had an application yield of 33.42%, compared to the VCCS average of 37.53%. CVCC application yield rates have been lower than the state average as shown in Table 5.1.

Table 5.1

Application Yield for VCCS and CVCC

	VCCS Average	CVCC
Fall 2015	37.25%	34.73%
Fall 2016	34.40%	29.31%
Fall 2017	38.29%	34.77%
Fall 2018	37.53%	33.42%

Note. VCCS, 2020

These aggregate results do not tell the complete story for the individual applicants. Overall application yield for Virginia's community colleges must be considered within the appropriate context including the knowledge that many first-time applications are created without an intent to enroll because there is no cost associated with applying to Virginia's community colleges (Business Wire, 2017). Also, during the time of this study, there has been a change in the application platform which also contributes to variances in aggregate reporting.

This study provides a more detailed account of the impact of the recommended research-based onboarding strategies by predicting the probability that a student will enroll based on three onboarding strategies including advising, FAFSA completion, and FAFSA award. Advising and FAFSA completion were positive predictors. Financial aid award is recommended for further study because the data in this study captured only disbursed funds, which would only occur after class enrollment and attendance in the first term.

Advising. Advising is a crucial component for Connection as it related to onboarding. This study found advising to be a significant predictor for student success in all four categories of the LMF. As such, advising will also be discussed further in the Entry, Progress, and Completion section. Community college reform supports an academic advising model that provides opportunities for intervention when situations occur that present barriers to student enrollment during onboarding (Bailey et al., 2015). For CVCC applicants those barriers could be related to a failure to enroll in classes at all or a failure to secure funding which could result in being dropped from classes altogether.

One advising method that has proven successful is referred to as intrusive advising. In intrusive advising models, academic advisors proactively reach out to students, understand students' backgrounds and challenges, and recommend appropriate resources (EAB, 2012). With that in mind, CVCC improved processes during onboarding promoting the significance of meeting with an advisor maintaining record for advising interaction. Advisors participated in professional development that promoted a proactive, high touch process that was implemented for interaction with applicants (CVCC, 2018). The percent of applicants who made advising appointments increased from 29% to 53% from fall 2016 to fall 2017 as illustrated in Table 5.2.

Table 5.2

Percent of First Time Applicants with Advising Appointments Recorded

	Percent
Fall 2015	16%
Fall 2016	29%
Fall 2017	53%
Fall 2018	54%

While the overall increase in advising at CVCC is impressive, that increase cannot be attributed solely to the changes in advising strategy. Some of the increase is due to process improvements. Prior to the implementation of the EAB Navigate SSMS in 2018, advising

appointments were maintained at the CVCC counseling desk using a SharePoint add-in (CVCC, 2017). The implementation of the EAB Navigate SSMS allows for more accurate tracking and supports additional, more detailed analysis. There were other policy changes and process improvements that led to better recordkeeping when capturing student appointments. Those improvements took place between 2016 and 2017 and included the addition of multiple measures for placement testing, which required applicants to bring in a high school transcript and meet with an advisor to be considered as an alternative to the Virginia Placement test (VCCS, 2017). Also, staff changes and process improvement led to increased accuracy by removing fraudulent applications and consistently recording student identification numbers with advising appointments.

Entry, progress (retention), and completion. In higher education student success is often measured by student retention and graduation. Initial research related to four-year retention was conducted by Tinto (1975), who introduced the theory of retention in his seminal publication. He asserted that students develop through various stages as they make the transition from being a first-time college student to becoming a mature student. These stages are influenced by academic and social integration. His study focused on academic factors as well as social factors within the context of the students attending four-year residential colleges. The social factors included by Tinto in his study were specific to a student's integration into the formal setting of academia (measured by grades) as well as the informal (social) interactions with advisors, faculty, and peers as well as extracurricular activities.

The findings of this study are consistent with Tinto (1975), confirming that the integration of both formal academic and informal social factors combine and lead to the student's decision of whether to continue from term to term at CVCC. Academically, course successes

were predictors of retention, and socially, advising, completion of a student success course, FAFSA completion, and the ability to enroll full time predicted retention and completion for CVCC's students.

Moreover, Astin (1991) is well known for his input-environment-outcome model. According to Astin, outputs (degrees earned, number of graduates, etc.) must always be evaluated in terms of inputs (college readiness, gender, age, major, etc.). The educational environment related to variables such as courses, programs, facilities, faculty, and student activities are also necessary for Astin's model. Assessing student outcomes accurately requires input, output, and environmental data (Astin, 1991).

