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Developmental Education Redesign: An Analysis of Cooling Out in a Community
College Mathematics Assessment Preparation Program

A Doctoral Research Project
Presented to
the Faculty of the Morgridge College of Education
University of Denver

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

by
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August 2017
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Advisor: Dr. Judy Marquez-Kiyama

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ABSTRACT

Developmental education is a critical issue in higher education, particularly within community colleges. Each year, thousands of students enroll in community colleges, yet many are unprepared for college-level work. These students are often required to enroll in developmental courses before they can enroll in college-level courses, and these courses are often a barrier to student success. In recent years, a number of community college systems across the United States have redesigned their developmental education programs in an attempt to improve student outcomes.

This project examines one such statewide redesign that uses a qualitative case study analysis to apply Burton Clark's theory of the cooling out function of community colleges to the experiences of students navigating the redesigned developmental education program. Using interview data from developmental students participating in a Math Bridge program as part of the redesign as well as interview data from advisors and other key staff members involved in the enrollment, testing, and advising process, I argue that while the key features of Clark's cooling out process are not evident in these practices, there are other factors impacting the academic aspirations of developmental math students at the study site. Using these findings, I propose recommendations for policy and practice as well as updates to the theoretical framework.

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CHAPTER ONE: INTRODUCTION

Floyd was a first-time, first-generation college student who had been out of school for fifteen years due to his service in the United States Armed Forces. He returned to school and completed his Associates of Science in Information Technology in two years with a 3.34 GPA. Maricruz was the daughter of non-English speaking immigrant parents who fled to the United States from Nicaragua. She had dropped out of high school two months before graduation, but later enrolled in a community college where she graduated with a 3.75 GPA and planned to pursue a law degree. Elise was a student who had attempted college in her thirties, but dropped out before completing a degree. She returned to school at age 54 and completed two associates' degrees in five years. Nichole was a recent high school graduate who enrolled in college at age 18. She graduated with an Associates of Arts degree and was on the Dean's List (National Association for Developmental Education, n.d.). Though these students had different backgrounds and college-going experiences, they all had one thing in common; they all participated in developmental education programs in college. Though they had arrived at college underprepared for college-level courses, they were able to achieve academic success. These stories are a reflection of what developmental education programs across the United States attempt to achieve: a path to college success for students.

In the United States in 2016, nearly 20 million students were enrolled in degree-granting higher education institutions (National Student Clearinghouse Research Center, 2015). Students often enroll in college because in today's economy, a postsecondary degree is considered necessary for high-skilled, high-paying jobs (Conley, 2010). Additionally, a college degree has become a requirement for American workers to access the middle class (Carnevale, Smith & Strohl, 2010) because college credentials are increasingly necessary in the job market. The need for a postsecondary degree or credential has become even more pronounced in the United States' post-recession economy. During the recession, an estimated 7.2 million jobs were lost, and the majority of those jobs were those in which workers held a high school diploma or less (Carnevale, Jayasundera & Gulish, 2016). When the job market rebounded after the recession, 11.5 million jobs were added, and 99 percent of those jobs required some form of postsecondary education (Carnevale, Jayasundera & Gulish, 2016). These economic trends, as well as increases in technological advances and declining production industries have furthered the importance of a postsecondary credential in today's workforce (Carnevale, Jayasundera & Gulish, 2016). A national report by the Georgetown University Public Policy Institute found that by 2020, 65 percent of jobs in the United States will require some form of postsecondary education (Carnevale, Smith & Strohl, 2013). Although the job market has rebounded since the recession, the economy still needs to add an additional 6.4 million jobs in order to restore to the job market to where it would be in 2020 had the recession not occurred (Carnevale, Jayasundera & Gulish, 2015). It is projected that at least 3 million of these future jobs will require some form of

postsecondary degree or credential (Carnevale, Jayasundera, & Gulish, 2015). Because of these projections, college completion has become an increasingly important national issue that impacts, individuals, institutions, and economies.

Among the millions of students who enroll in higher education institutions in the United States each year, many choose to begin their education in community colleges. In 2013, 7 million students in the United States enrolled at 2-year institutions, which represents nearly half of the nation's undergraduate population (National Center for Education Statistics, 2015b). Community colleges appeal to students because they are open access, low cost, and offer options to complete a credential or transfer to a four-year institution (Sydow & Alfred, 2013). Low-income students are more likely to enroll in a community college than a four-year college or university because they are sensitive to tuition increases and can more easily access a college that is a lower cost (Perna & Titus, 2004). Community colleges also serve as a key means of access to higher education for students of color. More than 43% of all students of color in high education are enrolled in community colleges (Parker, 2012). However, despite the popularity of community colleges they face high attrition rates, and the majority of students who enroll will not complete a degree. Of students who begin their postsecondary education at community colleges, only 39% will complete a two- or four-year degree within six years (Shapiro, Dunder, Yuan, Harrell & Wakhungu, 2014).

One of the key reasons for the low completion rates of community college students is that many who enroll are underprepared for college-level work. There exists a discrepancy between student access to college and student preparation for college; this

discrepancy is known as the readiness gap (The National Center for Public Policy and Higher Education, 2010). College readiness is defined by the ACT as, “The knowledge and skills a student needs to enroll and succeed in credit-bearing, first-year courses at a postsecondary institution, such as a two- or four-year college, trade school, or technical school,” (Schmeiser, 2010, p. 3). Although community colleges typically have minimal entrance requirements, upon admission students are required to take a placement test that determines their level of college readiness (Kirst & Venezia, 2006). Students who do not test high enough to place into college-level courses are required to take extra non-credit classes to develop the skills required for college-level courses. These courses are commonly referred to as developmental courses¹, also known as remedial or college preparatory courses (Parker, 2012). Students placed into these courses are generally required to complete them before moving on to college-level classes (Parker, 2012).

In the United States each year, 1.7 million students enter into remediation, and more than 50 percent of students entering two-year colleges start in remediation compared to 20 percent in four-year colleges (Complete College America, 2012). The need for remediation is especially pronounced among students of color and low income students. Complete College America (2012) found that 67.7 % of African American students and 58.3 percent of Hispanic students require at least one developmental course, compared to 46.5% of White students; additionally, 64.7% of low-income students need at least one developmental course. Placement into such courses is a major barrier for

¹ Developmental and remedial education are often used interchangeably and both typically refer to courses designed to prepare students for college-level classes. More specific definitions of each are discussed later in this introduction.

students. Approximately 40% of community college students who start in remediation will never complete their remedial courses (Complete College America, 2012). Of the community college students who do complete their remedial coursework, only 25% complete their gateway college-level English and math courses, which are the freshman college-level classes students must take before entering into more advanced courses (Complete College America, 2012). Of all students who begin their college careers in remediation, fewer than 10% will graduate from community college in three years and only a third will complete a bachelor's degree in six years (Complete College America, 2012). Placement into remediation adds to the barrier of increased time to degree completion that community college students already face. These courses delay students in their degree progress, thereby decreasing the likelihood that they will ultimately graduate (Complete College America, 2011).

The high numbers of students needing developmental courses and the low success rates of these courses are key areas of criticism faced by community colleges. Critics argue that community colleges function more to uphold existing race and class inequalities than provide students with opportunities for upward mobility (Beach, 2011). This concept is known as cooling-out, a theory proposed in 1960 by Burton Clark that argues that community colleges are a mechanism to channel lower-class students out of their ambitions (Clark, 1960). Clark argues that remedial courses are one means by which community colleges systematically structure failure for students. Although there are a number of controversial issues surrounding developmental education research, policies, and institutional practices, scholars are largely in agreement that developmental

education is an important higher education function and merits serious research because of its educational, social, and economic impact (Oudenhoven, 2002).

Background of the Problem

At the nexus of the debate surrounding developmental education is an issue known as the readiness gap, which refers to the disparity between college eligibility and college readiness (The National Center for Public Policy and Higher Education, 2010). A high school diploma or equivalency does not necessarily indicate that a student is prepared for college-level work, and therefore students are often not college-ready when they complete high school. Even in high school college preparatory tracks, students do not automatically graduate ready for postsecondary education (The National Center for Public Policy and Higher Education, 2010). This gap is most pronounced in community colleges, where 75% of students are not considered college ready (The National Center for Public Policy and Higher Education, 2010). According to Rose (2012), about 35-40% of students in state colleges and universities require at least one remedial course in English, reading or math, and that number is as high as 60% in community colleges.

One key reason for the readiness gap is that there exists a strong disconnect between high schools' graduation standards and colleges' entrance standards because states have not implemented specific and consistent readiness standards (The National Center for Public Policy and Higher Education, 2010). Though there have been some moves in recent decades to better align high school exit standards with college admissions standards, such as in the City University of New York (CUNY) system and New Jersey's community colleges which standardized their assessment and placement

practices (Jaggars, Hodara & Stacey, 2013), misalignment still persists (St. John, Daun-Barnett, & Moronski-Chapman, 2013). According to St. John, Daun-Barnett, and Moronski-Chapman (2013), simply adopting higher math and science standards for high school students does not improve student achievement. The problem with the adoption of higher standards is that it does not address the systemic inequalities that exist in the K-12 school systems; higher standards lead to more tracking of underprepared students away from higher education (St. John, Daun-Barnett, & Moronski-Chapman, 2013). Furthermore, high school graduation and college entrance policies differ greatly across states, which perpetuates the misalignment across state borders (St. John, Daun-Barnett, & Moronski-Chapman, 2013).

In addition to the misalignment of standards, the readiness gap is exacerbated by the fact that policy makers often focus too much on high school college preparation programs while ignoring the factors preceding high school such as early childhood and middle school experiences that may impact student preparation and persistence in college. Flores and Oseguera (2013) found that early childhood experiences such as preschool enrollment and small class sizes, middle school experiences such as completion of algebra and other advanced mathematics courses, and high school experiences such as access to Advanced Placement (AP) and International Baccalaureate (IB) courses are all predictors of college preparation. Because so many varied forces converge to influence students' chances of academic success, policy makers and institutions struggle to find ways to incorporate all of these factors into high school graduation and college preparation standards.

The misalignment of standards between secondary and post-secondary institutions is one of the key factors influencing which students place into developmental courses when they enroll in college. Because students are graduating from high school not academically prepared for college-level work, community colleges are expected to serve the role of making students college ready (Attewell, Lavin, Domina, & Levey, 2006). Developmental courses are designed to correct skill deficits created by this preparation gap. However, when underprepared students arrive in community colleges, the misalignment of standards still persists. In community college systems across the United States, there is no standard placement score that clearly determines which students will perform well in college-level courses and which students will fail without remediation (Jaggars, Hodara & Stacey, 2013). As a result of this misalignment, students are often over- or under-placed in developmental courses (Jaggars, Hodara & Stacey, 2013). Placement into developmental education can impede student success, particularly among low income students, students of color, and students for whom English is not their first language (Jaggars, Hodara & Stacey, 2013). Additionally, developmental education has not been found to be an overwhelmingly successful bridge between high school graduation and college-level courses, and students who enroll in developmental courses often fail to complete a degree (Parker, Bustillos & Behringer, 2010). When students are required to enroll in developmental courses, it can delay their time to graduation, prevent them from enrolling in a four-year institution, or lead them to drop out (Attewell, Lavin, Domina & Levey, 2006).

The readiness gap has a dramatic impact on students in developmental education. Parker (2007) notes that it is not necessarily placement into remedial courses that causes students to drop out or stop out of college, but instead the lack of persistence among remedial students may be due to the misalignment of high school graduation standards and college expectations. Institutions in many states are often focused more on increasing admissions standards than on uncovering the causes of the academic preparation gap (Parker, 2007). Additionally, students who lack access to advanced courses, particularly low-income students and ethnic minorities, may not have access to advanced courses or additional preparation materials required to adequately prepare them for college-level work (St. John, Daun-Barnett, & Moronski-Chapman, 2013). These students may therefore be more likely to find themselves placed into remediation when they enter college.

Developmental education programs are designed to bridge the academic preparation gap by providing underprepared students an opportunity to develop the skills they need to be successful in college-level courses (Cohen, Brawer & Kisker, 2014). However, the nationwide misalignment of standards and unclear formula for successful remediation leaves state and institutional policy makers with a need to revise their developmental programs to better address these skill deficits and provide students with a successful pathway through college. This study addresses one such statewide revision to its community college developmental education programs.

State Context for Study

This study focuses on the low retention and graduation rates of developmental education students in the Vista Community College System (VCCS)², a large state system in a western state. Because of the high failure rates of students placed into remedial courses, VCCS, which found that only 5% of students who start in remedial courses will complete a degree or credential, has implemented a restructuring of its programs to provide a more successful pathway into college-level courses (DETF Process Narrative, 2014). In 2013, 40,000 students within the VCCS system took at least one developmental education course. Students in the lowest developmental math and English courses would typically spend two years in the developmental course sequence before reaching college-level courses (Vista Community College System, 2014). The need for remediation in the VCCS system was especially pronounced in math. In the 2012-2013 academic year, 58.8% of total developmental course enrollments were in math courses, and 23.9% of the total developmental enrollments were in the three lowest-level math courses (Vista Community College System, 2013).

In 2014, VCCS fully implemented a complete redesign of its remedial programs in math, reading and English across all of its institutions. This redesign was based on the findings of a Developmental Education Task Force (DETF) created in 2011 to determine a new direction for VCCS developmental programs (DETF Process Narrative, 2013). The DETF was commissioned by the state to develop recommendations for improving the success rates of students based on the principles of acceleration, modularization,

² For this project, pseudonyms will be used in place of the names of the system, individual institution, and interview participants.

contextualization, and mainstreaming. The task force was comprised primarily of math and English faculty members from all VCCS colleges who were tasked with critiquing current developmental education practices within the system and generate recommendations for improving developmental education outcomes (Developmental Education Task Force, 2013b). The new developmental education program includes a new placement test, elimination of lower-level developmental courses, offering different pathways for STEM and non-STEM students, and encouragement of colleges to offer a non-credit option to prepare students to pass the placement test (DETF Process Narrative, 2013). The redesign is semi-structured, requiring some specific changes for schools while offering each college some flexibility in deciding how to implement it. The redesign for math involves four major components: 1) A revised test to replace the ACCUPLACER that ensures consistent placement testing throughout the entire system, 2) A shortened developmental math sequence that involves placement into either STEM Math or non-STEM Math for students who do not test into college level math with an optional concurrent one-credit lab course for students who place just below either one, 3) An optional “soft-landing” option to be determined by each college to help students who do not test high enough to place into either of the two developmental math courses and that is designed to prepare students to retake the placement test, and 4) Additional support in the form of academic skills preparation, college readiness skills, advising, and career counseling (DETF Process Narrative, 2013).

This study focuses on the developmental education redesign in one of the schools within the VCCS system. Mountain View Community College (MVCC) is the second-

largest community college in the VCCS system, serving 22,000 students annually across its three main campuses, three off-campus centers, and online courses. Specifically, this study examines the implications of the redesign for students who place into the soft-landing option instead of a developmental math course. Students who test into the soft landing option at MVCC can prepare to re-test through two options: fee-based college readiness courses offered by the school's workforce development center, or Adult Basic Education courses at an off-campus school.

Statement of the Problem

Developmental education in community colleges is a complex and contentious issue among state and institutional policy makers. More than half of students entering into community colleges need at least one developmental course, and yet only 10% of students in developmental education will complete a college degree or credential (Complete College America, 2012). To address the problem of the low rates of success of developmental students, the Vista Community College System has redesigned its developmental education program. The redesign has strong potential implications for students who do not test high enough to place into the new developmental math sequence. Although the long-term outcomes of the redesign cannot yet be determined, it is necessary to understand the experiences of students in the program. In particular, there exists a need for a qualitative case study to understand what students who do not place into the new math sequence are experiencing and what role this experience plays in the academic aspirations of students and the cooling-out function of community colleges.

Purpose of the Study

The purpose of the study is to learn what students experience when their placement test scores do not qualify them for either of the two developmental math courses. Additionally, this study sought to understand the role that advisors play in student perceptions of their placement into the soft landing option and the relationship between these experiences and the cooling-out function of community colleges.

Although there exists substantial research (Attewell, Lavin, Domina & Levey, 2006; Bahr, 2008; Bahr, 2010; Bettinger & Long, 2005; Bremer, Center, Opsal, Medhanie, Jang & Geise, 2013; Esch, 2009; Kowski, 2014; Martorell & McFarlin Jr. 2011) into the outcomes of developmental education programs, much of the research is centered on completion and transfer rates rather than individual student experiences, particularly the role of advising in shaping these experiences. Additionally, little is known about impact of the developmental education redesign and the ways in which it is shaping student experiences and outcomes. The new VCCS developmental education program has been in effect for less than three years, so its long-term impact on student success is yet to be determined. Because the soft-landing placement is a new process for the system, the experiences of soft-landing students have not been studied. It is important to understand what these students experience in order to determine what their advisors and other key staff and faculty members might do to foster their academic success.

Research Questions

The central research question of this study aimed to understand the role that placement into soft landing and subsequent academic advising play in students' academic

aspirations and the cooling-out process of community college students. Specifically, the study addressed the following questions:

1. What do students who place into “soft landing” experience during the testing, advising, and enrollment process?
2. What role does placement into “soft landing” play in the academic aspirations of community college students?
3. What role does advising play in the academic aspirations of community college students placed into “soft landing?”
4. What roles do placement into soft landing and advising play in the “cooling-out” function of community colleges?

Significance of the Study

This study is significant because of the role that developmental education programs play in fostering equity for underprepared students, particularly those from marginalized populations. Additionally, these programs impact the institutions at which they are offered and the states in which these institutions reside. There are four main stakeholders in the debate over developmental education: states, institutions, intermediary organizations, and individual students (Dougherty & Reid, 2007; Martinez & Bain, 2013; McCabe, 2000; Neuburger, Goosen & Barry, 2013). The federal government is less of a stakeholder because state governments exert greater influence over developmental education outcomes than the federal government (McCabe, 2000). Because states have primary responsibility for education programs, the federal government has little input into remediation policies (McCabe, 2000). States are concerned with the outcomes of

remediation because unemployment is a social cost of not providing remedial education (Martinez & Bain, 2013). According to Martinez and Bain (2013), the benefits of successful remediation leading to a college credential include “stronger participation in the global marketplace, improved local economies, decreased crime rates and improved quality of life” (p. 5). These benefits assume that students who are successfully remediated can become more productive members of the workforce than those who do not achieve a college credential. Despite the apparent benefits of developmental education, state legislators often fail to see the connection between access and remedial education, believing that allowing remediation encourages complacency and diminishes the quality of college education (McCabe, 2000). These states may fail to see both the market value and individual benefit of successfully remediating underprepared students.

A second key stakeholder in developmental education policy is higher education institutions themselves, particularly the community colleges that most often offer these programs. These institutions are directly influenced by policies implemented at the state level. This can lead to tension between institutions and states because state legislatures often make the policy decisions rather than the faculty members who will be teaching these courses (Neuburger, Goosen & Barry, 2013). Furthermore, faculty are not always brought into the decision making process for how developmental education courses will be taught, which can lead to internal tensions (Neuburger et al., 2013). Some institutions, however, approve of developmental education policies dictated by state governments. Dougherty and Reid (2007) found that institutions in states that mandate remediation testing and placement view the success of their programs more favorably than institutions

in states that lack such mandate. It should be noted that this is only the perception of success of these programs rather than an actual measure of success.

Another reason that developmental education is important to individual community colleges is the pressure from former President Obama's American Graduation Initiative (AGI). The AGI, which was proposed in 2009, aims to increase the number of degrees and certificates awarded by postsecondary institutions in the United States by five million by the year 2020 (Kotamraju & Blackman, 2011). Additionally, the Obama administration's College Scorecard, which rates higher education institutions by criteria such as affordability and return on investment, puts added pressure on higher education institutions to increase their completion rates (College Scorecard 2.0, 2015). At one point, the administration also considered the idea of tying federal funding to the college ratings, which would have added additional institutional pressures (College Scorecard 2.0, 2015). Kotamraju and Blackman (2011) found that in order to meet this demand for more graduates, community colleges will need to find ways to improve outcomes for their existing students, particularly the underprepared and underserved students who already have the lowest completion rates. To improve retention and completion rates, community colleges will need to improve existing academic and student support services, centralize authority to give community colleges the autonomy to focus on their specific issues, and increase global competitiveness to prepare students to meet modern workplace needs (Kotamraju & Blackman, 2011).

In addition to states, institutions, and individuals, intermediary organizations are also key stakeholders in developmental education and its outcomes. Non-profit

organizations play a vital role in influencing institutional and state policies and help drive institutional completion agendas. Among the intermediary organizations in the United States, two of the most influential are Complete College America and the Lumina Foundation.

Complete College America is a non-profit organization whose mission is “to work with states to significantly increase the number of Americans with quality career certificates or college degrees and to close attainment gaps for traditionally underrepresented populations” (Complete College America, 2017, p.1). This organization, funding in part by the Bill and Melinda Gates Foundation, builds alliances with colleges across the United States to help them set goals, measure data, and develop programs to improve student success (Complete College America, 2017). One key focus for Complete College America is improving the success rates of remediation through programs such as Math Pathways and Corequisite Remediation. Math Pathways recommends providing developmental students with a pathway through their math courses that best suits their intended credential and major. It also aims to help students complete their developmental math courses within no more than a year (Complete College America, 2017). The Corequisite Remediation model alters placement procedures to ensure that students are placed into the appropriate course and gives students who need extra help in a course to enroll in a corequisite course in that subject area (Complete College America, 2017). Elements of these models have already been adopted in Colorado, Maryland, Nevada, Ohio, Tennessee, and Texas.

Another important intermediary organization is the Lumina Foundation, a non-profit organization designed to make postsecondary learning accessible to everyone (Lumina Foundation, 2017). The Lumina Foundation has a goal for 60% of Americans to hold some type of postsecondary credential by 2025. It aims to achieve this goal by influencing policies at both the institutional and state level. The five key features of the Lumina Foundation's strategic plan are offering guided, equitable pathways to student success, bringing transparency to student credentials so employers can see the value in a student's expertise, implementing competency-based learning which measures progress based on what students know and can do, measuring student outcomes through a quality assurance system, and providing more accessible pathways to degrees for those who already hold work-related credentials (Lumina Foundation, 2017). The Lumina Foundation is working to advance its agenda in all 50 states.

In addition to its strategic plan, the Lumina foundation also has partnered with the Bill and Melinda Gates Foundation to advance its educational goals. In 2009, the two organizations launched the Developmental Education Initiative (DEI) to help accelerate students through their developmental courses (Quint, Jaggars & Bindloss, 2013). The DEI worked with 15 community colleges in six states to revise and expand existing interventions for developmental students. The initiative also relied on partnerships with other intermediary organizations, including MDRC, the Community College Research Center (CCRC) at Teachers College, Columbia University, the American Association of Community Colleges, the Community College Leadership Program at the University of Texas at Austin, Jobs for the Future, MDC, and Public Agenda (Quint, Jaggars &

Bindloss, 2013). With support from these organizations, the participating colleges developed and implemented specific strategies ranging from individual class instruction to college-wide policy changes in an effort to improve developmental education outcomes. The initiative had mixed results; some strategies resulted in positive outcomes, some resulted in negative outcomes, and some had no effect. Despite these varied results, a major outcome of the DEI was that intervention from these intermediary organizations led to more discussions among campus policy makers about how to improve developmental education outcomes and inspired campus leaders to continue with the strategies they developed that were successful (Quint, Jaggars & Bindloss, 2013).

A key aspect of the work of both Complete College America and the Lumina Foundation is that both are heavily influenced by the Bill and Melinda Gates Foundation (Mangan, 2013). The Lumina Foundation partners with the Bill and Melinda Gates Foundation to influence developmental education policy, and both organizations are heavy funders of Complete College America. These intermediary organizations are important because they are heavy influencers of developmental education policy nationwide, often influencing colleges to completely overhaul their developmental education programs (Mangan, 2013). While the efforts of these organizations are often applauded for their efforts in improving developmental education outcomes, they have also come under criticism because the people working at the Bill and Melinda Gates Foundation do not have experience in developmental education and often bypass the developmental education experts to push agendas that have not been vetted by the

individual colleges themselves and that may not be the most effective changes for those specific institutions (Mangan, 2013).

The final, and perhaps most important, key stakeholder group in developmental education are the students on which these policies center. It can be difficult for policy makers to create policies that effectively improve outcomes for all students, and developmental education policies largely do not reflect the specific learning needs of students (Neuburger, Goosen & Barry, 2013). Additionally, there are specific student groups most affected by developmental education policies. First, students from low socioeconomic status backgrounds are heavily affected by such policies. Attewell, Lavin, Domina, and Levey (2006) found that students in the lowest quartile of socioeconomic status were more likely than their peers to need developmental courses. This is problematic for low-income students who often view education as a gateway to the middle class (Callan, 2011). Second, students of color are strongly affected by these policies. In an analysis of racial differences in attainment levels of students in the California Community Colleges, Bahr (2010) found that White students are significantly advantaged over students of other races in developmental math courses. White students are 105% more likely than their Black peers, 20% more likely than their Hispanic peers and 16% more likely than their Asian peers to remediate successfully. Bahr (2010) notes that a significant contributing factor to these racial disparities in outcomes is that racial stratification begins during early childhood educational experiences and is further exacerbated by remediation. The negative impact of remediation among these student groups is further compounded by the fact that most states do not evaluate their

remediation policies as fostering academic success for low-income students and students of color (Dougherty & Reid, 2007).

Because of the importance of developmental education programs to states, institutions, and students, it is important for researchers to study developmental education programs, particularly those with recent changes in their policies and implementation. As a new program, the long-term outcomes of the VCCS developmental education program are unknown, and even less is known about what the students impacted by this redesign are experiencing. The recent implementation of this program provides an opportunity to study the experiences of its students while the program, particularly the soft landing option, is in its infancy. This is a unique opportunity to contribute research to a higher education process while it is ongoing and offer tangible solutions to issues identified in the implementation of this program. Furthermore, there is sparse literature on the experiences of students during the advising process after they do not place into college-level courses. This study aimed to contribute to this important body of research as well.

Scope of the Study

Using a case study methodology, this study sought to understand the experiences of students in the MVCC Math Bridge program as they navigated the enrollment, testing, and advising processes. Using data gathered from interviews with students and staff and from supporting VCCS and MVCC documentation, this project analyzed these experiences through the theoretical framework of Clark's (1960) theory of the cooling-out of community college students and uncovered additional themes not addressed by the

theory to help understand these experiences and their implications for developmental student success.

The scope of the study for this project included degree- or credential-seeking MVCC students who enrolled in MVCC's soft landing option, the Math Bridge program, after the implementation of the developmental education redesign. The study also included academic advisors, the Testing Center Coordinator, the Workforce Development Career Pathways Coordinator, and a chair of the Developmental Education task force.

Theoretical Frameworks

The theoretical frameworks for this study are Burton R. Clark's (1960) theory of the cooling-out function of community colleges and Albert Bandura's (2006) theory of human agency. In 1960, Clark proposed that contrary to their missions of providing upward mobility for marginalized students, community colleges "cool out" certain students from their educational aspirations. American life, according to Clark (1960) encourages higher education as a means of access to opportunity, and the open-door policies of community college are designed to provide this access for all interested students. However, Clark asserts that the community college, while opening access to some, also structures means of failure for academically underprepared students who are destined to fail. The cooling-out function of community colleges manifests itself in a number of ways. One method is that schools may simply terminate failing students. Another method is that schools channel students out of degree tracks that would be transferrable to four-year institutions and into vocational programs. Community colleges might also place students into remedial courses, which "casts doubt and slows the

student's movement into bona fide transfer courses” (Clark, 1960, p. 572) or counsel them into terminal programs. Students who are underperforming may be placed on academic probation, which can further deter them from the transfer track. On a more positive note, however, open-door colleges such as community colleges might discover hidden talent, such as students from low socioeconomic backgrounds who can successfully transfer to four-year institutions. However the positive outcomes of some students in community colleges also serve to legitimize their practices, thereby allowing them to continue enrolling students and furthering the cooling-out process (Clark, 1960).

Clark's (1960) theory highlights five key features of cooling-out: alternative achievement, gradual disengagement, objective denial, agents of consolation, and avoidance of standards. With alternative achievement, students are channeled into programs that the school determines as better fitting their abilities, often ones that lead to lower-status careers. Gradual disengagement is the slow movement of the student away from their goals. Objective denial involves the use of record-keeping and other bureaucratic procedures to detach the organization from the emotional aspects of cooling-out. With agents of consolation, counselors work to change the intentions of students, channeling them into lower-status careers. Finally, the avoidance of standards avoids measuring students by ambiguous standards in which different types of abilities are valued. It focuses instead on distinct and specific standards which shifts the focus to clearly defined student classification and placement.

A decade after Clark first proposed the idea of the cooling-out function of community colleges, another scholar, Jerome Karabel echoed Clark's assertions, adding

new insights to the theory. Karabel (1972) posits that community colleges emerged due to changes in the labor force, particularly in terms of an increased need for highly skilled workers, stating, “Americans have not only believed in the possibility of upward mobility through education, but have also become convinced that, in a society which places considerable emphasis on credentials, the lack of the proper degrees may well be fatal to the realization of their aspirations” (p. 523). Higher education, then, has a monopoly over controlling who can enter into middle and upper level positions within the class hierarchy. In 1972, most community college students came from lower-middle and working class backgrounds. Low-income students attended school in such large numbers that the colleges managed them by tracking them into lower status career fields.

According to Karabel:

Community colleges, which are located at the very point in the structure of educational and social stratification where cultural aspirations clash head on with the realities of the class system, developed cooling-out as a means not only of allocating people to slots in the occupational structure, but also of legitimating the process by which people are sorted (p. 539).

In other words, students from disadvantaged backgrounds turn to higher education as a source of upward mobility, but the structure of these institutions acts as a barrier to access higher tiers in the class system.

The social stratification function of community colleges is not an intentional mechanism, but rather a byproduct of the way community colleges are structured and their role in the American higher education system (Brint & Karabel, 1989). The open access nature of community colleges, however, leads to a perceived permeability of class boundaries, when in reality these class boundaries are highly segmented (Brint &

Karabel, 1989). The segmenting structures and policies that were in place in community colleges in 1960 when Clark first identified the cooling-out function were still evident to Brint and Karabel in 1989. For low socioeconomic status students, this segmentation is especially troubling because higher education may be their only means of accessing upward mobility. Brint and Karabel report that completion of a four-year degree is necessary for low-income students to obtain high-status positions. Students with vocational credentials or associate's degrees are more likely to be employed in low-status jobs than students with bachelor's degrees. Karabel (1972) notes, "Community colleges exist in part to reconcile students' culturally induced hopes for mobility with their eventual destinations, transforming structurally induced failure into individual failure" (p. 556). If community colleges are cooling-out students and failing to meet their promised transfer function, then students from marginalized backgrounds may continue to be segmented from students from more privileged backgrounds.

Clark's (1960) theory is a useful tool for this study for several reasons. First, the theory recognizes remediation as one of the mechanisms by which community college students are cooled out of their ambitions. Because this study focused specifically on the experiences of developmental students, the use of this theory helped to shed light on the role of remediation in the cooling-out process. Second, Clark's theory recognizes that cooling-out is often a subtle process that occurs through student's experiences and interactions with community college faculty and staff. One of the goals of this study was to understand developmental student interactions with staff members during the enrollment, testing and advising process and the role that these interactions played in

either supporting or altering student ambitions. Clark's focus on the role of these staff members, particularly advisors, was a critical component in understanding how cooling-out may or may not be occurring among MVCC developmental students. Although there have been some studies interrogating Clark's theory (Bahr, 2008; Hellmich, 1993), there have not been significant contributions to the cooling-out literature in recent years, nor has there been a new or updated model introduced to supplement or replace Clark's model. Because the cooling out literature has stagnated, it remains an important theory to employ to determine its viability and whether it still has merit or is in need of a revision or replacement.

The theory of the cooling-out function of community colleges informed the design of this study as well. Data sources, particularly interview participants, were selected to ensure that the student experience throughout the enrollment, testing, and advising process was included both from student and staff perspectives. Because advisors are some of the primary agents of cooling-out in Clark's (1960) theory, data from advisors became a critical component of the study. Additionally, the role and features of the cooling-out process helped to inform the research questions for this study. Questions were crafted to help determine whether cooling-out is happening among Math Bridge students. The five key features of cooling-out also provided the preliminary codes that proved useful in the analysis of the study data.

The second key framework employed in this study is Bandura's (2006) theory of human agency. Bandura argues that humans are capable of cognitive self-regulation, enabling them to visualize futures that cause them to act in the present to bring those

futures to fruition. Humans are able to modify their behaviors to ensure their desired outcomes, even overcoming environmental barriers. At the core of human agency is the idea of self-efficacy, which is the belief that people have the power to achieve their desired goals by taking deliberate actions. Bandura (2006) notes, “Efficacy beliefs affect whether individuals think optimistically or pessimistically, in self-enhancing or self-debilitating ways. Such beliefs affect people’s goals and aspirations, how well they motivate themselves, and their perseverance in the face of difficulties and adversity” (p. 170-171). The degree of a person’s self-efficacy is a major determining factor in whether that person will achieve their intended future.

There are four core properties of human agency that Bandura identifies. First, is intentionality, wherein people create intentions and then determine plans of action that enable them to achieve those desired intentions. The second property is forethought, which means that humans are able to set future goals and anticipate the potential results of their actions. This in turn, influences human behavior because humans will modify their actions to bring these future outcomes to fruition. Third, the property of self-reactiveness argues that humans self-regulate to construct deliberate courses of action to bring about their intended goals rather than passively waiting for them to happen. The last property is self-reflectiveness, whereby people self-examine their own thoughts and behaviors to analyze how these are impacting their intended futures, and then modify these thoughts and behaviors as needed to stay on track with their desired outcomes.

In addition to these individual properties, Bandura (2006) also notes that human agency is not always an individual effort. Because people do not always have control

over the factors that will influence their goals, they rely on others who have the ability to help them achieve these outcomes, which is also known as collective agency.

Additionally, people do not always have control over their life circumstances and sometimes rely on fortuitous events, which are unintended encounters with people who can impact a person's future. These events are important because they can dramatically alter someone's intended path. Bandura's theory also notes that people are proactive agents and not onlookers. Proactive agents are people who work purposefully to achieve their desired outcomes, rather than being onlookers who work autonomously without purposeful thought.

Bandura's (2006) human agency framework is a key analytical component of this study. Because there are factors outside of Clark's (1960) theory impacting student outcomes, it is important to understand the types of educational choices students are making and the factors influencing those choices. The human agency framework is a useful tool in understanding the decision-making processes of developmental students in the Math Bridge program and how those decisions are influencing the educational outcomes of these students.

Definition of Remedial and Developmental Education

In order to understand the function of developmental education, it is first important to explore the different ways in which it is defined. Scholars, policy makers, faculty members, and administrators often use the words "developmental" and "remedial" interchangeably, as both terms refer to courses that are below college level (Martinez & Bain, 2013). However, those terms carry distinct definitions. "Remedial"

generally refers to the correction of skill deficits and implies that students lack the skills necessary for college level work, whereas “developmental” refers to an unfinished learning process and needed growth (Parker, Bustillos & Behringer, 2010). Students in remediation or developmental education include those with large skill deficits in many subjects, those who are only deficient in one subject, those who are rusty from having been away from school for a number of years, those with learning disabilities, and those with language barriers (Levin & Calgano, 2008). Remedial courses are therefore intended to help students relearn skills they have been previously taught and developmental courses aim to develop new skills. The differing terms imply different student needs, which is one of the reasons for the disparate state and institutional policies governing developmental education. Whether these courses are called developmental, remedial, skills, or college preparation, they are designed to meet the same educational outcomes (Attewell, Lavin, Domina, & Levey, 2006). Therefore, for purposes of this paper, developmental and remedial education will both be defined as, “postsecondary courses designed to prepare a student for college-level academics” (Martinez & Bain, 2013, p.2) and will utilize the terminology employed by the researchers that are cited throughout the paper and the terminology used by the community college system that is the focus of this study.