While this study did not capture all these variables, the findings support that, apart from early alert, there is a positive relationship between participation in programs and services offered to support students and their decisions to continue at CVCC. Specifically, alternatives to placement testing and a student success skills course are positive predictors of student retention.

Fike and Fike's (2008) study found, using regression models, that success in developmental reading is the strongest predictor of retention. Students who qualified for college-level English courses were equally successful, indicating that strong reading skills have an impact on student retention despite the level of college readiness. Fike and Fike also found that other categories that were positively associated with retention were receiving financial aid, taking an online course, credit hour accrual in the first term, and participating in student support services. Negative correlates were student age and dropping credit hours during the first semester. Ethnicity and parent education level were not consistently associated with student retention (Fike & Fike, 2008).

Consistent with Fike and Fike's study, this case study found that success in college-level math and English courses by both developmental and college-ready students were positive predictors in the models. There was also a positive association with credit accrual in the first term, participation in advising, and a student success course. Receiving financial aid was not a predictor of student entry, progress, or completion for this study and online courses were not considered.

Based on this research and the research of others, best practices were applied within the LMF and specific measures for success are mapped in the form of key performance indicators (KPIs) (Completion by Design, 2017). The VCCS and CVCC have adapted these KPIs into a performance-based funding model that supports student success in the Commonwealth (VCCS, 2018). These system- and college-level aggregate results serve as annual indicators of progress within the framework and allow colleges to benchmark against each other and the overall system average. This process uses a point system to allocate funding to each of the community colleges in the system, whereby colleges are competing for funding. Institutional goals are to increase student success and perform better than the VCCS average at a minimum.

At CVCC the alignment of strategic planning to this model has facilitated the implementation of strategies identified to positively impact the student success categories, yet the annual aggregate results are not positive in some areas. Results during the timeframe for this project implementation are included in Table 5.3. During the first reporting cycle in 2015 (baseline), 18.4% of developmental math students were successfully completing college-level math within their first four semesters. By 2019, there was a decrease to 11%, well below the VCCS average of 14.6%. Success rates for students who entered for the first time and were placed in college-level English in three semesters have increased from 65.6% in 2015 to 67.5%

in 2019, which is higher than the VCCS average of 66.4%. The measures for college-level math and English success, as defined by the VCCS performance-based funding model, are more aggressive than the key performance indicators as recommended in the LMF and supported by research.

Table 5.3

Entry and Progress Performance Funding Report Results for VCCS and CVCC 2015 and 2019

	CVCC			VCCS
	2015	2019	Change	Average
Developmental – Math Success	18.4%	11.0%	-7.4%	14.6%
Developmental – English Success	41.4%	18.5%	-22.9%	30.2%
College-level Math Success	46.1%	46.8%	0.7%	49.4%
College-level English Success	65.6%	67.5%	1.9%	66.4%
Fall to Spring Retention – Full-Time	80.0%	86.9%	6.9%	87.1%
Fall to Spring Retention – Part-time	59.7%	64.8%	5.1%	66.6%
Fall to Fall Retention – Full-time	59.0%	58.0%	-1.0%	64.9%
Fall to Fall Retention – Part-time	38.1%	36.6%	-1.5%	43.4%
Progress (12 credit hours)	52.8%	55.5%	2.7%	52.4%
Progress (24 credit hours)	45.7%	48.1%	2.4%	45.2%

The LMF indicates that strategies to increase success should result in an increase to the percent of developmental education students completing developmental education coursework within one year. In addition, there should be an increase in the percent of students completing college-level math and English on the first attempt within one and two years (Completion by Design, 2015). The VCCS performance-based funding model measures the success of developmental students in college-level courses within four semesters (fall, spring, summer, fall), and the success of college-ready students is measured in three semesters (fall, spring, summer) (VCCS, 2015). Positively impacting results for this measure would require further study to encourage summer enrollment, which is not currently included in defined pathways, and increasing enrollment to full time when currently only 56% of cohort students enroll full time.

Success in math and English was found to be a positive predictor for retention and completion in this study. Consistent with these findings CVCC has worked to implement strategies to support success in these gateway courses. Tutoring support has been added for writing and math, and enhancements have been made to support developmental students that include corequisite models and required tutoring.

Other categories that were positive predictors of student retention were full-time enrollment during the first term and the credits attained during the first year. Students who enroll in 12 credit hours or more and who successfully complete them with a GPA of 2.0 or higher are more likely to return to continue their program of study. To further understand the impact of specific strategies as predictors, each category included in this study is described below.