Summary

In summary, community colleges are a significant part of the higher education system in the United States. Each year, millions of students enroll in community colleges, yet due to the readiness gap, approximately half will be required to enroll in at least one

developmental course. Of those in remediation, fewer than 10% will complete a degree, which brings developmental education under criticism for acting as one of the mechanisms of cooling-out of community college students. Systems such as the Vista Community College System are attempting to improve the outcomes of developmental students by redesigning their developmental education programs. It is important to understand what students are experiencing while navigating the developmental education redesign, particularly the students who do not test high enough on the placement test to place into a developmental course and are instead placed in one of the school's "soft landing" options. Understanding what is happening during the testing, advising, and enrollment process of these students is important to understanding whether this process is beneficial to students or is acting as a mechanism of cooling-out. The next chapter will cover some of the key literature surrounding developmental education in the United States.

CHAPTER TWO: LITERATURE REVIEW

This literature review will provide an overview of the research on developmental education in United States community colleges. First, I cover the history and purpose of community colleges and a history of developmental education from its early inception to the shift of responsibility for remediation from four-year institutions to community colleges. Second, I discuss how high school characteristics, socioeconomic status and race influence which students need remediation in college. Third, I review research into the effectiveness of developmental education programs, covering the barriers to studying its effectiveness as well as the benefits and drawbacks of these programs and attempts by community colleges to improve developmental outcomes. Fourth, I discuss how placement testing, course sequence, cost and pedagogy, and advising function as barriers to successful remediation. Fifth, I outline some of the criticisms of remediation from the cooling-out function of community colleges to the lowering of academic standards.

History and Purpose of Community Colleges

The contemporary community college began with the purpose of preparing high school graduates for delayed enrollment into a 4-year institution (Beach, 2011). In 1890, the second Morrill Act authorized a steady stream of state funding for higher education institutions, which secured public colleges and universities and paved the way for public-access institutions. By the early 1900s, Normal schools emerged as institutions designed

to train teachers, and originated the idea of lower-division, state-sponsored colleges. These schools appealed to students because they were low cost, had easier admissions policies, were geographically accessible, and because students viewed them as a means to achieve social mobility (Beach, 2011). As Normal schools expanded their curriculum from teacher preparation to a more general liberal arts curriculum, they paved the way for the emergence of junior colleges. Cohen, Brawer and Kisker (2014) also note social forces that contributed to the rise of community colleges were, “the need for workers trained to operate the nation’s expanding industries; the lengthened period of adolescence, which mandated custodial care of the young for a longer time; and the drive for social equality and greater access to higher education” (p. 1). Early two-year preparatory institutions in the late 1800s were originally housed in high schools or near university campuses. In 1901, Joliet Junior College in Illinois became the first official junior college in the United States (Beach, 2011).

Increased high school enrollments in the early 1900s led to steady growth rates in junior colleges (Beach, 2011). In the United States in 1910 there were 25 junior colleges (Beach, 2011), and this number tripled in five years to 74 junior colleges by 1915 (Cohen, Brawer & Kisker, 2014). Due largely to the increased numbers of high school graduates and demand for college access, this growth continued throughout the 1920s and 1930s, and by 1939 there were 575 junior colleges in the United States (Cohen, Brawer & Kisker, 2014). Prior to the 1940s, these two-year preparatory institutions were referred to as junior colleges; however, the 1950s and 1960s saw a shift in the terminology for these institutions. During this time period, schools that were lower-division branches of private

universities or run by churches were known as junior colleges, and public two-year institutions became known as community colleges. By the 1970s, nearly all types of two-year institutions were referred to as community colleges (Cohen, Brawer & Kisker, 2014). The rise of community colleges is also largely credited to Harry Truman, whose Truman Commission report, *Higher Education for American Democracy*, popularized the term “community college” (Beach, 2011). This report also helped to legitimize the expanding mission of community colleges, which included, “academically oriented general education, vocational education, adult education, and also responsiveness to local community needs” (Beach, 2011, p. 16). Fueled largely by high birth rates in the 1940s and the G.I. Bill, which made college more affordable for veterans, the growth of two-year institutions continued steadily throughout these decades and then began to level off in the 1980s. Since 1980 the number of community colleges has fluctuated between 1000 and 1200 institutions nationwide (Cohen, Brawer & Kisker, 2014).

Throughout its emergence and growth, the function of community colleges has shifted. Before the emergence of the junior colleges, several college presidents and trustees across the country advocated for universities to drop their lower-level preparatory work and focus solely on higher levels of scholarship. They argued for freshman and sophomore level education to take place in secondary schools that would provide general and vocational education as a path to junior and senior level courses at the universities (Cohen, Brawer & Kisker, 2014). University leaders also believed that this model would create a buffer institution to eliminate poorly prepared students from upper-division schools by channeling them into vocational programs. Although this

specific school structure never came to fruition, it did initiate the perception of community colleges as low-level institutions responsible for the vocational training of less academically prepared students, which contrasted with the students' view of the community college as a vehicle for upward mobility and a means to access a baccalaureate degree (Beach, 2011).

In the early years of the junior colleges, there existed an identity crisis surrounding the purpose of these institutions. Early secondary and postsecondary school systems in the United States lacked a clear organizational structure, and the junior colleges were loosely coupled with both types of institutions (Beach, 2011). Junior colleges served an array of functions such as college transfer, college preparation, and technical or vocational training; it was unclear whether these schools were separate, autonomous colleges or merely an extension of high schools (2011). In 1941, a report published by the American Association of Junior Colleges (AAJC) concluded that the function of junior colleges was to provide students with a terminal education that provided occupational training to students and channeled them into less prestigious careers dictated by the needs of the economy (Beach, 2011).

The encouragement of a terminal education persisted throughout the 1930s through the 1950s, where only 15 to 33 percent of junior college students transferred to a four-year institution. The shift from junior colleges to community colleges added greater confusion as to the mission and purpose of these types of institutions; they prepared students for transfer, offered remediation, provided occupational and continuing education, and provided a variety of community services (Beach, 2011). Although

community colleges were able to form their own stable identities by the 1970s, this identity differentiation has remained largely unchanged since the 1960s. During the 1970s, community colleges came under criticism for losing more than half of their students to attrition each year and only graduating or transferring a third of their students (Beach, 2011). This trend continued into the 1980s, vocational education became more of a mission for community colleges, which created a barrier for minority students attempting to access higher education. By the early 1990s, approximately half of nonwhite and low-income students began their college careers at community colleges. The debate over the mission and purpose of community college still persists today (Beach, 2011).

Despite the unclear and contradictory mission of community colleges, there are several functions that most community colleges serve. Cohen, Brawer and Kisker (2014) identify transfer preparation, occupational and continuing education, developmental education, and community services as the primary functions of today's community colleges. Academic transfer programs allow students to complete their freshman and sophomore year coursework at community colleges before transferring to a four-year institution. Occupational education programs prepare students for a variety of careers in vocational and technical fields. Continuing education programs allow non-degree-seeking students to take courses in subjects that interest them, encouraging lifelong learning. Developmental education teaches basic skills to academically underprepared students to prepare them for college-level work. The community service function ranges from cultural and social events to workshops and noncredit courses for the surrounding

community (Cohen, Brawer & Kisker, 2014). Because of the various functions that community colleges serve, it can be complicated for policy makers to design practices that effectively suit all of these functions.

History and Purpose of Developmental Education

History of Preparatory Programs

Although the debate over developmental education has gained increased attention over the past several decades, it is not a new phenomenon on college campuses. Underprepared students have been documented in postsecondary education since at least the nineteenth century (Brier, 1984) and preparatory courses have been present at universities since 1636 when Harvard was founded (Parker, Bustillos & Behringer, 2010). In 1828, the Yale Report recommended that students with “defective preparation” be denied admission to postsecondary institutions, which was in conflict with the increasingly popular egalitarian education movement seeking to create more equitable access to higher education (Brier, 1984). Furthermore, these underprepared students were admitted to colleges and universities because colleges needed the enrollment to generate revenue.

As open admissions colleges multiplied in the nineteenth century, faculty members and college administrators complained about the academic deficiencies of incoming students (Brier, 1984). Preparatory departments, tutoring schools, and pre-college courses were created at many colleges in response to the growing numbers of underprepared students (Brier, 1984). Although four-year institutions initially assumed the role of remediating underprepared students, the emergence and growth of junior

colleges (now known primarily as community colleges) in the 1900s led to these new schools taking responsibility for preparing students for college-level work (History of Learning Assistance, 2010). Additionally, state and federal governments increased the funding they provided to four-year institutions, which lessened the financial need to admit underprepared students (History of Learning Assistance, 2010).

During the 1960s, community colleges attempted to more clearly define their roles as a result of rapid growth. The identity of the community college emerged as an institution that served the roles of transfer, remediation, and vocation (McGrath & Spear, 1987). In the 1960s, community colleges awarded credit for remedial courses and allowed students to enroll in any course regardless of academic preparation. While this increased access for students, it resulted in high dropout and failure rates (McCabe, 2000). Remediation programs were present in the majority of colleges and universities in 1970, when 80 percent of post-secondary institutions required skill-deficient students to enroll in developmental courses (Friedlander, 1981). During this time period, community colleges increasingly created compensatory programs, which channeled students with skill deficiencies into remediation. In the 1970s, tensions arose among community college state policy makers and college administrators as to whether placement testing should be mandatory and whether credit should be awarded for remedial courses (McCabe, 2000). Additionally, community colleges began to be criticized for their roles in reinforcing existing class structures by channeling low income students into vocational programs and away from transfer programs (McGrath & Spear, 1987).

Shifting Responsibility

The growth of community colleges and compensatory programs led to a debate among higher education institutions as to who should be responsible for remediation (Bettinger & Long, 2005; Ignash, 1997; McCabe, 2000; Melguizo, Hagedorn & Cypers, 2008; Wilson, 2012). Though compensatory education was initially undertaken by four-year and two-year institutions, the role of providing remediation slowly shifted to community colleges. In the 1980s and 1990s, legislators became increasingly dissatisfied with public schools not preparing students adequately for college and felt that remediation reduced college standards (McCabe, 2000). This debate was furthered by the rapid growth in community colleges in the 1990s, where enrollments increased by 14%, which was 5% more than higher education collectively (Melguizo, Hagedorn & Cypers, 2008). The burden of offering such courses is increasingly shifting to from four-year institutions to community colleges. According to a 2003 statistical report of student enrollment in postsecondary remedial education programs at 1,186 institutions in the United States, the National Center for Education Statistics (NCES) found that public-two year institutions provide more remedial courses than other types of institutions, with 98% offering one or more remedial courses in reading, writing, or mathematics compared to only 59-80% of other institutions. A growing number of states have taken legislative steps to formally shift the role of remediation to community colleges. Tennessee, North Dakota, New York, Missouri, Minnesota, Louisiana, Florida and Colorado have state policies that prohibit four-year colleges and universities from offering developmental courses, and several states have eliminated state funding for developmental courses in

four-year colleges; these policies have led to community colleges bearing the sole responsibility for remediation (Wilson, 2012).

There are several reasons why institutional and state policy makers believe that community colleges should bear the responsibility of offering developmental courses. One reason is that this shift results in substantial monetary savings for four-year institutions and community colleges can offer these courses at a lower cost to students (Bettinger & Long, 2005). The cost differential is important to legislators who have become frustrated with having to fund remedial education twice: once at the P-12 level and again at the college level (Ignash, 1997). Another reason is that four-year institutions worry that offering developmental courses lowers their academic reputation and value of their diplomas (Ignash, 1997). Furthermore, the open access nature of community colleges allows greater access for students in need of college preparation than a four-year institution (Ignash, 1997).

Despite the state push for community colleges to be the sole postsecondary providers of developmental courses, evidence suggests that this move does little to improve the success rates of these programs. Parker (2007) analyzed developmental education state policies in the City University of New York (CUNY) and California State University (CSU) systems, both of which eliminated remediation in four-year institutions. While the CUNY system automatically requires students below college level to enroll in community colleges, the CSU system allows underprepared students to stay in four-year institutions for one year before being removed to community colleges if they fail to elevate to college-level preparation. According to Parker (2007), students in the CUNY

system who are de-admitted from a four-year college due to low test scores have the option to enroll in a community college, but only 1200 of the 4500 de-admitted students in 2003 chose to do so. For the CSU system, students who are removed from four-year institutions and channeled into community colleges have low rates of returning to four-year schools. Parker (2007) concludes that removing developmental courses from four-year colleges and universities does not advance college preparedness for students needing remediation. In fact, for underrepresented minority students, the removal of developmental education from four-year institutions may further marginalize these groups. Parker (2012) notes that minority serving institutions educate 43% of all students of color enrolled in postsecondary education. Because many of these institutions are four-year campuses, removing their abilities to provide developmental education hinders their missions of diversity and access and could ultimately widen the racial gap in college attainment by limiting access of students of color to the type of institutional support that may best serve their needs (Parker, 2012).

Factors Influencing the Need for Remediation

High School

There are a multitude of factors that predict which students are most likely to need developmental courses when they enter into community colleges. Among these factors, three variables that scholars have identified are high school characteristics, socioeconomic status, and race (Attewell, Lavin, Domina, & Levey, 2006). The first element that impacts the need for remediation is a student's high school education. Teacher education level, school income level, school location, and academic standards

are among the influencing high school factors (Attewell, Lavin, Domina, & Levey, 2006; Howell, 2011; Pretlow III & Wathington, 2014; Rose, 2012). High school teacher education level is one high school element that plays a role in the need for remediation. By using a regression model to compare high school teacher education level to remediation enrollment data of first-time college first-year students in the California State University system, Howell (2011) found that California high school students whose teachers had master's degrees were less likely to need mathematics remediation in college than those whose teachers did not possess a master's degree. Howell also found that high school teachers with a master's degree plus additional coursework had fewer students needing English remediation than those without a master's degree. Additionally, there is an increased need for remediation among students from schools that rely heavily on teachers with teaching waivers and emergency teaching credentials (Howell, 2011).

In addition to teacher education level, the school's income level and location are factors influencing which students need remediation in college. Howell (2011) notes that lower income schools are also more likely to have students needing remediation because they do not provide the academic rigor and resources necessary to effectively prepare students for college-level work. Fifty-two percent of students in urban high schools enrolled in developmental courses compared to 40% in rural high schools and 38% in suburban high schools (Attewell, Lavin, Domina, & Levey, 2006). Rose (2012) notes that students from low-performing high schools have low persistence rates in community colleges because of lack of appropriate academic preparation. The students who are less

academically prepared are also less likely to remediate successfully when placed into developmental courses.

A final high school characteristic that influences the need for remediation is the rigor of the school's program and standards. Employing a counterfactual model of analysis of students in the National Educational Longitudinal Study (NELS:88), which tracked the academic progress of students from 1988 to 2000, Attewell, Lavin, Domina, and Levey (2006) found that students who took the most advanced courses in high school enrolled in remedial courses at lower rates than those who took less demanding courses. In an experimental evaluation of high school students in a developmental summer bridge program offered at seven community colleges and one four-year institution, Pretlow III and Wathington (2014) found that although students who completed a high school diploma perceived that they were academically prepared for postsecondary education, 80% tested into developmental courses. Pretlow III and Wathington argue that this finding is an additional piece of evidence supporting the need for clearer alignment between high school graduation requirements and college entrance requirements. The researchers suggest that one solution to this problem is to offer the developmental assessment test to students while they are still in high school to correct their academic deficiencies before they enroll in college.

Socioeconomic Status

Another key factor influencing which students enroll in developmental education courses is socioeconomic status, which impacts not only college affordability, but also a student's academic preparation for college. Analysis of the NELS:88 survey data reveals

that among high school graduates in the 1992 cohort, more than half of students in the lowest two income quartiles enrolled in community colleges (Bailey, Jenkins, & Leinbach, 2005). Students from higher income brackets are more likely than their low-income peers to enroll in four-year institutions (Bailey, Jenkins, & Leinbach, 2005), and low-income students are also less likely to transfer to a four-year institution from a community college (Porchea, Allen, Robbins & Phelps, 2010). Additionally, Soliday (2002) notes that, although more racial minorities and women attend college each year, most come from middle and upper-income families. More recent research shows that there is a continuing trend of community college enrollment among low-income students. A 2008 statistical report by Provasnik and Planty found that community colleges have higher percentages of low-income students than four-year colleges. Among community college students, 26 percent were from the lowest income quartile, compared to 20 percent at not-for-profit four-year institutions (Provasnik & Planty, 2008).

The underrepresentation of students in higher education from low socioeconomic status families is largely because these students cannot meet the financial burden of paying tuition. Most of these students are responsible for paying for school themselves, with little financial help from parents. These students are therefore more likely to enroll in a community college, where tuition costs are lower than most four-year institutions (McDonough, 1997). Similarly, Kim (2012), found that the availability of state need-based financial aid is a key factor influencing low-income students to enroll in community colleges. Low-income students are more likely to enroll in community colleges when more state need-based aid is available. McDonough (1997) also notes that

these students may choose community colleges because they are closer to home and because they have not yet decided on an intended major and can explore different subject areas at a lower cost than at four-year institutions.