Advising. Research consistently supports advising as it relates to student success. Embedded advising, progress tracking, and individual feedback about progress are integrated into pathways leading to successful transfer or entry into the labor market (Completion by Design, 2010). "EAB's advising and administrative tools help colleges improve advising supports and business processes" (Virginia Community College System Student Success Center, 2018, para. 1). Intrusive academic advising is discussed as a proactive approach to engaging students (Garing, 1993). Community college reform supports an academic advising model that provides opportunities for intervention when situations occur that could slow down a student's progress. This approach is effective for at-risk students and is referred to as intrusive advising. In intrusive advising models, academic advisors proactively reach out to students, understand students' backgrounds and challenges, and recommend appropriate resources (EAB, 2012).

Guided Pathways describes highly structured student experiences that guide students on a pathway to the completion of a certificate or degree. With this approach, students are given support to identify or clarify realistic goals for college and careers, choose a program of study, and develop an academic plan with predictable schedules. Best practices include embedded advising, progress tracking, and methods to provide feedback to students during various stages of their educational journey and to support their successful transfer or entry into the labor market (Bailey et al., 2015).

This study confirms that resources to enhance advising services for students throughout their academic careers should continue to be a priority and that institutions should continue to provide professional development to advisors and Navigators. A complete review of the advising structure, including the addition of a caseload management system, has taken place at CVCC and across the VCCS as part of the current strategic plan. In 2018, four Navigators were

added to the CVCC advising model. Navigator job responsibilities include providing proactive advising services to students beginning at the time of application. Navigators are also trained to deliver excellent customer service to prospective students during connection and support enrolled students through entry and progress. Ultimately, students complete under the guidance of a program specific advisor, but Navigators remain available throughout each phase. Navigators work closely with the academic divisions, faculty, and other student services personnel to respond to students' individual or collective needs. Navigators refer students to appropriate personnel to address their academic or non-academic needs. This high-touch, intrusive model has enhanced the advising support available to students.

Financial aid. CVCC has restructured the financial aid office and increased professional and para-professional staff to support students in completing the steps required to access financial aid successfully. These enhancements have improved customer service and reduced the wait time to see the appropriate individuals to complete the financial aid process. This study confirms that efforts to provide these services to students in their entering term increase the likelihood that they will enroll and continue enrollment during their first to second semester (fall-spring).

The EAB Community College Executive Forum (2010) conducted a study of six community colleges that had successfully restructured financial services and payment to work cohesively. These institutions offered complete support for students to access available funds, starting with completion of the Free Application for Federal Student Aid (FAFSA), which is a required step in the intake process (EAB, 2010). The researchers discussed organizational structure, customer service, and wait time for in-person, phone, and electronic interaction. EAB's (2010) research found that most institutions housed financial aid in the student affairs

division to improve the integration of student services within the college. Additionally, good customer service in financial aid generally involved creating a positive experience for students while processing applications as quickly and accurately as possible. Institutions often used wait times, anecdotal evidence, and student satisfaction surveys to assess service quality. These surveys consistently revealed that a good customer service experience was negatively impacted if there were long wait times (EAB, 2010).

The EAB study led to recommendations that financial aid offices can significantly reduce wait times and expedite processing by increasing automation and improving the triage process in offices. Skilled frontline staff can recognize and redirect students who do not need to see a financial aid specialist, reducing the number of students waiting in line. Automation of small tasks (e.g., scanning applications) can result in substantial time savings for staff, allowing staff to meet with more students and reduce wait times further (EAB, 2010).

Placement method. This study provides evidence of the impact of some of the research-based recommendations associated with placement testing. Findings for high school GPA did indicate that there is a positive relationship between that placement method and fall-to-fall retention. Because placement based on GPA is new to CVCC further study is recommended due the small number of students entering using this placement strategy during the timeframe included in this project.

According to a study by Windham and colleagues (2006), close to half of all community college students leave before achieving their stated goals. In order to determine what student characteristics increase community college student retention, with a heightened interest on the predictive nature of placement methods and taking a student success course, researchers conducted a post-facto, quasi-experimental study to determine whether placement by ACT and

participation in a study skills course affected retention at a southeast community college (Windham et al., 2014). Results indicated that students placed by ACT score and the successful completion of a study skills course increased fall-to-fall retention. Results also showed that, while ethnicity/race and socioeconomic status were not significant indicators of retention, gender, age, and ACT Compass Reading scores significantly predicted student retention (Windham et al., 2014; ACT, 2016).