When students from low socioeconomic status backgrounds enroll in community colleges, they are more likely than their higher status peers to be placed into at least one remedial course (Attewell, Lavin, Domina, & Levey, 2006; Bailey, Jenkins, & Leinbach, 2005; Hollis, 2009; Soliday, 2012). According to an analysis of the NELS:88 data, seventy percent of community college students in the lowest income quartile take at least one remedial course (Bailey, Jenkins & Leinbach, 2005). Attewell, Lavin, Domina, and Levey (2006) note that students from families in the lowest quartile of socioeconomic status were more likely than their peers to need remedial coursework. The remediation need for these students is directly linked to high school academic background because they often come from high schools that have not academically prepared them for college-level work (Attewell et al., 2006). Soliday (2002) also notes that low-income students are among the ones most likely to need remediation, the majority of which is in mathematics. Hollis (2009) argues that the lack of college-level skills among low-income students is part of a cycle where areas with low family incomes have lower tax bases, which then lead to weaker school districts and the need for developmental education among students graduating from those school districts.

Further research into the persistence of low-income students shows that even when controlling for variables such as race, gender, age, and family, these students still have far lower persistence rates than their higher income peers (Corrigan, 2003). In

addition, low-income students are more likely to possess the risk factors of lack of rigorous high school preparation, attainment of an alternate high school credential such as a GED, and parents who did not attend college (Corrigan, 2003). Thirty-five percent of middle- to upper-income students completed what is considered as a moderately rigorous high school program, compared to fewer than 20% of low-income students. Corrigan (2003) also finds that in terms of institution choice, low-income students are more likely to enroll in community colleges or for-profit institutions than more affluent students. The barriers that low income students face translate into less success in college than more affluent students.

Colyar and Stich (2011) further illuminate the issues of persistence for low-income students, stating that only 6% of those in the lower income brackets earn bachelor's degrees as opposed to 40% at the highest income level. These low-income students, according to Colyar and Stich, "are more likely to enroll at a 2-year school, attend college part-time, and enroll more sporadically than their higher income peers" (p. 125). Furthermore, Colyar and Stich posit that low-income students are generally academically underprepared and more likely to need remediation than higher income students. Using discourse analysis of essays written by 86 low-income high school graduates who participated in a remedial summer bridge program, Colyar and Stich noted that low-income students expressed insecurities about remediation and college student identity, suggesting that low-income students face challenges in passing remedial courses because they are already embedded in a discourse that they are ill prepared and will need additional support (Colyar & Stich, 2011).

The research surrounding economically disadvantaged students shows that these students are often most in need of remediation because of lack of appropriate academic preparation in high school (Soliday, 2002; Corrigan, 2003; Attewell, Lavin, Domina & Levey, 2006). This is an additional setback for students already burdened by the high cost of education. Although low-income students are disproportionately represented in developmental courses, it is important to note that students from other economic groups are also in need of remediation. According to Rose (2012), 24% of students in the highest income quartile are in need of at least one developmental course. Additionally, the gap between low-income and high-income students in remediation is more pronounced in four-year institutions than in community colleges.

Race / Ethnicity

In addition to high school and income factors, race and ethnicity play a significant role in influencing which students are in need of developmental education. Students of color are disproportionately overrepresented in community college compared to their white peers. In a national longitudinal study of students in postsecondary education from 1988 to 2000, Bailey, Jenkins and Leinbach (2005) found that there are twice as many Hispanic students enrolled in community colleges than in four-year institutions. This study also found that Black students enroll in community colleges in higher numbers than in four-year institutions. According to Bahr (2010), Black and Hispanic students experience a disadvantage in academic achievement, particularly in math, that begins in kindergarten and continues through the end of high school.

Along with being overrepresented in community colleges, students of color are also overrepresented in remediation. High schools with higher populations of African American and Hispanic students have higher rates of students in need of remediation in math and English than schools with a lower numbers of these students (Howell, 2011). High schools with higher Asian populations also have higher proportions of students needing remediation than White schools, but only in English and not in mathematics (Howell, 2011). Howell's study does not specifically address racial differences in developmental reading or whether the findings about English remediation included reading courses as well. On average, 61% of non-Hispanic Black students enroll in at least one developmental course, while only 35% of non-Hispanic White students are required to remediate (Attewell, Lavin, Domina, & Levey, 2006). Even when controlling for factors other than race such as socioeconomic status, academic preparation, high school characteristics, and high school academic performance, Attewell et al. found that Black students are 16% more likely than White students to enter into developmental courses. In a statistical analysis of data from students in California's community colleges, Bailey (2010) found similarly that only 25% of Black students and 20% of Hispanic students are prepared for college-level math when they graduate high school. Furthermore, 62% of African Americans and 63% of Hispanics enroll in at least one remedial course compared to 36% of Whites and 38% of Asians (Bailey, 2010). Bailey found that Asian students have a higher likelihood than whites of needing remediation in English and reading, but not in math.

There are a number of contributing factors that help explain the reasons for the racial disparities in developmental education. Howell (2011) argues that academic outcomes among students who are racial minorities are more influenced by school factors such as teacher educational attainment than their non- minority classmates. These students are statistically more likely to attend low-income schools with teachers who lack master's degrees or teach with emergency waivers (Howell, 2011). Apart from income and high school factors, however, the racialized experiences of Black and Latino/a students in particular appear to contribute to the readiness gap. A high school readiness study in 2010 of students in Illinois found that, while 30% of White students who took the ACT met the minimum college readiness standards, only 3% of Black and 8% of Latino/a students did (Castro, 2013). One of the reasons for this preparation gap is that Black and Latino/a students had less access to college preparatory curricula. Even among higher income brackets, Black and Latino/a students had less rigorous preparation for college than White and Asian students. Castro concludes that race is a factor in the college readiness gap, due largely in part to deficit ideology, which is the perspective that the individual student is to blame for academic shortcomings under the assumption of lack of motivation rather than assigning blame to the institution itself (Castro, 2013). Additionally, factors such as, academic tracking, low parental capital, and poor primary and secondary school quality contribute to racial disparities in remediation (Bahr, 2010). Black, Hispanic, and Native American students are more likely than their White and Asian peers to be tracked into general or vocational programs in high school, and are more likely to drop out of college if they do attend. (Kao, & Thompson, 2003). Low-

income and non-white students are also more likely than affluent white students to take remedial courses and courses related to low-skill jobs. While many students in these minority groups have strong social capital from cultures and families that place strong emphasis on academic achievement and work ethic, low family income and parental education levels and stereotype threat lead to lower rates of college completion among these students (Kao, & Thompson, 2003).

School characteristics, socioeconomic status, and race do not act independently from one another; rather, there is an intersection of these categories that influences the need for remediation. For example, Attewell and Domina (2008) found that students from low-income schools are more susceptible to tracking into less rigorous coursework, and Black and Hispanic students are disproportionately represented in low-income schools. Curricular intensity is a strong predictor of future academic performance in college, and because low socioeconomic status students have limited access to more rigorous high school courses and these students are often Black and Hispanic. Therefore, Black and Hispanic students are often excluded from accessing the curriculum necessary to prepare them for college-level work not on the basis of their race alone, but by societal and institutional factors connected to race (Attewell & Domina, 2008).

Effectiveness of Remediation

Issues with Studying Effectiveness

One issue that educators and policy makers face when making decisions about developmental education programs is that there is inconclusive evidence about the effectiveness of such programs (Bettinger & Long, 2005). Sparse and conflicting data

make it difficult to determine which students, if any, benefit the most from remedial courses and which do not. One of the reasons for the lack of data on remediation is that most schools do not have exit standards for remedial courses, so the effectiveness of these courses is not tracked (Merisotis & Phipps, 2000). Furthermore, remediation standards vary by institution, and there are no set measures for determining what constitutes preparedness for college-level work (Merisotis & Phipps, 2000). For example, there is disagreement among institutions as to whether college algebra is a transferrable course or whether it is a college preparatory course (Oudenhoven, 2002). According to Merisotis and Phipps (2000), “Research about the effectiveness of remedial education programs has typically been sporadic, underfunded and inconclusive” (p. 75). Levin and Calgano (2008) note that one reason for this inconclusive data is that these studies do not randomly assign students to remediation so it is difficult for researchers to control for the various factors that might influence student outcomes and it is insufficient to simply compare the academic outcomes of remedial and non-remedial students.

Another reason for the limited research on remediation is that it has only been a contentious issue since the 1990s (Attewell, Lavin, Domina & Levey, 2006) and therefore scholars have not yet devoted considerable time to studying its effectiveness. Large gaps in the data on the effectiveness of remediation make it difficult for policymakers, researchers, and administrators to know which remediation strategies work and which ones fail. In a case study of 15 community colleges in 6 states across the U.S., Perin (2006) found that the states had no set policies for advancing through or exiting developmental courses. Additionally, the states all had varying procedures for assessing

the effectiveness of their developmental programs, with mostly subjective measures such as course grades, informal tests, and instructor's perceptions (Perin, 2006). Testing the outcomes of remediation is also difficult because of high faculty-to-student ratios, low funding for remedial programs, and piecemeal systems that leave no systematic way to determine program effectiveness (Esch, 2009).

Because of the lack of consistent data on the effectiveness of remediation, researchers have proposed new methods of better evaluating developmental programs. Levin and Calgano (2008) call for community colleges to become experimenters and apply experimental, quasi-experimental, non-experimental, and mixed method research designs to the evaluation of their remedial programs. The authors argue that this more structured approach to evaluating remediation will yield more accurate information about the effectiveness of these programs. Handel and Williams (2009) also argue in favor of more research on remediation. They note that schools need to gather more data, assess the most promising developmental practices, use data to learn the strengths and weaknesses of specific students, and use these data to develop more challenging learning environments for students and preventative programs to keep students out of remediation.

Benefits of Remediation

Despite the sparse data about the effectiveness of developmental programs, there are some significant studies that shed light on the issues of remediation. Developmental education remains a common practice in community colleges because there is evidence supporting positive outcomes of such programs. In a longitudinal study comparing college-level students to skill-deficient students in a 1992 community college cohort,

Weissman, Silk, and Bulakowski (1997) found that skill-deficient students in remediation had higher levels of persistence than those who were not required to take remedial courses. In addition, these students persisted at similar rates to their college-level peers. The researchers also found that these students were more successful when they were required to begin their remedial coursework during their first semester of school. In addition, students in remediation persisted at higher rates when they were permitted to take college-level courses alongside their remedial courses. Echoing these findings, Bettinger and Long (2005) found that students in remedial courses do not necessarily perform worse than those who are not in developmental programs, and when controlling for background, students in mathematics remediation were 15% more likely to transfer to a four-year college than students with similar test scores who did not take a remedial course.

Further evidence of some degree of success in developmental education comes from a study by Attewell, Lavin, Domina, and Levey (2006), who sought to uncover the effects of remediation on graduation rates and time to degree, and the consequences for students who take multiple remedial courses. Using data from the National Education Longitudinal Study that was conducted in 1988-2000, the researchers compared enrollment in different types of remedial courses with graduation rates. The results of the study show that students who successfully complete their remedial courses are more likely to graduate with a bachelor's degree. Remedial reading and writing showed a positive effect for students, meaning that those enrolled in such courses have a better chance of graduating. Conversely, placement into remedial mathematics had a negative

effect on students and reduced their chances of graduating. Attewell et al. (2006) conclude that, when remediation works, it works well, but only for those who pass their courses. The researchers also determined that it is not placement into remedial courses that is causing low persistence rates; rather, other factors such as race, socioeconomic status, family, and high school background are influential factors. In addition, the study does not include students who withdrew or stopped attending their remedial courses, so the impact of remediation on dropout rates remains unknown (Attewell et al, 2006) The study also notes that placement into multiple remedial courses increases time to degree completion, which could lead to higher attrition rates for remedial students.

For mathematics remediation, which is often a greater barrier for students than remediation in English and reading, remedial math sequences can effectively help students resolve skill deficiencies. Kowski (2014) conducted a quantitative study of outcomes for traditional-age students in mathematics remediation in a New Jersey community college who had taken a placement test and were attending community college for the first time. Students who passed their remedial mathematics courses achieved similar levels of credential and degree attainment as those who did not need remediation. However, the lower a student's level of mathematics proficiency, the lower the likelihood that the student will complete school. More than two-thirds of students in remedial math did not complete the developmental course sequence within two years, and only one-quarter of all developmental math students eventually remediated successfully (Kowski, 2014). Kowski's findings align with previous studies that found that

remediation can increase the likelihood of degree attainment for students, but only among those who are able to pass their remedial courses.

Echoing Kowski's (2014) findings is a study by Moss, Yeaton, and Lloyd (2014). Using a randomized experiment design, Moss et al. studied students at a large multi-campus community college who had taken the math placement exam and found that students who took developmental math had more positive outcomes than students who had similar placement test scores, but were placed into college-level math. The researchers concluded that students benefit from being required to take developmental courses, and even those whose placement test results put them on the threshold of college-level courses would be better served by taking a developmental class than directly entering into a college-level one (Moss et al., 2014).

Drawbacks of Remediation

Although there is evidence supporting the success of developmental education programs, there are also numerous studies that have found these programs to be inadequate in preparing students for college-level work. McGrath and Spear (1987) summarize the major criticisms of remediation, contending that, "Institutional remediation efforts tended to be limited, marginal, and largely ineffective" (p. 15). According to McGrath and Spear, remedial courses represent a watering down of academic standards and community college remediation courses have been reduced to rote memorization and information transfer. The authors state, "The remedial and developmental educator attempts to reconstruct community colleges and make them adequate settings for nontraditional students, but such attempts lack the educational

vision and the pedagogical practices appropriate to countering the leveling-down of literacy standards” (p. 19). These courses do not adequately prepare students for college-level work and may hinder the academic progress of students hoping to transfer to four-year institutions.

A number of studies examined the effectiveness of remediation and support the arguments made by McGrath and Spear (1987). One such study by Bettinger and Long (2005) analyzed the benefits and drawbacks of remediation in community colleges. Using data from a longitudinal study conducted by the Ohio Board of Regents, Bettinger and Long examined the college paths of 13,000 first-time freshmen community college students over a span of five years, from 1998 to 2003. The study found that, in Ohio, 60 percent of traditional age community college students needed remedial math, and 40 percent needed remedial English. Of the students studied, two-thirds had completed their first semester of remedial study. However, students in remediation were 15 percent more likely to have stopped without a two-year degree and less likely to have transferred to a four-year school by 2003, which shows some negative influence of remediation. One concern brought forth in the study is the affordability of remediation. Bettinger and Long (2005) note, “Often [...] remedial courses do not count toward degree or certificate credits. Therefore, remediation frequently lengthens the time necessary to complete a degree, which can have implications for time-limited financial aid packages” (p. 20). Another concern with remediation is that it can limit the college-level courses in which students can enroll and therefore hinder their abilities to enter into their chosen majors.

This may inadvertently track students, particularly low-income students, into lower-status degrees or vocational programs.

Among the developmental courses that community college students are required to take, the greatest barrier to graduation is remedial math. While generally positive outcomes have been recorded for students in developmental English and reading, placement into developmental math has been shown to negatively affect student outcomes. Bremer, Center, Opsal, Medhanie, Jang and Geise (2013) studied retention and completion outcomes in students from four public U.S. community colleges and found that enrolling in developmental English and reading in the first year of college increased the likelihood of those students persisting into their second year, but not into their third year. However, developmental math enrollment had no predictive effect and was negatively associated with GPA and persistence. Additionally, taking developmental math negated the positive outcomes associated with taking developmental English and reading (Bremer et al., 2013).

Because enrollment in developmental math is associated with more negative outcomes than enrollment in developmental English and reading, a number of studies have examined the effectiveness of remedial math specifically (Bahr, 2008; Bahr, 2010; Esch, 2009; Martorell & McFarlin, Jr., 2011). One compelling study about the effectiveness of mathematics remediation looks at the academic attainment among community college students enrolled in remedial mathematics courses. Bahr (2008) analyzed data from 85,894 freshmen at 107 community colleges in California. The findings of this study support other existing data about the success of remediation in that

students who successfully complete remedial courses achieve academic success at the same rates as students who achieve in college math without needing remediation. Bahr notes that, while these findings are promising for students who successfully complete their remedial math courses, “Three out of four (75.4%) remedial math students do not remediate successfully, and the academic attainment of these students is abysmal: more than four in five (81.5%) do not complete a credential and do not transfer” (p. 443-444). Furthermore, Bahr found that students who are the least academically prepared are the least likely to remediate successfully. The conclusion then is that mathematics remediation works well for some students, but not for the students who may need it the most. The negative impact of mathematics remediation is especially pronounced among students of color, particularly Black and Hispanic students (Bahr, 2008). In a similar study of students placed into the lowest level of mathematics remediation in California’s community colleges, Bahr (2010) found that Black and Hispanic students enter into remediation with greater deficiencies in mathematics than White and Asian students and are less likely to complete their remedial sequences. This disparity furthers the already existing racial stratification in mathematics rather than leveling the playing field. However, Bahr does note similar academic outcomes among students in all race categories for those who do successfully complete their remedial course sequences.

Another analysis of remedial courses at Sacramento City College (SCC), a community college in California that serves mostly low-income and minority students, echoes existing literature about the ineffectiveness of developmental education programs (Esch, 2009). By studying enrollment and completion data at SCC, Esch determined that

only 60% of remedial students pass their remedial courses with a C or higher. Of the students placed in these courses, only 30% complete remedial math and fewer than one in four goes on to complete a degree. Esch's data show that students who need remediation drop out of college at higher rates than students who do not. Similarly, using administrative record data of students in two- and four-year institutions from the Texas Schools, Microdata Panel, Martorell and McFarlin Jr. (2011) employed a regression discontinuity approach that revealed no positive academic outcomes of remediation for students. The authors suggest that two possible reasons for the ineffectiveness of these developmental programs are a lack of close monitoring due to the inelastic demand of such courses and that students in remediation take more total courses and their busy schedules leave them with less time to develop the social networks that would help facilitate their success in college.

Attempts at Improving Developmental Outcomes

Because of the questionable successes of developmental programs, there have been both small and large-scale attempts among U.S. community colleges to improve student outcomes in developmental courses. Deil-Amen and Rosenbaum (2002) conducted a study of two community colleges in a large Midwestern city that had restructured its remedial courses in an attempt to remove the stigma of remediation. The researchers conducted an analysis of interviews with staff and students, observations of classes and meetings, student surveys and institutional procedures to examine how students' perceptions of remediation are managed. Remedial courses are structured to slowly guide students towards college level courses. There is a complex hierarchy built to

preserve standards while giving remedial students a path to higher level courses (Deil-Amen & Rosenbaum, 2002). The schools award institutional credit for remedial courses, which counts towards enrollment status and financial aid, but not towards degree completion. Faculty and counselors at these schools are committed to not underestimating the potential of their students (Deil-Amen & Rosenbaum, 2002). While this approach may help alleviate some of the stigma of remediation, it also bears some negative consequences. Because the remedial nature of the courses is downplayed and the term “developmental” is used instead, students often do not know the remedial nature of their course placements. Students might not be aware that they have been placed into classes that are not earning them college credit, or may be confused by where they fall within the course sequencing (Deil-Amen & Rosenbaum, 2002). This confusion can lead to students not having the information they need to make appropriate decisions about their path through college, which can be a waste of both time and money (Deil-Amen & Rosenbaum, 2002).

Another recent attempt at improving developmental outcomes is taking place at the state level in Texas. The Closing the Gaps By 2015 plan was put in place in 2000 by the Texas Higher Education Coordinating Board (2010). It sets a series of statewide goals for increasing higher education participation and success rates, with a specific focus on Hispanic and African American male students. For students in developmental education, the plan aims to make recommendations to state legislators to provide better funding for developmental courses, improve pathways to college-level courses, accurately assess and place students, improve instruction in remedial courses, and track the effectiveness of

these courses (Texas Higher Education Coordinating Board, 2010). Despite these new state policies, statewide persistence rates at community colleges in Texas improved or stayed the same for White, Hispanic and Asian students, but declined by 0.9 percentage points for African American students in the 2011 to 2012 cohorts (Texas Higher Education Coordinating Board, 2014). Data for more recent cohorts has not yet been made available.

Barriers to Successful Remediation

Placement Testing

Students who enroll in developmental education face a number of barriers to successfully remediate. One such barrier is placement testing. Colleges typically rely on standardized test scores to place students into courses (Asmussen & Horn, 2014). Placement testing policies vary greatly across institutions, and current tests such as the ACT, PSAT, and SAT do not accurately measure college readiness (The National Center for Public Policy and Higher Education, 2010). In addition, state policies differ greatly on whether community colleges should require placement testing and how to use the testing to determine placement into developmental courses (Dougherty & Reid, 2007). In 2007, 28 states mandated placement testing, 19 clearly did not require it, and 3 had unclear policies (Dougherty & Reid, 2007). As of 2012, 35 states had at least some policies regarding placement into developmental courses (Wilson, 2012), but 26 states do not mandate placement (Dougherty & Reid, 2007).

There are also conflicting policies surrounding standards for college readiness. While the majority of states use the College Board's Accuplacer test for placement

purposes, all of the states have different cutoff scores (Wilson, 2012). This means that a student who is considered college ready in one state might be placed into remediation in another state. Further confounding this problem is the fact that despite state placement mandates, colleges sometimes informally exempt students from placement testing or find ways to circumvent state assessment and placement policies (Dougherty & Reid, 2007). Finally, there is debate over whether placement testing is an effective predictor of student success. Flores and Oseguera (2013) found that placement tests are relatively predictive of future student success in a particular course, but not predictive of degree attainment overall. Armstrong (2000) analyzed the predictive validity of placement testing for English and mathematics courses at three large community colleges and found that placement tests did not accurately predict a student's level of academic preparation. Armstrong (2000) argues that high school GPA, grades in English and mathematics courses, and number of courses taken are stronger predictors of postsecondary success in these subject areas than placement tests. Assessment and placement policies based on tests such as the Accuplacer further complicate the path to achievement for developmental students by potentially not placing them into the courses that will best facilitate their academic success. Additionally, the focus on academic skills alone ignores other factors that predict college success such as motivation, commitment, and perseverance (Asmussen & Horn, 2014). These differing standards for college readiness often lead to students being misplaced and can hinder their chances of success in college (Asmussen & Horn, 2014).

For students who are placed into one or more developmental courses, there are inconsistent state policies surrounding whether students should be allowed into courses for some subjects while they are going through remediation for other subjects. In terms of state policy, approximately two-thirds of states permit students to take some college-level courses while completing remediation and about one-third of states allow students to take any college-level course while enrolled in remedial courses (Weissman, Silk & Bulakowski, 1997). Maryland is the only state that requires students to complete developmental courses before they can take any college-level courses, while some states allow students in remediation to enroll in occupational courses, but not general education classes (Jenkins & Boswell, 2002). A number of states have also imposed rules for how long students can stay in remediation. Six states have time limits for the completion of developmental courses, and seven states limit the number of times a student can repeat one of these courses (Jenkins & Boswell, 2002). However, even states with clear policies on remediation face barriers to success because there are often exceptions to these rules; policies are vague and difficult to enforce (Weissman, Silk & Bulakowski, 1997).

In addition to the issues with inconsistent readiness standards and misplacement, there are also issues with placement based on a student's intended major, particularly math placement. College reading and English are typically deemed important for students seeking any type of degree or credential (Asmussen & Horn, 2014). With math students, however, students may be required to take math courses not relevant to their intended major. This can lead students in non-STEM fields to struggle in math courses intended for STEM majors (Asmussen & Horn, 2014). As a result of this, some colleges have

started creating different math pathways for STEM and non-STEM students in order to more effectively place students into the math courses most appropriate for their field of study (Asmussen & Horn, 2014).

In order to address the inconsistencies in placement testing, Parker (2007) supports greater collaboration along the P-20 continuum to better align high school graduation standards with college assessment benchmarks. Parker argues that this alignment is necessary not only within states, but across states so that there is greater consistency in developmental policies nationwide. Additionally, Parker notes that policy makers should consider how states can achieve this consistency while still offering institutions the autonomy to determine how to implement course plans that best serve their specific student populations.

Course Sequence

In addition to the issues with placement testing for developmental courses, the required course sequence of these programs is another reason many students fail to successfully remediate. One problem with course sequence is the time frame in which students begin their developmental courses. Traditional developmental programs require developmental students to progress through a series of developmental courses before they can enroll in college-level courses; these courses can be problematic for students because they can take several semesters to complete (Asmussen & Horn, 2014). Although many states require students to take their remedial courses as prerequisites before enrolling in college-level courses with the goal of ensuring that these students are adequately prepared before moving into more advanced classes, students often find ways to bypass

these rules through instructor overrides (Perin, 2006). In some cases, students were permitted to delay entry into developmental courses, making them a condition of graduation rather than entry (Perin, 2006). Often, students who delayed assessment and entry into remediation encountered difficulty in other courses due to academic skill deficiencies.

Not only are students potentially disadvantaged if they delay entry into remediation, the number of developmental courses a student is required to take is negatively associated with academic persistence (Adelman, 1998; Attewell, Lavin, Domina & Levey, 2006; Bahr, 2012; Bettinger & Long, 2009; Kowski, 2014). A comparison of remediation versus graduation rates found that students who do not take any remedial courses are more likely to graduate with bachelor's degrees than students who require one or more such courses (Adelman, 1998). As the number of remedial courses a student takes increases, the likelihood of that student graduating decreases (Adelman, 1998). In support of Adelman's findings, Bettinger and Long (2009) note that remediation may be harmful in that it increases the number of courses that students must take and lengthens the time to degree, which gives students more exit points. Bahr (2012) also found that the length of remedial course sequences is problematic. Bahr compared the length of time spent in remedial math courses with retention and graduation rates in California Community College System and found that students who started in the lowest-level math course remained in the system for the same amount of time as those not requiring remediation. However, because these students spent so much time working their way through their remedial courses, they were more likely to leave school before

completing a degree. Kowski (2014) found that, among students who were still attending community college after two years of mathematics remediation, only 10% completed a degree or credential. Kowski's findings support the argument that the longer a student remains in remedial courses, the less likely that student will be to graduate. Taking three or more remedial courses reduces the likelihood that a student will graduate with a bachelor's degree (Attewell, Lavin, Domina & Levey, 2006).

The majority of students who pass a class in the remedial sequence will attempt the next class, but those who fail are largely unlikely to attempt the class again (Bahr, 2012). This is especially problematic for historically disadvantaged groups who are disproportionately placed in the lowest level of the remedial course sequence. The relationship between length of time in remedial courses and attrition rates is why there is now a push from community colleges to accelerate students through remedial courses (Bahr, 2012). This acceleration can happen in a number of ways. Some colleges have combined two semesters of a developmental course into one semester to progress students more quickly through the sequence; other schools have offered corequisite courses to mainstream students into college-level courses while providing extra instruction to meet their developmental needs (Asmussen & Horn, 2014). These new developmental sequence options have shown some early positive outcomes, although their long-term effects on student completion rates has not yet been determined (Asmussen & Horn, 2014).

Cost

Inadequate placement testing and lengthy course sequence are not the only factors that impede successful remediation. The cost of these courses is also a concern for states,

institutions, and individual students. Estimates of the true costs of remediation are varied, but reports by Breneman (1998) and Breneman and Haarlow (1998) place the cost of remediation around \$1 billion nationally. An updated analysis by Pretlow and Wathington (2011) found that national developmental education costs have remained relatively consistent since Breneman and Haarlow's 1998 study. Pretlow and Wathington found that for the 2006-2007 biennium, the national cost of developmental education was \$1.13 billion. According to the U.S. Department of Education (2017) in the 2013-2014 academic year, students in colleges nationwide paid \$1.3 billion in out-of-pocket costs for developmental education. Of this amount, \$920 million was paid by students at two-year colleges. As for the burden on the federal government and taxpayers, it is estimated that developmental students borrow approximately \$380 million in federal loans annually to cover the costs of their developmental courses (U.S. Department of Education, 2017). However, Pretlow and Wathington (2011) caution that there is a lack of empirical data on developmental education expenditures, which makes it difficult to pinpoint the exact total cost. Additionally, some studies into the costs of developmental education tend to extrapolate data from one or two states and apply the data nationally, which can lead to inaccurate reports about the total costs of remediation (Saxon, 2016).

Although \$1 billion is a large sum of money, it is a small percentage compared to total national higher education expenses. According to Neuburger, Goosen, and Barry (2013),

Each year, local, state and federal governments invest over \$160 billion in higher education—approximately 1% of the U.S. gross domestic product. However, as little as .02% of that sum goes specifically to fund DE [developmental education]

programs for students with little other access to the economic growth and cultural mobility that postsecondary credentials make possible (p. 78).

For state governments, remediation costs are between 1% and 2% of the state education budget and there is a trend indicating that state budgets cover more of the costs of remediation than local districts (Martinez & Bain, 2013). Education and finance and budget policy is affected by increased need for developmental courses (Martinez & Bain, 2013).

Saxon and Boylan (2001) took a closer look at remediation costs and found that community colleges and universities are generating more income from remediation than they are spending on it. The data indicate that while schools are making money from their remedial programs, they are not reinvesting that money into improving these programs and that the growth of funding spent on remediation services is stagnant (Saxon & Boylan, 2001). Developmental programs are not particularly costly to the institutions themselves. Remedial courses typically cost less to deliver than college-level courses (Martinez & Bain, 2013). In addition, community colleges incur more of the costs of remediation than universities, and revenue generally exceeds costs (Martinez & Bain, 2013).

One reason for the historical lack of monetary investment in developmental education programs is that prior to the year 2000, there were minimal financial incentives from state governments to encourage community colleges to improve the success rates of their developmental programs. Most state accountability and finance systems did not incentivize degree completion (The National Center for Public Policy and Higher Education, 2010) and only one third of states offered performance funding for

community colleges (Dougherty & Reid, 2007). In recent years, however, performance-based funding has gained more traction among higher education institutions. In 2015, 35 states, or two-thirds of the country had some form of performance-based funding for their higher education institutions, with approximately two-thirds of these states implementing it for all higher education institutions, and the remaining states implementing it for either just four-year colleges or just two-year colleges (Hillman, 2016).

Among the states that offer performance-based funding for higher education institutions, there has been little evidence to show that these performance-based funding measures have a significant impact on student attainment rates (Zumeta & Kinne, 2011). Shin (2010) notes that while performance based funding may have a slight positive impact on graduation rates, this impact varies greatly across institutions; the institutional characteristics of a college have greater influence on attainment rates than state funding policies. After analyzing the body of research on the outcomes of performance-based funding programs from 1997 to 2012, Hillman (2016) found that performance-based funding largely had either no effect on student completion, or had a negative effect. Similarly, a 2014 study of Pennsylvania's performance-based funding system found that the implementation of this system did not lead to an increase in college graduates (Hillman, Tandberg & Gross, 2014), although completion rates were not found to be negatively impacted by this policy. These results are echoed by a study of colleges in Indiana, where researchers found that not only did the performance-based funding law not improve graduation rates in two-year or four-year colleges, the law actually limited access for racial minorities and low-income students as colleges began only admitting

students who they felt were most likely to graduate (Umbricht, Fernandez & Ortagus, 2017).

In addition to state funding policies regarding developmental education, remediation can be a costly personal barrier to college success for students. Financial aid typically covers the cost of remedial courses, but students who use aid to pay for remedial courses may use up all of their federal aid before they complete a degree (Martinez & Bain, 2013). One of the reasons that the cost of developmental education is such a burden for students is that higher education public policy has led to decreased affordability of college tuition. Callan (2011) notes that state support for higher education has fluctuated greatly depending on the United States economy. Decreased state support has led to steep tuition increases that limit access for first-generation and low-income students.

Historically, the institutions themselves shouldered much of the responsibility for helping students pay for college, but the new state model of financing higher education has led to higher costs for individual families and less access to institutional aid for low-income students (St. John, Daun-Barnett & Moronski-Chapman, 2013). Current federal financial aid policies offer some help to these students, but do not greatly facilitate college opportunity. Rather, state and local policies have a greater influence on college access and affordability (Callan, 2011).

Although students receive some financial assistance for remedial courses, the total cost to the student may be greater than institutions and policy makers realize. Melguizo, Hagedorn and Cypers (2008) examined students at nine community colleges in the Los Angeles area and calculated the true cost of remediation by factoring in both direct costs

such as tuition, fees, and living expenses, as well as indirect costs such as opportunity costs for not working. The findings of the study were that students were spending half of their time in college taking remedial courses, spending most of their money on classes that would not transfer (Melguizo, Hagedorn & Cypers, 2008). Therefore, despite the low cost of community college tuition and financial aid options available to students, the students who have the highest remediation needs spend more time enrolled in community college and spend more money than those who need less remediation. Students needing remediation already find themselves at a financial disadvantage given the extra courses they are required to take, and the diminished aid for low-income students further financially stratifies this group.

Remedial Pedagogy

Along with placement testing, course sequence, and cost, a final barrier to successful remediation is the pedagogy employed in developmental courses. Students who place into remediation often struggle not only because of their skill deficiencies, but because of the way developmental courses are taught (Rose, 2012). These students are not appropriately taught how to use critical thinking to solve complex problems or understand their own learning needs. Rather, their instruction is routine and superficial (Rose, 2012).

Grubb et al. (2011) outlines a number of pedagogical challenges to teaching developmental courses. Developmental courses often focus solely on building basic skills rather than on higher-order thinking, which do not effectively prepare students for transfer into college-level courses. The basic skills focus is often something that students

have already encountered in their primary and secondary studies. If these methods have failed in the past, they are likely to fail students again in college (Grubb et al., 2011).

Another issue with remedial pedagogy is the teaching methods themselves. Instructional approaches in remedial courses are greatly varied, and not all approaches are effective. While some instructors create learning communities or focus on project-based learning, others simply engage in information transfer by lecturing (Grubb et al., 2011). Grubb posits that there is a dominance of “remedial pedagogy” which focuses on developing smaller sub-skills through drill-and-practice approaches. Such approaches lack contextualization for students and there is limited student-to-student interaction. There is little emphasis on how these sub-skills related to broader concepts or how they can be applied in other contexts; rather, the goal is simply for students to arrive at the correct answer (Grubb et al., 2011). Subjects may also be covered too quickly for students to effectively understand them. These issues abound in math, English, and reading courses (Grubb et al., 2011).

Advising

Advising community college students is an important yet challenging process that can strongly impact student success; ineffective advising can lead to low graduation and transfer rates for community college students (Grubb, 2001). Several studies have found that academic advising is particularly challenging for developmental students (Grubb, 2001; Hollis, 2009, Moore, 2005). One challenge that advisors face is meeting the specific needs of developmental students. According to Moore (2005), developmental students may not always know what support they need in order to be successful, and may

feel that attendance and assignment completion are enough for them to remediate successfully. Academic advisors tend to rely on their advisees for information about their academic performance. This is a barrier for advisors because students may misrepresent their efforts in their courses, leaving their advisors unable to identify the behaviors that are impeding their students' success (Moore, 2005). In addition to receiving inaccurate advising for their academic needs, students who desire to transfer might not be correctly advised as to what the transfer degree will require; students needing remediation might not know that they will need additional coursework to meet their transfer goal (Grubb, 2001).

Not only is ineffective advising detrimental to students because their academic needs are not met, it also has the potential to further marginalize student populations who are already overrepresented in developmental education (Grubb, 2001; Hollis, 2009). In particular, low-income and minority students have reported that their advisors treated them as incapable students with unrealistic ambitions. Consequently, those students reported being steered towards vocational programs rather than transfer programs (Grubb, 2001). Hollis (2009) notes that misadvisement has a particularly negative impact on developmental students, who often come from low-income backgrounds. Applying Maslow's Hierarchy of Needs to students in developmental courses, Hollis (2009) found that low-income developmental students tend to devote more of their time to satisfying their basic needs such as food and shelter than to their schoolwork, which can lead them to struggle academically and have lower self-esteem. Low-income students are also more likely than high-income students to delay entry into college, leaving them less

academically prepared. Because they are focused on satisfying their basic needs, these students have less time to work on self-esteem and self-actualization and do not perceive themselves as powerful people; traits that can be further damaged when advisors treat them with judgment and belittling behavior (Hollis, 2009). Hollis recommends that in order to successfully help developmental students, advisors should let these students know that they are not alone, be specific and detailed when discussing their academic abilities and provide realistic advisement based on their abilities, be prepared to coach these students through any setbacks, help these students make connections with support services across campus, and use self-reflection to consider their preparedness to help their developmental student advisees.