CVCC's redesign work within their current strategic plan emerges from the Gates Foundation's LMF and EAB research. These are supported by and align with system-level initiatives. To remove barriers for students entering community college, in fall 2017 the VCCS implemented a new policy of multiple measures for placement testing to permit options for the establishment of college readiness outside of the traditional Virginia Placement Testing (VPT) for Reading and Writing (VCCS Policy Manual, 2018). The policy provides guidelines for placement into college-level coursework for high school graduates based on high school grade point average or SAT and ACT scores. In addition, CVCC began participating in a VCCS pilot study for waivers to placement testing for adult learners that launched in spring 2018 (CVCC, 2018). Because this is a recent change in Virginia and at CVCC, the data collected for this study reflected that most students (94%) took the VPT. There were minimal results for SAT/ACT (4%) and high school GPA (2%) placement.

Student success course. Research indicates that Student Success Courses (SSC) are promising practices for first-time-in-college students. Previously, SSCs were not always required courses in community college programs, but the VCCS and CVCC have taken steps to ensure students are taking such courses early in their educational career. The SSC course introduces higher education to students by assisting them as they transition from high school to

college and by providing them with guided overviews of college policies, procedures, and curricular offerings (Kimbark, Peters, & Richardson, 2017).

Kimbark (2017) studied SSC participants and non-participants at one mid-sized community college in Texas and found that a relationship exists between completing an SSC and persistence, retention, academic achievement in English and mathematics, and student engagement. Study participants also indicated that taking the SSC altered their perceptions of the importance of the course and their social and study skills (Kimbark et al., 2017).

Hatch (2018) recently completed a study on SSC course design, demonstrating that the SSC course requirement alone will not positively impact student success. In the study, the most successful courses incorporated required activities that promoted interaction with other students, faculty, and college personnel associated with support services. These activities increased awareness about processes for accessing these support services and the significance of using them. Community college students were usually unfamiliar with the college environment and the transition was made easier by practicing engagement on a community college campus (Hatch et al., 2018, p. 117).

Consistent with this research, CVCC's SSC is a positive predictor of student retention and completion. Despite the intent to require the SDV courses within the first 15 hours of study, the percentage of students included in this sample who have done so has declined from 54% in 2014 to 44% in 2018 at CVCC. VCCS Policy 6.4.0.3 states:

> All curricular students placed in at least one developmental education course should take the student success course (SDV 100, 101, or 108) in their first semester of enrollment at the community college. All curricular students, except those in career studies certificate programs, must enroll in SDV 100, 101, or 108, within the first 15 credit hours of

> enrollment. The requirement may be waived for students who hold an associate degree or bachelor's degree from a regionally accredited institution. Other requests for a waiver may be considered on a case-by-case basis. Students must still successfully complete the required number of credits for their degree. Each college is encouraged to offer a pre-enrollment orientation experience to enhance student success (VCCS Policy Manual, 2020, Policy 6.4.0.3).

At CVCC the SSC assists participants in transitioning to college by providing an overview of college policies, procedures, and resources. Contact with other students and staff is required and supports students with college success by engaging with others to find solutions. The course includes personality-type questions such as Jung's Typology Test to determine careers and occupations most suited to student interests and the visual, aural, read/write, kinesthetic (VARK) questionnaire which identifies learning styles and teaches students skills and techniques to support their learning styles. During the SSC, students complete the Ruffalo Noel Levitz College Student Inventory (CSI), which identifies non-cognitive indicators of student's success including academic motivations, levels of risk and receptivity to assistance. These results are used individually by Navigators and advisors to develop support plans and appropriate interventions for students. The results are used collectively to offer targeted workshops on areas with the highest levels of need and receptivity. As indicated in this study, successful completion of the SSC course is a positive predictor of student enrollment and retention. CVCC should continue to monitor practices and enforce policy to increase the percentage of first-time-in-college students who enroll in and successfully complete student success courses that are appropriately aligned with their program of study.

Early alert intervention. Community college reform with the support of technological tools is also discussed within the *Integrated Planning and Advising for Student Success* (iPASS Initiative), which provides an integrated advising and interactive student support system (Achieving the Dream, 2012). Similarly, EAB provides the student support management system (SSMS) called *Navigate*, a technology platform that promotes guided pathways and integrated student services such as early alert. In Navigate, early alerts are initiated by faculty members or counselors in a technology platform, expediting the communication of information to direct a student to the resources available to increase success (Navigate, 2012).

CVCC implemented Hobsons' Starfish Early Alert System, referred to by the VCCS as the Student Assistance and Intervention for Learning Success (SAILS). CVCC transitioned to the EAB Early Alert platform in spring 2018. As Dwyer's (2017) research on early alert across Virginia's community colleges in 2013-14 indicates, early alert had the greatest positive impact on developmental math students. Overall, Dwyer found that the value of an early alert system is a worthwhile addition to a comprehensive retention plan (Dwyer, 2017).

While this study did not indicate that early alert is a positive predictor within the LMF, there are many limitations related to the data included in the sample that warrant further study. This study simply identified whether a "flag" or "kudo" were initiated for the students included in the sample. The positive feedback as specified by a "kudo" was a negative predictor of student retention and completion, which may be an indicator that their intent was to transfer (also a negative predictor of completion), or the positive feedback gave them confidence to transfer, but further study is recommended.

Credits successfully completed in first term. Fike (2008) found that credit-hour accumulation in the first term was positively associated with student fall-to-spring retention at

community colleges. This study confirms that successful completion of the attempted courses positively predicts the likelihood that a student will return for a second term. The average number of credits attained by first time students has increased slightly during the timeframe included in this sample from 6.92 to 7.26. Percent of success in attempted courses has increased from 62% to 66%. Overall, first-time-in-college students tend to enroll full time at a higher percentage (56%) than the general community college population (33%), but this study further confirms that full-time enrollment, which is defined as 12 credit hours or more, is a positive predictor of retention and completion. Therefore, this study supports strategies to encourage full-time enrollment and the usage of academic support services such as tutoring to increase credit accumulation in the first term.

College-level math and English success. College math and English are the two gateway courses considered in this study. Success in either or both courses within three or four semesters of first enrollment are positive predictors of retention and completion. CVCC has enhanced support for students in college-level math and English in the classroom by offering corequisite content that covers remedial work to support the college-level work. Tutors are working closely with faculty members to ensure that content is consistently reinforced. These results confirm the need for maintaining academic support services and exploring further corequisite remediation models to support the ongoing success of students (Logue, 2018).

Nearly two thirds of entering community college students are ineligible to enroll in college-level coursework based on institutional standards (Bailey et al., 2015). Those students are required to take developmental math and/or English courses that do not count towards credit for a degree (Bailey et al., 2015). This study confirms that students who achieve success in college-level courses are more likely to be successful, but the percent who achieve success

within their first year is only 29% for math and 54% for English regardless of the placement at entry. To stay on track, a student should enroll full-time, but that is not always practical for community college students.

Over 60% of new community college students take at least one remedial (developmental) course (Bailey et al., 2015, p. 134). Developmental education serves as a diversion to entering a college path; redesigning the approach should reduce time to completion. Since their inception, community colleges have served students who may not be well prepared for college-level coursework. Redesigning to eliminate this barrier requires innovation and open-mindedness that support remediation before entry into college-level programs while in high school, developing corequisite courses, or remediation in summer bridge programs (Bailey et al., 2015).

Edgecombe and Bickerstaff (2018) studied reforms related to developmental education and addressing the needs of the academically underprepared. Their conclusion is that support for the academically underprepared is often measured by success at the developmental and college-level math or English courses. When considering the overall completion agenda, the rate at which underprepared students complete a program of study has not changed significantly. The needs of the underprepared college student should be considered throughout their academic careers to realize success at all levels of the framework (Edgecombe & Bickerstaff, 2018).

Developmental education and its role in student success continue to be part of ongoing debates nationally and in Virginia. Currently the VCCS is conducting a direct enrollment pilot that is designed to determine the feasibility of placing students directly into college-level classes (VCCS, 2019). Support for the academically underprepared will still exist in the form of corequisite and other non-credit based educational experiences.

A key informant for community colleges who is involved in this study has also been instrumental in the evolution of developmental education and advocating for the academically underprepared in the VCCS. In his own redesign work for developmental English, he observed that success rates in developmental classes are meaningful only when they are viewed in the context of students' success in later college-level classes (Capps, 1994, p. 210). This case study confirms that Capps' argument remains relevant and that success of developmental students in college-level English courses early in their college experience is a positive predictor of student retention and completion as well as overall student success.