Despite the numerous potential setbacks of academic advising for developmental students, there are indications of its success. Using data from the California Community College System, Bahr (2008) looked at completion rates among students in a remedial math cohort and students in a transfer-seeking cohort who were not in remediation. Bahr found that advising had a positive effect on the remedial math students; advising increased their chances of remediating successfully, and this positive effect was the strongest among the least-prepared students. In Bahr's study, there was no indication of race-based, direct, counselor-driven cooling-out of remedial math students. However, Bahr cautions that one of the reasons for this positive effect could be the number of remedial math students enrolled in the college. Colleges with large populations of students needing remedial math might offer more academic support and advising services to mathematically underprepared students, which could lead to greater academic success

rates among these students. Therefore, Bahr concludes that these findings do not mean that cooling-out is not occurring in community colleges.

Criticisms of Remediation

Cooling-Out

In addition to the concerns raised by educators about the effectiveness of remediation and the barriers that students in these programs face, the general nature and purpose of these programs face criticism. One such criticism is the cooling-out of community college students. Some research exists that supports the idea that remediation is a mechanism by which students are tracked out of their ambitions to persist beyond the community college. In an analysis of student data from the Beginning Postsecondary Students Longitudinal Study, which tracked student data between 2003 and 2009, Crisp and Delgado (2014) found that while enrollment in remedial courses in the first year of community college did not decrease students' likelihood of persisting into their second year, it did decrease their likelihood of transferring to a four-year institution. Specifically, enrollment in remedial math and English courses significantly decreased the chances that a student would transfer to a four-year institution within six years. This relationship was found to be stronger for enrollment in remedial math than enrollment in remedial English (Crisp & Delgado, 2014).

Responding to criticism of the cooling-out process, Hellmich (1993) conducted a study to test the fairness of Clark's claims. Using graduation data from a Florida community college, Hellmich analyzed students who had completed either an Associates of Science or an Associates of Arts degree between 1984 and 1991 to determine if race,

gender, or socioeconomic status were predictors of who was cooled out. Students were identified as being cooled out if they had, “ultimately graduated with a terminal degree (the Associate of Science degree) after enrolling in the transfer degree program and being placed into one or more college preparatory courses due to low pre-entrance standardized examination scores” (Hellmich, 1993, p. 21). It is important to note that Hellmich is using Clark’s definition of a terminal degree, which is a credential that terminates in the two-year college rather than leading to transfer to a four-year college (Clark, 1960). The results of the study show that race, gender, and socioeconomic status are not necessarily predictors of which students are cooled out. Hellmich notes that in order to stay true to Clark’s definition of cooling-out, the scope of the study is limited only to students who completed a degree and does not cover students who dropped out during the cooling-out process. However, Hellmich emphasizes that students who dropped out also deserve consideration, stating:

Those students included within this study were those who found academic success to the extent that they graduated with either a transfer or terminal degree. They were students who sufficiently exhibited the linguistic and social norms most valued by the community college’s personnel, who adequately overcame racial and social devaluation, and who ultimately were rewarded for their academic efforts. To critical theorists, they were aberrations. Any attempt to determine the importance of SES, race, and gender on students being cooled out using only these students, thereby, fails to discern the true importance of SES, race, and gender during the cooling-out process and produces invalid results that serve to prop up the meritocratic facade of the community college. (p. 25)

For students who dropped out during the cooling-out process, Hellmich posits that it is not gender, race, and socioeconomic status themselves that led to their academic failures, rather it is the social stigma surrounding these categories that led students to devalue their own academic abilities. Deil-Amen (2011) supports the social stigma claim, finding

through interviews with developmental students at Pima Community College in Arizona that developmental students in remediation struggle in classes because they resist asking for help out of fear that they will be perceived as incompetent and that they are imposing on faculty members.

The literature surrounding the cooling-out function shows that something is happening within community colleges that is blocking certain students from achieving academic success and upward mobility. Although cooling-out is ultimately a product of a number of variables, it is important to know the roles that individual factors play in this process. One practice of community colleges that functions in cooling students is remediation.

Academic Standards

In addition to the cooling-out function of community colleges, critics of remediation argue that it represents a watering-down of academic standards. The perception of developmental education lowering standards is such that a number of four-year institutions have opted to eliminate developmental programs (Shields, 2005). Community colleges are then relegated to the role of providing remediation and struggle to maintain academic standards while still keeping with the open door model. Perin (2006) notes that community colleges maintain their open-access model by admitting all students who have obtained a diploma or high school equivalency; however, these schools also wish to maintain high academic standards for their students. These two goals may be in conflict with one another. Remediation is one way that community colleges strive to maintain both open access and academic standards, however the high dropout

rate of students in developmental courses is a threat to the open-access mission (Perin, 2006).

Another argument made by critics of developmental education is that the developmental student population is mostly recent high school graduates who were not adequately prepared for college and that the blame for remediation rests on these schools (Shields, 2005). This has led some states to consider plans to charge high schools for the cost of remediating their students in community college. However, recent high school graduates only comprise 19.6% of the developmental student population, and Shields (2005) notes that parents, students, and schools should not be punished for these skill deficits. Furthermore, there is some concern that the lack of academic preparation among college students will lead to grade inflation by faculty members who want to pass students through their courses and it could also divert attention and resources away from other academic programs (Kett, 2001).

Summary

The research on developmental education programs and policies reveals a complex network of challenges for states and institutions. Whether students are defined as developmental or remedial, these programs attempt to close the readiness gap between high school completion and college standards. States, institutions, and students all have a stake in developmental outcomes, particularly regarding the cost to implement and participate in such programs. The history of developmental education reveals that although academic assistance has been present from the inception of the early United States colleges, the burden of providing this assistance has increasingly shifted from four-

year institutions to community colleges. The perception that community colleges should provide remediation is such that state governments have begun to bar four-year colleges and universities from providing developmental courses.

The outcomes of developmental education programs are particularly significant among historically underrepresented student populations, specifically low-income students and student of color. Developmental education research suggests that high school characteristics such as teacher education level, location, and school socioeconomic level all influence which students will need remediation in college. Students from economically disadvantaged high schools and low-income families are among those most in need of remediation. Additionally, students of color are more likely to need remediation than White students, with Black students being the most disadvantaged, particularly in mathematics.

Although developmental programs are designed to help these marginalized student populations prepare for college-level work, studies into their effectiveness have yielded mixed results. Some developmental programs have shown positive outcomes for students, while others demonstrated little to no success. Furthermore, inaccurate placement testing, lengthy course sequences, program costs, ineffective advising, and remedial pedagogy are all barriers to successful remediation. Rather than helping students succeed, developmental education programs may be a mechanism for cooling-out the academic ambitions of community college students, thereby furthering their social stratification.

CHAPTER THREE: METHODOLOGY

This chapter gives an overview of the methodology that was implemented to study the experiences of students in the soft landing math option at Mountain View Community College, the Math Bridge program. I first discuss my rationale for utilizing qualitative research and case study as a qualitative methodology. Next, I discuss the role of the researcher in the research process. I then explain the specific process for this project including a description of the research site, data sources, data collection methods, and the data analysis process. Finally, I review some of the ethical considerations of the project.

Rationale for Qualitative Research

Qualitative research plays an important role in understanding how people make meaning of their experiences. According to Denzin and Lincoln (2011), the goal of the qualitative researcher is to “study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of meanings people bring to them” (p.3). This type of research is particularly useful for several reasons. It helps the researcher understand the nature and characteristics of reality, allows the researcher to be an insider with the participants being studied, includes the interpretations of the researcher along with interpretations of the participants, and involves a methodology that permits the researcher to revise questions and strategies throughout the research process (Creswell,

2013). Qualitative research is particularly useful to explore and craft a complex and detailed understanding of an issue, to hear silenced voices, and to understand the contexts and settings of the study's participants (Creswell, 2013).

Creswell (2013) has identified a number of key characteristics of qualitative research that make it a valuable research method. Qualitative researchers are able to collect data in the field in a natural, rather than contrived setting. In qualitative research, the researcher is a key instrument of data collection, and is not reliant on instruments developed by other researchers. The flexible nature of qualitative research also allows for use of multiple methods and sources of data, and for an emergent design in which the process of the research may be modified during data collection (Creswell, 2013). Additionally, qualitative researchers use complex reasoning and logic throughout the research process to uncover the meanings that participants bring to the research topic. Finally, qualitative researchers position themselves within the study to understand how their perspectives influence their interpretations of the data. These factors combine to form a complex, holistic, large-picture account of the issue being studied (Creswell, 2013).

The outcomes of qualitative research can offer insight into the experiences of marginalized populations. Creswell (2013) notes that through this process, the qualitative researcher can use theoretical frameworks in meaningful ways. Transformative social justice frameworks enable the researcher to explore issues that disadvantage and marginalize certain groups of people or individuals. The qualitative researcher takes an interpretive stance that respects the participants and uncovers meaning in their

experiences so that they are able to give back to them. Clark's (1960) theory of cooling-out is ideally suited to a transformative social justice framework, because it allows for participants to share their experiences and discuss whether there are subtle mechanisms that may be functioning to channel students away from their academic aspirations. According to Creswell (2013), transformative frameworks reflect social power and can be used by researchers to reform policies and improve the lives of members of marginalized populations. Cooling-out is a useful social justice framework that enables an exploration of the role of developmental education in disadvantaging the already marginalized populations who are over-represented in developmental education. The use of this framework in the study allowed both students and staff members at MVCC to share their perspectives about the institutional processes that shape developmental student experiences. Through the use of this theory, students and staff members were able to share their experiences and discuss the ways in which students are being discouraged or supported in their academic ambitions. The theory also informed the analysis of the data for this study to determine the role of these experiences in developmental student aspirations and outcomes.

Because this study centers on learning the experiences of students placed into soft landing, it is ideally suited for a qualitative approach. A qualitative method allowed me to study students under natural settings and adapt the interview questions during the research process. Qualitative research also enabled me to apply the cooling-out framework to understand ways in which students may be advantaged or disadvantaged by the developmental education redesign. Specifically, I was able to learn from research

participants whether or not students are receiving messages during the placement and advising process that support their academic aspirations or attempt to channel them away from these aspirations. This type of method is also ideal for applying cooling-out because the cooling-out process is an unintentional and subtle mechanism within community colleges that is not always overtly articulated by institutional policies, but can also occur as a function of the communication between people within the college. By utilizing a case study approach, research participants were able to share their subjective experiences regarding developmental education and the Math Bridge program, allowing the researcher to uncover the subtle, unconscious patterns and messages that emerge.

Rationale for Case Study

Case study is a type of qualitative research that is relevant in asking how or why a complex social phenomenon works (Yin, 2014). Schramm (as cited in Yin, 2014) states, “The essence of a case study, the central tendency among all types of case study, is that it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what result” (p. 15). Case studies are distinguished from other qualitative research methods by the types of research questions asked and the extent of control that the researcher has over behavioral events. In a case study, the researcher asks questions about how and why a social phenomenon operates. Additionally, the case study researcher studies the phenomenon in its natural setting, and is ideal for studying contemporary events when the behaviors of the research subjects cannot be manipulated (Yin, 2014).

Yin (2014) illuminates five key components of the case study process: research questions, propositions, units of analysis, logic linking data to propositions, and criteria for interpreting findings. The researcher should establish clear “how” and “why” research questions to be explored. For the units of analysis, the researcher needs to clearly define the case through boundaries; cases can be bound by a specific organization, an individual, or a time frame (Yin, 2014). Case studies also may or may not come with propositions that guide the researcher towards what should be studied within the case, and those propositions should have a clear logic linking them to the data, such as through pattern matching (Yin, 2014). The researcher should also set criteria for interpreting their findings. For case studies not relying on statistical data, the researcher will then use analytic generalization to corroborate, modify, reject, or advance the concepts presented as part of the theoretical framework (Yin, 2014).

The research questions for this study are as follows:

1. What do students who place into “soft landing” experience during the testing, advising, and enrollment process?
2. What role does placement into “soft landing” play in the academic aspirations of community college students?
3. What role does advising play in the academic aspirations of community college students placed into “soft landing?”
4. What roles do placement into soft landing and advising play in the “cooling-out” function of community colleges?

The nature of these research questions and the focus on a specific program make this project ideally suited to case study research. They allowed for the research to focus on the experiences and decisions of specific students and their advisors. Furthermore, by interviewing participants at the school and over the phone, students and advisors were studied in a natural setting without any attempts to manipulate the behaviors of participants.

Case study research also allows for the application of a particular theoretical framework, which in this case is Clark's (1960) theory of the cooling-out of community college students. For this study, the key theoretical propositions included the use of Clark's five features of cooling-out and their role in the process of channeling students away from their academic aspirations. These five features are Alternative Achievement, Gradual Disengagement, Objective Denial, Agents of Consolation, and Avoidance of Standards (Clark, 1960). These propositions also informed the interpretation of the findings of this study to help determine if cooling-out is occurring among soft landing students at MVCC.

There exist three key types of case studies: single instrumental case studies that focus on an issue and studies it through one bounded case, collective case studies that select multiple cases to study the issue of concern, and intrinsic case studies in which the focus is a case that is unusual or unique (Creswell, 2013). This project was a single case study because it offered an opportunity to deeply investigate multiple units of analysis within a single institution. The case is bounded within the specific institution of Mountain View Community College (MVCC), and the individuals under study are students enrolled

in the soft landing program for math, which is the Math Bridge program, academic advisors, the Testing Center coordinator, the Workforce Development Career Pathways Coordinator, and a member of the DETF. Additionally, the case is bound by time, and includes students enrolled in the Math Bridge program since its inception in Fall 2014, as well as staff members currently employed at MVCC.

Role of the Researcher

Education has long been a passion of mine, and there are a number of experiences that have shaped my perspectives and may influence my role as a researcher in higher education. I have been employed in higher education for the past ten years. I first began teaching communication courses as a graduate teaching assistant while I was completing my Master's degree. After completing my degree, I returned to my home state and began teaching for the community college system. For the past eight years, I have worked as an adjunct instructor in communication, and during this time I have taught at five different community colleges within the system in both face-to-face and online settings.

Transitioning from teaching at a four-year research university to teaching at two-year colleges has been a transformative experience for me. During this time, I have developed a passion for serving non-traditional students, particularly those from marginalized populations. I am committed to the successes of the students in my classes, and value my role in facilitating positive learning outcomes for them. I am invested in helping students achieve their goals not only inside my classrooms, but also in their other academic pursuits and their professional lives. Though as an adjunct instructor I am

limited in my scope of influence within the institutions I serve, I have long reflected on ways that I might help further student successes beyond my own classes and department.

Although I have not been personally involved with developmental education within my current professional role as an instructor, my interest in this aspect of community colleges has been fueled by discussions with my own students who are in developmental courses, and conversations with my father, who taught developmental math for several years within the same community college system. Additionally, I have written research papers on developmental education for my doctoral coursework.

Because of my experience teaching at community colleges and my commitment to student success, I recognize that I bring some of my own biases to the research process. I have pre-existing conflicting opinions about developmental education and whether or not the VCCS redesign is a good program. I also feel strongly that every student should have an opportunity to be successful in college. Additionally, as current faculty member within a community college system, I am supportive of the mission of community colleges and the success of these institutions. As a researcher, it was important for me to recognize my own biases and understand how my current perceptions and teaching lens might impact my interpretations during this study. As I moved through the data collection process, I reflected on my perspectives and interpretations of the data continuously as part of the research process to ensure that I am accurately representing the experiences of the people I was interviewing. While my commitment to student access and success did not falter during the data collection process, I do feel that I was

able to set aside my preconceptions about my study site and the developmental education redesign, even allowing my findings to change my perspectives on the subject.

Research Site

This project is a single case study that focuses on the developmental education redesign as it applies to one specific institution within the Vista Community College System (VCCS). The selected site for this study is Mountain View Community College (MVCC), one of the schools within the VCCS. Mountain View Community College was selected due to its large population, diverse student body, and the soft-landing options that it offers to its students.

Mountain View Community College is the second-largest community college in the state. In the 2014-2105 cohort, there were 19,961 students enrolled (Mountain View Community College, 2016c). The college has three main campuses, an online program, and satellite programs at local high schools and military bases. The majority of MVCC students are between the ages of 25 and 34 and the average age of MVCC students is 27 (Mountain View Community College, 2016c). White students at MVCC account for 63% of the student population, Hispanic students account for 15%, Black students account for 9%, Asian or Pacific Islander students account for 6%, and American Indian or Alaskan Native students account for 3% (Mountain View Community College, 2016c). The majority of MVCC students are state residents, with only 19% of students attending from out of state, and 61% of MVCC students attend part time (Mountain View Community College, 2016c). Among MVCC students, 57% are female and 43% are male. The

college also has a strong veteran student population, with 26% of students identifying as military students (Mountain View Community College, 2016c).

Like many community colleges, MVCC struggles with achieving high retention and graduation rates. Only 49% of students in the Fall 2013 cohort were retained in 2014, and only 29% of students from the Fall 2011 cohort transferred out or graduated by 2014 (Mountain View Community College, 2016c). Retention at MVCC also varies by race and ethnicity. From the Fall 2013 cohort, 56% of Asian students, 51% of White students, 47% of Hispanic students, and 33% of Black students were retained in 2014. Additionally only 19% of Asian students, 14% of White students, 6% of Hispanic students, and 3% of Black students from the Fall 2011 cohort graduated by 2014 (Mountain View Community College, 2016c).