Regardless of the delivery of the services to the academically underprepared, their overall success will be dependent upon their early academic successes. CVCC has enhanced tutoring services for writing and mathematics in recent years. The Writing Center was introduced in 2014 and the Math Achievement Learning Lab (MALL) was opened in 2017, with an expansion in 2019. Developmental coursework now requires students to attend tutoring sessions. Both peer and professional tutors are available to support student success. Future studies should include the use of tutoring and other student support services as variables in the model.

The concept of tracking community college student progress is not unique to the LMF or the Guided Pathways framework. In the book *America's Community Colleges*, student progress is defined in the context of outcomes related to retention, credit accumulation, progression through developmental coursework, and success in gateway courses (Cohen et al., 2014, p. 391).

Many students seeking degrees drop out after only one or two terms. To combat the challenges that derail student progress, colleges need to understand how students get from their initial enrollment in the college to the point of passing their first college-level courses in their chosen program of study (Completion by Design, 2019).

Results that were not consistent with research. Overall, the results of this study are consistent with research as cited throughout this document concerning the best practices for student success that were measured as CVCC strategies. Initial assumptions were that there would be positive predictive relationships between all independent variables and the dependent variables as implemented and measured at their relevant point in the LMF cycle. The unexpected results were those in which a negative relationship emerged or there was no statistically significant result.

Initially, the decision to control for equity-related demographic characteristics of age, race, gender, and socioeconomic status was based on research that indicated that Guided Pathways could perpetuate equity gaps and warrant monitoring as part of the implementation process (Castro, 2015, pp. 43-58). In this study, the only statistically significant indicator associated with the demographic categories was the negatively predicted relationship with age at fall-to-spring retention. Providing additional support and intervention specific to adult learners and continuing intrusive advising models should further strengthen progress in these areas.

Data related to early alert intervention were not as compelling as anticipated in this project. By design, early alert data should include timely responses by individuals assigned to follow up with the student receiving the alert. During the time of this study, the timeliness of the responses was not consistently captured in the data, and the intervention detail was not specific enough to include. So, as the data collection began, dichotomous variables that captured whether an alert was issued were the most logical and consistent indicator specific to this population. Further study should include analyses of the timeliness of raising and responding to alerts and the types of follow-up interventions that occur once an early alert is issued by a faculty or staff member.

Because the technology supporting early alert is part of a new initiative at CVCC, further consideration should be given to implementation and usage expectations in order to fully realize whether there is a positive relationship between its use and student success. A majority of CVCC's courses (59.6% in 2018-19) are taught by adjunct faculty (CVCC, 2020). While the use of Early Alert is encouraged, adjunct faculty are not required to use it. In fall 2019 full-time faculty were expected to issue early alerts, but only 74% of them used the system to issue at least one. Efforts are underway to expand the usage of the system by implementing and consistently communicating accountability standards for faculty and staff. EAB Navigate offers some potential explanations for implementation challenges from their research at other institutions (EAB, 2019):

1. Early alert programs may lack clear and narrow objectives.
2. Early alert programs are not designed with faculty in mind.
3. There are no established paths between early alerts and coordinated interventions.

At CVCC, there is an expectation that a comprehensive early alert program exists and should be used when appropriate, but the inconsistency in using the system may well be the result of a lack of a clear and specific objective. In fall 2019, EAB Navigate Team members delivered professional development to faculty members in person and online to seek feedback to consider faculty perspective when creating objectives for the program. Finally, clear goals were implemented to measure the effectiveness of the early alerts and the coordinated interventions. The process for issuing and responding to early alerts has improved since the time period of the data collection for this study, but there is a need to strengthen the early alert process to realize the full intended impact as it relates to student success.

Even so, the negative relationship between students who received a "kudo" and their likelihood to return in fall, spring, or ultimately complete was not anticipated. There is a

possible explanation in the fact that there is also a statistically significant negative relationship for students who are enrolled in programs for transfer and their retention and completion outcomes. This study may indicate that students receiving a "kudo" may be less likely to complete due to transfer before completing a degree. The positive feedback as indicated by a "kudo" was a negative predictor of student retention and completion, which may be an indicator that their intent was to transfer (also a negative predictor of completion) or the positive feedback gave them confidence to transfer, but further study is recommended.

Finally, the absence of a statistically significant relationship between a federal financial aid award and student success was unexpected. Further study is needed to determine whether the awarding of aid has an impact on applicants. The data used in this project did not include whether an applicant successfully navigated the financial aid process to the point of being awarded aid. Disbursement never actually took place for these students since they did not enroll. It is troubling that the applicants who potentially had the greatest financial need may have never realized the potential for funding available to them. Data from the FAFSA may have been more compelling for this variable, but the data included here was retrieved from the SIS and therefore included only indicators of whether funds were disbursed.