Additionally, MVCC has a large percentage of students enrolled in developmental courses, and has seen a shift in developmental course enrollments since the implementation of the redesign in 2014. In 2013, MVCC had 7,121 students enrolled in at least one developmental course, representing 32.54% of the total student population (Vista Community College System, 2013). After the implementation of the redesign, the total number of students enrolled in a developmental course was 4,519, or 22.66% of the overall student population (Vista Community College System, 2015). These numbers include only those students enrolled in a developmental course and not the students enrolled in soft landing. The number of students who enrolled in the MVCC soft landing option of the Math Bridge program during this time period was 112 (Mountain View Community College, 2016b). One possible explanation for this dramatic decline in

developmental course enrollments is the elimination of lower-level developmental courses, leading students who test in at the lowest level to leave school or enroll in a soft landing option such as the Math Bridge program. An additional possible explanation for this decline is the implementation of corequisite options in math and English, allowing some higher-level developmental students to bypass developmental math and enroll in college-level math with corequisite support.

Finally, MVCC also struggles to matriculate students after they are initially admitted to the school. In Fall 2015, 4,147 first-time freshman were admitted to MVCC, yet 1,831 of those students never enrolled (Mountain View Community College, 2016a). This means that nearly half of admitted students ultimately fail to enroll in classes. This lack of enrollment may be partly caused by the new testing and placement policies instated after the redesign. It could also be due to other factors such as access to financial aid, student admission to other institutions, life and schedule changes, or changes in goals among other factors. Additionally, some of these students may have simply delayed enrollment rather than leaving altogether.

Data Sources

Case studies allow for the use of multiple data sources such as documentation, archival records, interviews, direct observations, participant-observation, and physical artifacts (Yin, 2014). For this study, two main data sources were used: interviews and documentation. Interviews are important data sources because they allow for the researcher to gain firsthand insights into the issue under study and hear different perspectives on that issue. Interviews can also aid in corroborating findings (Yin, 2014).

Documents are also useful in that they help verify and supplement evidence collected from the interview sources.

Interview sources for this study consist of individual interviews with 10 degree- or credential seeking students who enrolled in the Math Bridge program in order to enroll in a developmental or college-level math course, and individual interviews with 5 academic advisors who advise students after they have enrolled, including the Testing Center coordinator and the Coordinator of Career Pathways in the Workforce Development department. The academic advisors are also part of the student testing and advising process. The study also includes an interview with one of the chairs of the Developmental Education Task Force, who provided critical information about the developmental education redesign.

In addition to the interviews, I collected document evidence from several sources. First, I gathered information about testing, placement, advising, and the Math Bridge program from the MVCC website. I also gathered all public documents about the redesign from the VCCS website. These documents include the redesign brochure, the DETF process narrative, the DETF recommendations, meeting minutes, and a chart of each VCCS school and how each school plans to implement the redesign. Additionally, I was able to obtain outcome and enrollment data from a Math Bridge report shared by the Workforce Development coordinator, and an independent report of the developmental education redesign outcomes published on the VCCS website.

Recruitment Process

Recruitment took place in two key phases. In Fall 2016 after IRB approval at University of Denver and MVCC was obtained, recruitment emails (Appendix B) were sent to potential participants. For students, the initial recruitment email was sent by the Workforce Development Career Pathways Coordinator to all students who had participated in the Math Bridge or Adult Basic Education programs within the last academic year, which included approximately 200 students. This email had to go through the Workforce Development department because of privacy laws that limit my own access to student data. I personally sent the recruitment email to all of MVCC's 18 academic advisors, using the information available on MVCC's public staff directory. I also sent emails to one of the DETF chairs as well as the Workforce Development coordinator. To incentivize participation, all study participants were offered an opportunity to be entered into a drawing for a \$100 gift card.

Results from the first round of recruitment were mixed. From the initial recruitment email, I was able to schedule and complete interviews with three students. After no more participants came forward, the Workforce Development coordinator sent the recruitment email a second time and also gave copies of the email to the Math Bridge instructors to distribute in class. During this time, I was able to schedule and complete interviews with three advisors. The initial DETF chair I contacted was unavailable for an interview, but I was able to connect with and interview another DETF chair instead. I also completed the interview with the Workforce Development Career Pathways Coordinator during this time period. Interviews with the DETF chair, the Workforce

Development coordinator, and two of the students were completed in person. Interviews with the three advisors and were completed over the phone and the participants signed the consent form (Appendix C) electronically.

Due to the low number of student participants in the study, revisions to the recruitment process were necessary to gather more data. In Spring 2017, I revised my IRB process and obtained approval for several changes. First, I added a new incentive of a \$10 gift card for any student who participated in the study. These participants were also still eligible for the \$100 gift card drawing. Second, in addition to the recruitment email, I created a flyer for the study and obtained permission to visit the Math Bridge courses in person to distribute the flyer and collect student contact information. Third, I amended the consent process to include verbal consent for the study rather than requiring participants to sign the consent form, making it an easier process to interview students by phone rather than in person. The last major change I made to the recruitment process was to expand the participant pool to all students who had participated in the Math Bridge program since Fall 2014 when it began rather than just within the last academic year.

The revised recruitment procedures yielded better results than the previous attempts. The recruitment email was sent to all Math Bridge and ABE participants again, which resulted in the successful recruitment and completion of an interview with one additional student. In March of this semester, I visited two sessions of the Math Bridge on two campuses to recruit students. Of the 7 students who gave me their personal contact information, I was able to successfully complete phone interviews with five of them, bringing my student total to 10 participants. During this time, I also sent the

recruitment email again to advisors, ultimately completing interviews with two more. I also was able to interview the Testing Center Coordinator during this time as well.

Participants

The participants for this study consist of two key groups: students and staff. The students for this study were 10 students who enrolled in the Math Bridge program and who had not tested high enough on the placement test for a college-level course or who had opted out of the placement course because they knew they were not prepared for college-level math. Although recruitment emails were also sent to Adult Basic Education students, none came forward to participate in the study. Interviews with staff consisted of the coordinator of the Testing Center, five academic advisors, and the Career Pathways Coordinator in the Workforce Development department. The Testing Center coordinator is responsible for overseeing testing, including placement testing. Academic advisors are responsible for helping students interpret their test scores and guide students in their enrollment and career decisions. The Coordinator of Career Pathways meets with students who do not place into a developmental course and advises them on their soft landing options, including helping students to enroll in the Math Bridge program. Additionally, the study included an interview with one of the chairs of the Developmental Education Task force who helped oversee the decision-making processes of the developmental education redesign.

In total, there were 10 student participants who completed interviews. There were four male participants and six female participants. Four of the participants attended school full time and six of the participants attending part time at the time they

participated in the Math Bridge program. The student participants represent a diverse group of majors including Accounting, Aviation, Business, Construction Management, Early Childhood Education, English, Licensed Practical Nurse (LPN), Heating, Ventilation and Cooling (HVAC), Medical Office Technology, and Molecular Anthropology. Four of the students had already completed at least one session of the Math Bridge program at the time of the interview, and six students were currently participating in their first Math Bridge session. Six of the participants had taken the placement test at MVCC, and four had decided to either opt out or postpone taking the placement test. Because this project did not focus on issues of identity as they relate to developmental education, further demographic information about the students was not collected. In order to protect the confidentiality of these students I have given them the following pseudonyms: Adam, Bill, Brad, Cindy, Desiree, Jackie, Karen, Kelly, Patricia, and Tyler.

Student Participants					
Name	Sex	Full or Part Time	Major	Took Placement Test	Math Bridge Participation
Adam	Male	Part Time	Licensed Practical Nurse (LPN)	No	Completed one session
Bill	Male	Full Time	Accounting	No	Currently enrolled
Brad	Male	Full Time	Heating, Ventilation, and Cooling (HVAC)	No	Currently enrolled
Cindy	Female	Part Time	Construction Management	Yes	Currently enrolled
Desiree	Female	Full Time	Molecular Anthropology	Yes	Currently enrolled
Jackie	Female	Part Time	Business	Yes	Currently enrolled
Karen	Female	Part Time	Medical Office Technology	Yes	Completed one session
Kelly	Female	Part Time	English	Yes	Completed one session
Patricia	Female	Part Time	Early Childhood Education	No	Currently enrolled
Tyler	Male	Full Time	Aviation	Yes	Completed one session
<i>Table 1</i> Student Participants					

Study participants also included several key staff members at MVCC. First, five advisors completed interviews. These advisors had experience at MVCC ranging from four months to six years. The advisor participants were from different disciplines as well. Two advisors were from the STEM and Applied Sciences division, one was from the Arts, Business and Hospitality division, one was from the Health Sciences division, and one was a Pathway Advisor responsible for students from a variety of disciplines. Although most of the advisors specialize in providing advising to students within their assigned disciplines, they all serve as general advisors to drop in students and students who are undecided in their majors. In addition the advisors, the study also includes interviews with one of the coordinators of the Workforce Development department, the department responsible for running the Math Bridge program, and the Testing Center Coordinator, who is responsible for overseeing testing processes at MVCC, including placement testing.

Staff Participants	
Title	Department
Coordinator of Career Pathways	Workforce Development
Coordinator of Testing Center	Advising and Testing
Instructional Liaison – STEM and Applied Sciences	Advising and Testing
Pathway Advisor	Advising and Testing
Program Advisor – Arts, Business, and Hospitality	Advising and Testing
Program Advisor – Health Sciences	Advising and Testing
Program Advisor – STEM and Applied Sciences	Advising and Testing
<i>Table 2 Staff Participants</i>	

In addition to interviewing students and staff at MVCC, I also conducted an interview with one of the chairs of the Developmental Education Task force. This task force chair is a VCCS employee who was appointed to the task force when it was created. Although this chair could not speak to specific process of the redesign at MVCC, she was instrumental in providing background information about the redesign, particularly its key components and some of the rationales behind the task force decisions.

Data Collection

Data collection for this project took place during the Fall 2016 and Spring 2017 semesters at MVCC. Five separate interview protocols were utilized: one protocol for the Math Bridge students, advisors, the Testing Center coordinator, the Workforce Development coordinator, and the DETF chair (Appendix A). Questions in the interview protocols were guided by my research questions and by Clark's (1960) theory. For students, the interview questions focused on their academic and career ambitions to determine whether these goals had changed at all during the course of their college careers. Additionally, the questions asked students to discuss their interactions with key staff members during the enrollment, testing, testing, and advising process to understand the role of these interactions in altering or supporting student ambitions. The design of these questions intended to uncover whether cooling-out was occurring with these students. For the Testing Center Coordinator, Career Pathways Coordinator, and academic advisors, the interview questions were designed to serve two purposes. First, background questions about their departments and student outcomes were designed to provide valuable information in building the case description for this study. Second,

questions about their interactions with students were intended to uncover whether or not students are being communicated messages cooling the out of their academic aspirations. The purposes of the questions for the DETF chair were to provide background information about the history and rationales behind the redesign to help inform my case description.

Interviews were semi-structured, using the protocols to guide the conversations, but allowing for adaptability in revising questions or asking specific follow-up questions. Interviews lasted approximately 30 minutes to an hour and were a combination of in-person on-campus interviews and phone interviews. Participants were offered the option of either a phone interview or in-person interview based on which one worked best for our mutual schedules. The on-campus interviews took place in a private conference area or in a private office. The interviews were all audio recorded using a smartphone recording application and were later transcribed.

In addition to the interviews, the data collection included a review of VCCS documents pertaining to the developmental education redesign accessed from the VCCS institutional research website and from the MVCC website. A key document used in this study, particularly in building the case description, was a DETF report from 2013 detailing the task force's process and final recommendations. I also utilized several other key documents created by the DETF that were published to the VCCS website including the 2013 DETF process narrative, a 2013 FAQ sheet with answers to questions frequently asked by the VCCS colleges, an informational spreadsheet from 2014 that outlines each college's initial plans for implementing the new developmental courses and soft landing

option, and a brochure from 2014 that summarizes the key features of the redesign. Additionally, I was able to obtain outcome data for the redesign from reports published on the VCCS website and provided to me by the Workforce Development coordinator. Finally, I pulled information about MVCC specifically from the MVCC website. These documents were used to background the redesign and its intent, as well as to understand the rationale for the various components of the new developmental education program and its implementation at MVCC. These documents were used primarily to build the case description rather than being incorporated into the theoretical analysis.

During data collection, I will followed Yin's (2014) four principles of data collection. The first principle is the use of multiple sources of evidence. This study accomplished this through the use of official documents and multiple interview participants on both the student and staff side of the college to ensure that different perspectives were being represented. Second, this project utilized the second principle of data collection, which is the creation of a case study database to organize and document the data as it is being collected. This database was created in Microsoft Excel and helped to keep the data organized and to increase the reliability of data and preserve it in an easily accessible form (Yin, 2014). Third, I maintained the chain of evidence by keeping all collected data on a password protected computer only accessible by me to ensure its security. Although interviews were recorded on a phone, after each interview the recording was transferred to the password-protected computer and deleted from the phone. Fourth, data collected from electronic sources, such as the VCCS documents, were cross-checked for validity and accuracy of authorship, particularly through the

interview with one of the DETF chairs, who was able to verify the accuracy of my understandings of the redesign as presented in the DETF documents.

Data Analysis

Analysis of data took place in several stages. First, interview data were transcribed in order to make it accessible and easily retrievable. Interviews were sent to a professional transcription service immediately following the completion of the data collection process. Completed transcripts were generally returned 2-3 days after their initial submission to the service. Additionally, I maintained personal notes on each of the interviews to refer to as necessary, and typed those notes immediately following transcription in order to allow timely and accurate understandings of the data. This also allowed for flexibility to revise interview questions or add new interview questions to reflect emerging themes, as Creswell (2013) notes is an important facet of qualitative research.

A number of analytic strategies were employed to interpret the data. Yin (2014) notes four key analytic strategies, which are relying on theoretical propositions to guide the analysis, working the data from the ground up to uncover emerging themes, developing a case description, and examining possible rival explanations. This study utilized all four of these analytic strategies.

First, a case description was developed to provide a detailed overview of the case and its key themes. The case description utilizes both the DETF documents and interview data to build an overview of the redesign and an explanation of the soft landing placement and advising process. The case description includes an overview of the

redesign and its rationales, an explanation of the implementation at MVCC, and the most recent outcome data for the redesign both system-wide and at MVCC specifically. The case description became a critical component of the analytical process, because without it, it would be difficult to understand the ways in which the redesign has impacted processes and outcomes at MVCC.

Second, I employed a theoretical analysis to work the data from the theoretical propositions of Clark's theory of cooling-out of community college students and Karabel's update to Clark's theory. To apply the theory, during data analysis I looked for responses related to the proposition that students at community colleges are being channeled away from their ambitions. This proposition includes what Clark refers to as hard responses which encourage the student to drop out, and soft responses that channel students into alternative academic paths. During the analysis, I searched for patterns in the interview data and documents related to cooling-out, and whether students are receiving messages consistent with Clark's theory, encouraging them to drop out or channeling them into alternate degree and career paths and whether or not their ambitions have changed due to these messages. To code data according to Clark's theory, I initially created a priori codes, using Clark's five features of cooling-out: alternative achievement, gradual disengagement, objective denial, agents of consolation, and avoidance of standards. Definitions for each of these codes are as follows:

1. Alternative Achievement – Messages indicating students are being moved away from their original academic ambitions and into lower-level non-transfer fields

2. Gradual Disengagement – Messages indicating a slow process of moving students away from their goals
3. Objective Denial – Messages indicating a use of objective criteria such as placement scores or GPA, to emotionally distance counselors from the process of channeling students from their goals
4. Agents of Consolation – Messages indicating that counselors are the primary staff members responsible for moving students away from their goals
5. Avoidance of Standards - Messages focusing on clearly defined criteria to classify students into paths that are below their intended goals

These codes are key to understanding how cooling-out may manifest in community colleges. As I was coding the data, it became clear that evidence of these codes was not apparent within the interviews. However, as I was analyzing the interviews, I discovered that there was ample data that directly contradicted my original codes. This led me to create a new set of rival codes, which I used to code the data instead. These are the definitions of the rival codes:

1. Rival Alternative Achievement – Messages indicating students are being supported in their academic ambitions rather than being channeled into lower-level non-transfer fields

Advisor Example: “We have a lot of students who come in wanting STEM degrees who place into 050. It can be discouraging, but I tell them “If you want to be an engineer, just do it.” I think anyone can to

what they want if they apply themselves. It's possible, but it takes persistence.”

2. Rival Gradual Disengagement – Messages indicating a process of encouraging students in their goals and helping to ease them in the college transition

Student Example: “Yeah. Everything is fine, because they hold us accountable because every first of the month-- they call it a benchmark-- I have to turn in the grades, and the teacher has to answer like three questions, so we're held accountable to perform. And I'm just doing it because I want to do it. I mean I want to graduate, you know?”

3. Rival Objective Denial – Messages minimizing the use of objective criteria such as placement scores or GPA, to emotionally distance counselors from the process of channeling students from their goals, and instead providing emotional support to students

Advisor Example: “So a lot of students, and I talk to the students about this too, they always come in and they're like, "Well I didn't pass the test." And so I always encourage them to think of it as this is just a snapshot of where you're at academically right now. So we have to put you into where you're at right now and move you forward. And I also talk to them about how these college prep classes, I don't like using the term remedial or dev ed because to me that has a bad connotation or leaves a bad taste in your mouth.”

4. Rival Agents of Consolation – Messages indicating that counselors are key staff members responsible for supporting students in their goals

Student Example: “Honestly, everybody that I talked to was very supportive and very-- I never talked to anybody that was like, ‘Oh, you shouldn't try this,’ or anything like that. I thought everybody was pretty good. And I haven't talked to everybody by any means, but the people I did talk to were very supportive and very helpful. And if they didn't know, they definitely pointed me in the direction to somebody that might know. And that was priceless.”