Conclusions

Implications for action and recommendations for further research. In John Kotter's 8-Step Process for leading change, forming a strategic vision and supporting initiatives ensures clarity about how the future will be different from the past. CVCC strives to operate effectively within its mission and goals while monitoring progress and making improvements. The current six-year strategic plan emerged during a period of significant change for the community colleges. The VCCS created a sense of urgency, engaging stakeholders from across the Commonwealth

(powerful coalition) to engage in a Student Success Leadership Institute that introduced colleges to the LMF and research-based best practices. Armed with this information, colleges created a vision for increasing student success. Through those efforts, CVCC's strategic plan emerged to communicate the vision as it applied to the community served. Resources were allocated and sought to empower action related to the strategies. Successes and failures have been measured along the way in the form of aggregate and descriptive overall measures, but there were so many strategies and changes it has been difficult to determine which, if any, were making a difference. The end of a current Complete 2021 six-year strategic planning cycle is approaching for CVCC. Some changes have already been institutionalized like the addition of Navigators and the enhancement of tutoring services, and some others require further consideration (Kotter, 1996).

As the VCCS and CVCC prepare to identify initiatives to support the next strategic plan, this study reinforces many of the efforts that should be institutionalized and enhanced going forward. They include:

- **Advising** – CVCC is currently the recipient of grant funds that are allocated to strengthen the onboarding and enrollment experiences. Additionally, faculty are engaging with transfer advising as part of a new initiative for transfer students. The Navigate SSMS implementation continues to develop and allows for more detailed and consistent data collection to inform further initiatives. Because advising is a consistent positive predictor of student success within the LMF at CVCC, all efforts to enhance advising for students at all phases of enrollment are well placed.
- **Student Success Course (SSC)** – Because successful completion of the SSC course in the first term is a strong predictor of student success, advising should ensure that students are enrolled in the VCCS version of an SSC course within the first semester or first 15 credit

hours as defined by the VCCS. Action should be taken to follow up with those who do not enroll or those who enroll and are not successful to offer appropriate support and intervention.

- **Full-time Enrollment and Support for Adult Learners** – Opportunities should be pursued to increase enrollment of first-time students to 12 credit hours or more as appropriate. Full-time enrollment is a strong predictor of student success. Overall, two thirds of community college students attend part time while working or managing other responsibilities (Bailey, Jaggars, & Jenkins, 2015, p. 1). This study also revealed that older students are less likely to return after their first term. Efforts to identify and address the challenges of learners and the situations that limit their enrollment should be targeted. Programs like a 2020 initiative in Virginia, called Get a Skill, Get a Job, Give Back (G3), may offer that additional support. G3 is designed to make community college more affordable for low to middle-income families seeking employment in high-demand sectors such as technology, skilled trades, health care, early childhood education, and public safety (Northam, 2019). This funding could be the catalyst to increasing enrollment and success for students who may otherwise only be able to enroll in a few classes due to financial constraints. Because full-time students and students who are successful in more courses within their first two years are more likely to be retained and complete a program of study, identifying whether additional support could be provided to part-time learners to increase the number of credits earned would increase their probability of success. Removing the financial constraints to enrollment and full-time enrollment could increase rates of enrollment and shorten time to completion.

This study did not specifically address non-academic barriers to success outside of the general demographic characteristics, but research supports the non-academic challenges as

barriers. CVCC has increased non-academic support in advising with Navigators and by hiring a Community Connections Coordinator as part of a grant-funded project. This position coordinates prevention, intervention, and support services across campus communities to assist any student that is at risk of failing classes, facing crises or life traumas, or experiencing any other barrier that is interfering with their success (CVCC, 2020). Future study should also include awards along the academic pathway instead of limiting the focus to those who are pursuing associate degrees or diplomas.

- **Academic Support –** Community colleges need to provide accessible and effective student support services. Academic support for students in courses is delivered at CVCC directly by the instructors and additional services that enhance the classroom experiences. Tutoring is an important academic support service. Online and in-person tutoring is available to CVCC students regardless of discipline. Percent of credits successfully completed are positively associated with retention. Students are encouraged by instructors and advisors to seek support early in their academic careers. College-level math and English success are significant predictors of student success at each appropriate level of the LMF. Efforts to provide academic support to learners and professional development to instructors are indicated. CVCC has invested in the development of a Learning Commons, a space that houses tutoring, distance education, and library as an area dedicated to academic success (CVCC, 2020).
- **Student Success Management System (SSMS) Including Early Alert** – An SSMS is only effective when the underlying processes are effectively designed, and usage expectations are clearly communicated. The acquisition and implementation of the Navigate SSMS was undertaken with a rapid and ambitious timeline by the VCCS and CVCC. The process

required many revisions to internal processes, especially related to appointment scheduling and Early Alerts. The absence of significant results as they relate to Early Alert may be an indicator that the process itself warrants further attention. With the SSMS implementation project there was an expectation of significant institutional change. Initially, there were no additional human resources to support the project and the implementation was frequently associated with "initiative fatigue" by colleagues due to the additional workload.

CVCC has been a fortunate recipient of significant grant funds that support a dedicated information technology applications technician for the SSMS as of spring 2019. The same grant funds a first-year programs coordinator, who now provides professional development for the effective use of the SSMS. These additions should strengthen the use of the SSMS technology while generating more reliable data that is not reflected in this study. Now that additional resources are in place, the implementation leadership team should revisit any areas associated with the changes that are not yielding the expected results.

Concluding remarks. The purpose of this study was to conduct a more in-depth analysis of strategies for student success in a community college as they relate to current theory as described in the Completion by Design Loss Momentum Framework. At the onset, the Complete 2021 strategic plan was perceived by some as an effort simply to award more degrees and diplomas. Instead, the effort has resulted in improved processes and a better definition for what student success looks like for community college students. Consideration is now given to whether a student transfers before earning an award and acknowledges that students may enter and exit their programs of study as life events occur. The reality is that there is no one-size-fits-all when it comes to community college students. The LMF and the associated KPIs are strong indicators specific to students who are pursuing a two-year award, but community colleges may

also find positive predictors if focusing on other specific populations at their institutions. The cohorts of students at CVCC who align with the LMF and the VCCS performance-funding measures equate to about 15% of all students enrolling each fall with their progress being followed beyond the first year within the framework. The knowledge gained through study of these cohorts may also be applied to other student populations.

As indicated by this study, efforts to enhance both the quality and quantity of student advising with a focus on the following should be a priority:

- Timely success in courses including the Student Success Course (SSC), English, and math (both developmental and college-level) should remain a focus at CVCC.
- Strengthening outreach to applicants and ensuring they have accessed financial resources to support enrolling should be explored further.
- Policy development that is proven to remove barriers to academic success should continue as the direct placement pilot continues.

Change theory as described by Heath and Heath (2010) in *Switch: How to Change Things when Change is Hard* asserts that what looks like resistance is often a lack of clarity. It may be necessary to provide clearer processes with enhanced communication related to changes that have resulted from the SSMS implementation. It is possible that those who have been engaged most closely with implementing institutional changes may have reached a point of exhaustion and lost sight of their emotional connection to their work. It is important to pause and reengage to continue positive progress. Once the internal stakeholders are appropriately engaged, the path for effective change will be shaped to increase the success of the implementation of the SSMS with its supporting tools (Heath & Heath, 2010). Qualitative data related to the institutional

culture and the leadership around the changes would be better indicators for perceptions surrounding the project and would supplement this quantitative study.

As the development of a new strategic plan begins, a focus should be maintained on the successes of the cohorts of student included in this study, and then those successful practices should be applied to other cohorts who make up other portions of total enrollment as appropriate. Beyond program-placed, first-time-in-college students, analyses could also include subsets of this population like adult learners, as indicated by this study. Other cohorts may include dual enrollment, students pursuing career and technical education credentialed pathways as indicated by G3, and other transient student populations.

This project has confirmed that strategies implemented at CVCC support the college's work as an accessible, affordable and equitable educational institution to strengthen lives and the community. This study found statistically significant results for the following strategies as predictors within CVCC's planning categories of enrollment, retention, and completion:

- FAFSA completion,
- full-time enrollment,
- advising,
- college success skills course,
- college-level math and English success in four terms for developmental students,
- credit accumulation in first term, and
- college-level math and English success in three terms for college-ready students.

Public community colleges serve a population of students who often require more flexibility than those attending a traditional four-year higher education institution. This study serves as evidence to support student success strategies implemented at one community college. While an attempt has been made to document significant variables for CVCC, there are many cultural characteristics and processes that are unique to individual institutions. Such differences, like their unique student populations and various leadership styles, are tremendous assets and

represent the very core of institutions and should therefore be kept in mind when these results are considered or applied.

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