5. Rival Avoidance of Standards - Messages that avoid using clearly defined criteria to classify students into paths that are below their intended goals and instead support less-definable student strengths

Advisor Example: “Well, like I said earlier, I try to phrase it in a positive light. I do tell them that ‘Hey. Yes. Technically you can fail this test and you didn't fail you might not have done as you could have, but at least you placed into a class, and that's still a positive result. It might not have been the class you were hoping for, but the test designs are a matter of a few things. One, either you don't know the material, or two--you might've known the material, but it's been a while, and maybe you didn't, you know, take your time or study enough.’ So, if they feel that it was either of those cases, then certainly they come to

see that, maybe it's just a current reflection of my skill level now, and not as my overall capacity.”

The third analytical strategy employed in this study is working the data from the ground up. According to Yin (2014) sometimes patterns and themes emerge on their own within the data and can yield new insights into the findings. This is an inductive process allowing themes to emerge naturally rather than just relying on theoretical propositions to guide the analysis. As I analyzed the data for this study, several themes outside of the theory emerged to give important insights into why more MVCC developmental math students are not participating in the Math Bridge program and are instead leaving school. I have identified five key themes common among interview participants that help explain why some students are able to persist in school despite their need for the soft landing option. These five themes are: Academic Self-Awareness, Motivation, Time, Cost, and Need for Information. These themes became a new set of emergent codes defined as follows:

1. Academic Self-Awareness – Messages related to student’s own knowledge of their academic skill level and their need for additional academic support

Student Example: “Knowing that I was going to struggle with at least one subject, knowing it would be math, I figured I needed to go somewhere where I could, kind of, take a credit here and a credit there and make sure that I don't, you know, totally blow a semester at a four-year school when it's really expensive.”

2. Motivation – Messages related to both intrinsic and extrinsic driving factors motivating students to persist

Student Example: “I would just say, in general, don't get discouraged, you know what I mean? I think that, like you said, a lot of people come to obstacles and they're like, ‘Oh, forget it.’ I would say keep trying because had I not kept trying I would still be struggling. Probably with only one eyeball left in. But yeah, just don't get discouraged. It can happen, I think.”

3. Time – Messages related to a student's sense of time to degree completion and factors that may accelerate or delay their progress

Advisor Example: “You know, students are all about, ‘Well what's the quickest way I can finish this degree? How much time is it going to take me to finish this degree?’ I never answer that question for students because it's up to each individual student. If they fail a class, obviously they're going to have to repeat it. If they test into 050, that's going to add some time to their program. The students are always trying to know-- how do I get out of these classes?”

4. Cost – Messages related to the cost of tuition and other academic programs

Student Example: “I decided to try this route obviously to save money was the initial reason why I jumped into it. And then it ended up being just a really great program I feel. Not only helped save me money, but really wrapped my head around it before I dove into the process.”

5. Need for Information – Messages related to a student’s need to access all of the relevant information necessary to make informed decisions about their college careers

Student Example: “If had known about that, I definitely would have considered it as an option before taking a risk of failing a class because nobody wants to fail, it's not good for your self-esteem, it's not good for your academic record, and nobody wants to do that. I really would have considered it had I known about it ahead of time.”

After naming and defining these themes, I performed a second round of coding to code the data into these new categories. I then compared the results across all three of these analytical strategies, which will be discussed further in the findings. After the initial analysis of these new codes, I performed a secondary theoretical analysis by applying Bandura’s (2006) theory of human agency. Applying this theory enabled to me to further understand the factors influencing the students’ decision-making processes. It was clear that the student participants were exercising their agency from the ways in which students were taking ownership of their educational paths and making strategic decisions to achieve their desired educational goals. This secondary analysis explores the way in which the students are exhibiting human agency in relation to each of these five emergent themes and what barriers students may face in achieving their objectives.

Ethical Considerations

Because this study involves interviews with human subjects, it is imperative to address the ethical implications of the research. Prior to conducting any interviews, I

obtained approval from the Institutional Review Board (IRB) at both Mountain View Community College and the University of Denver to ensure compliance with ethical research guidelines, which qualified under exempt IRB status. After I decided to make some revisions to the recruitment process, I submitted the revisions to the IRB at both institutions and obtained approval for these revisions. Participant consent was obtained either verbally or via signature on the consent form. I have maintained confidentiality of records through the use of pseudonyms for the system, school, and interview participants. Interview recordings and transcriptions have been kept with coded, non-personally identifying file names on a password protected computer. Finally, I have used triangulation through my use of multiple data sources to cross-check data to ensure the accuracy of results.

Limitations

Although this study does provide valuable insight into student experiences and processes for developmental students at MVCC, there are several limitations to this study. First, the study included 10 student participants whose findings, while valuable, do not speak for the entire population of students who have participated in the Math Bridge program since its inception in Fall 2014. Additionally, the five advisors interviewed may not cover the range advising philosophies and practices among the advising staff at MVCC. Therefore, this study offers only a small window into the enrollment, testing, and advising processes at this institution.

Second, while the information gleaned from this study is a useful tool in determining some of the motivating factors for Math Bridge students to persist despite

the setback of needing extra preparation for developmental math, this study does not include interviews with students who left school after receiving their test scores.

Therefore, this study may not have uncovered all of the factors that influence why some soft landing students choose to leave school after testing rather than choosing to stay in school and utilize the Math Bridge program. This study also does not include students who left after opting into MAT050 or MAT055 and struggling in these courses. It is unclear whether some students leave because they do not know that the Math Bridge is an option for them, or if they left despite learning about the Math Bridge program.

A third limitation to this study includes the changing processes in the implementation of the developmental education redesign at MVCC. The opt-in option, new policies to reduce testing, and the combination of testing and advising into one department are all major changes that have taken place since Fall 2016. Because these changes are so recent, their long-term outcomes are not yet known. It remains to be seen whether giving developmental students more autonomy over their placement will have positive or negative impact on retention and completion rates. Additionally, it is not yet clear whether the combination of testing and advising will foster more efficient communication between these departments and provide students information about the Math Bridge program earlier in the enrollment process.

A final limitation of this study is that the focus of this study was on one VCCS school. Although the developmental education redesign has been applied to all 13 VCCS schools, each school is implementing it somewhat differently and therefore the practices at MVCC may not be relevant to other colleges within the system. Each school also has

different student profiles, campus cultures, and organizational structures, among other differences which means that what works at one college may not work well at another because each school has its own resources and needs. The results at MVCC are certainly valuable and may be useful to some of the other colleges in the system, but these findings may not be relevant to all 13 schools.

Despite these limitations, this is nevertheless an important study that adds valuable insight into the existing body of developmental education research. Although the findings do not point to all of the reasons why developmental students may not persist through the MVCC Math Bridge program, they do shed light onto some of the mitigating factors that could be addressed in future changes in MVCC practices. Additionally, even though only one school from the system was used for this study, understanding the ways in which practices at one institution are or are not effective is valuable information to other schools in the system who may look to MVCC for ideas for their own programs. This study also provides a starting point to direct future research into the developmental education redesign at MVCC and offers an opportunity to study the long-term outcomes for students in the Math Bridge program.

Summary

This project seeks to understand the experiences of students who are placed into soft landing for mathematics at Mountain View Community College. A qualitative case study is the ideal method for this type of research because it provided an opportunity to answer not only what students are experiencing, but why they are experiencing the process in this way. Using the single case of MVCC, one of the largest schools in the

Vista Community College System, this project utilized semi-structured interviews with students in mathematics soft landing (the Math Bridge program), staff members involved in the testing and advising process, and school documents to determine whether the soft landing process supports the propositions of Clark's (1960) cooling-out theory of community colleges and to yield a clearer understanding of how the VCCS developmental education redesign is impacting the experiences of its students.

CHAPTER FOUR: CASE DESCRIPTION

This chapter provides a detailed description of the case under analysis in this study. The first section of the chapter offers an overview of the VCCS developmental education redesign including its history, rationales, key features, and preliminary outcomes. The second section of the chapter discusses the redesign as it applies to the study site including its implementation and recent changes, an overview of the Math Bridge program and its outcomes, and a description of the experiences of the study participants.

Overview of the Redesign

In 2011, VCCS statistics showed that fewer than 5% of students who started their college careers in developmental courses would successfully complete a college degree (DETF Process Narrative, 2013). At the time, the lieutenant governor of the state wanted the state legislature to take control to find a solution to the developmental education issue. In response to this, the VCCS leadership asked for an opportunity to come up with a solution and were given 18 months to do so. This led to the creation of the Developmental Education Task Force (DETF).

According to one of the chairs of the DETF, task force consisted of representatives from all of the VCCS colleges including its online campus, three local colleges not within the system, the VCCS system office, the state's Department of Higher

Education, and a local scholarship organization. Members of the DETF included math, reading, and English faculty as well department chairs, deans, vice presidents, and student services staff. These members were selected by their campus leadership to represent their institutions. The task force spent its first eleven months learning about other successful programs across the country and meeting with experts in developmental education. (Developmental Education Task Force, 2013a). Because no one program would fit perfectly within the VCCS system, the task force selected pieces from these different models to craft their own new developmental education design. Key goals of the redesign included following reverse design to use the college-level course competencies to determine developmental course competencies, focusing on what students needed to learn to be successful, facilitating active and experiential learning, and implementing contextual learning relevant to students' individual goals (Developmental Education Task Force, 2013a).

The final recommendations of the task force were presented in the Spring of 2013. Colleges were given some choice of when to begin implementing the changes, with all schools expected to fully implement the redesign by Fall 2014 (Developmental Education Task Force, 2013b). Schools were given three choices of timelines to choose from for the implementation. They could fully implement the redesign in Fall 2013, they could do a partial or pilot implementation in Fall 2013 or Spring 2014, or they could wait until Fall 2014 for implementation (Developmental Education Task Force, 2013b). Each school took a different approach to this integration, with some transitioning to the new course sequences early on, and others waiting until the implementation deadline to make the

transition (Developmental Education Task Force, 2014). The next section overviews the key features of the redesign and some of the task force rationales for these decision.

Key Features of the Redesign

Testing

The final developmental education redesign has four key features: testing, course sequences, soft landing, and additional services. For testing, the task force found that all of the VCCS schools had been using the Accuplacer for placement purposes, and that was the only measure they used to determine placement. Additionally, there was a lack of uniform testing policies across the different VCCS schools (Developmental Education Task Force, 2013a). To remedy the issues with testing and placement, the task force recommended that a VCCS Accuplacer be created to match students more effectively with the VCCS course competencies (Developmental Education Task Force, 2013a). The DETF also recommended that every three to five years, test scores should be validated and the test should be revised as necessary to assure more accurate placement. To maintain consistency in testing practices, the task force also suggested a single Institutional Administrator to train testing staff and ensure that tests are being consistently administered (Developmental Education Task Force, 2013a).

Course Sequence

In addition to revising testing practices, the developmental education redesign also revised course sequences for developmental math, reading, and English. Prior to the redesign, reading and English were separate courses. Under the redesign these courses were combined into new College Composition and Reading (CCR) courses. The redesign

created new shortened course pathways for the lowest level, middle level, and highest level developmental students (Developmental Education Task Force, 2013a). The new CCR model offered a chance for the lowest-level students to either go directly into a developmental course with additional support or go into a soft landing assessment prep option to prepare them to retake the placement test. The new CCR model also gave high-scoring developmental students a chance to enroll in a college level course with corequisite support (Developmental Education Task Force, 2013a).

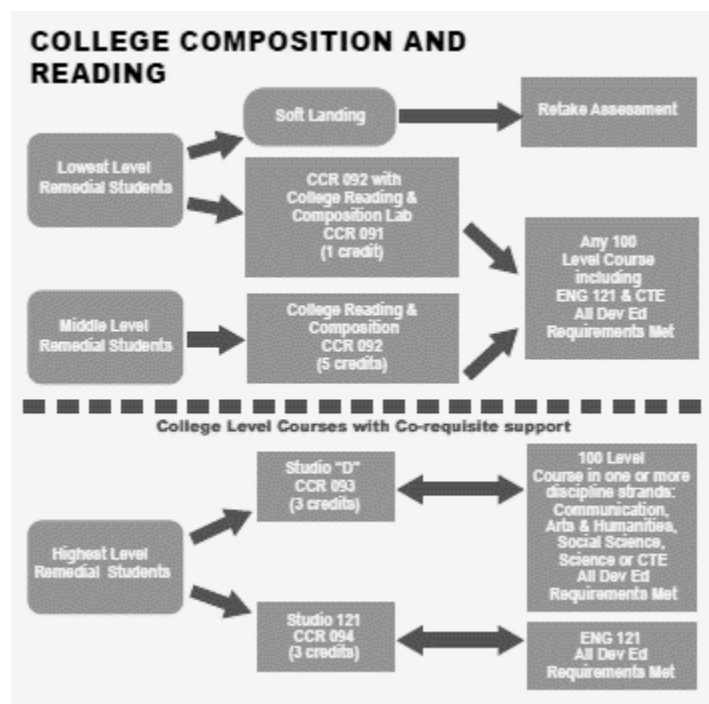


Figure 1. Redesigned CCR Pathways. Vista Community College System. (2014). *The redesign of Vista Community College developmental education*. Retrieved from Vista Community College website.

In math, the DETF designed shortened pathways to help move students through developmental math in a single semester. The math redesign reduced the number of

developmental math courses to two: MAT050 and MAT050. MAT050 is designed for students in non-STEM fields or non-transfer programs (Vista Community College System, 2014). MAT055 is designed for students in STEM fields. For students who test close to the required level for MAT055, they may enroll in the course along with an additional one-credit corequisite math lab to gain additional support. For students who test close to the required level for college-level math, they can also take a one-credit corequisite math lab (Vista Community College System, 2014). Students who do not test high enough to place into a developmental math course are referred to an assessment prep option known as soft landing that is designed to help prepare them to retake the placement test.

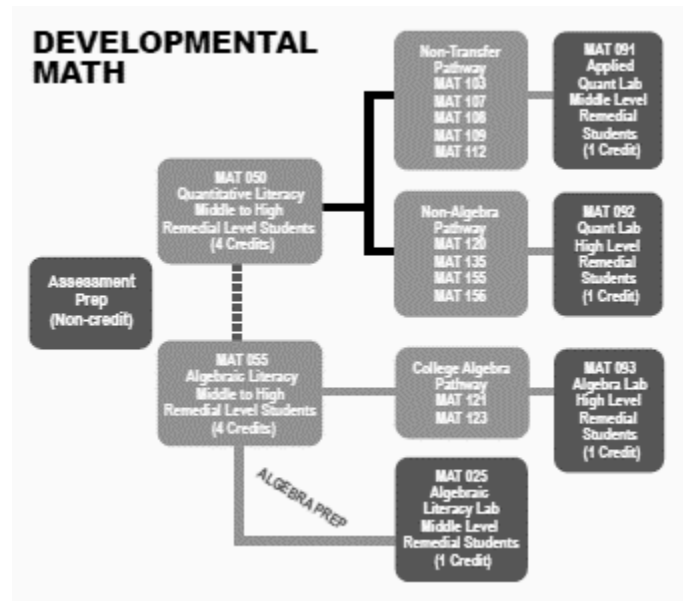


Figure 2. Redesigned MAT Pathways. Vista Community College System. (2014). *The redesign of Vista Community College developmental education*. Retrieved from Vista Community College website.

Although these charts show the recommended course offerings for each school, the schools were given some flexibility to choose their courses. In English and reading, colleges were not required to offer CCR091, and were given a choice of offering either CCR093 or CCR094 or both (Developmental Education Task Force, 2013b). In math, colleges were encouraged to offer the corequisite courses of MAT091, MAT092, and MAT093, but were not required to do so. Additionally, these courses could be offered to both developmental and non-developmental students (Developmental Education Task Force, 2013b).

Soft Landing

Another key feature of the developmental education redesign is the Soft Landing option. Prior to the redesign, students who tested at the lowest level in math would be placed into MAT030, which was essentially the level of 7th grade arithmetic. Students enrolled in MAT030 could receive financial aid to pay for it, but it would not count for college credit. According to the DETF chair, federal financial aid is not supposed to cover any course that is not at least high school level content. Anything below high school level is considered Adult Basic Education and is financed differently than developmental courses. When it came to light within the task force that there was a course being covered by financial aid that was not at least ninth grade content, the course was eliminated.

Because of the new placement cutoff scores and course sequences, including the elimination of courses such as MAT030, under the redesign some students would not test high enough to place into a developmental or college-level course. To compensate for the

loss of the lower-level courses, the task force decided to recommend an option that they called Soft Landing (DETF Process Narrative, 2013). Essentially, Soft Landing is a form of non-credit assessment preparation that the schools could offer to help prepare students to retake the placement test and test into a course in either math or college composition and reading. Because every college operates differently and has access to different resources, the task force decided to make Soft Landing optional and leave the schools to decide what services they wanted to offer (DETF Process Narrative, 2013). The task force suggested that Soft Landing could come in the form of tutoring, workshops, Adult Basic Education, test preparation, or online courses, among other options. Additionally, the schools could decide whether to offer their Soft Landing programs for free or for a fee.

Additional Support Services

The final key recommendation of the task force was that, in addition to the revised testing and placement procedures, the schools should develop plans that help students move more efficiently from enrollment, through their developmental courses, and into their college-level courses (DETF Process Narrative, 2013). The colleges were given the freedom to determine which learning support services would work best for their students based on the needs of their students and the resources available to the college. According to the recommendations of the task force, the colleges would be required to show how they plan to foster student success from their first contact through to their college-level courses and what types of strategies they put in place to sustain student success throughout this process (Developmental Education Task Force, 2013a). Some of

the suggested support services included a first year experience, alert and intervention programs, tutoring, learning communities, experiential learning programs, and supplemental instruction. In addition to academic support programs, the task force recommended students be supported in areas such as academic and career planning, academic advising, student orientations, and case management (Developmental Education Task Force, 2013a).

System-Wide Outcomes of the Redesign

According to a 2016 report analyzing the outcomes of the redesign, there have been mixed results among developmental education students. For students in CCR courses, 92.9% of students enrolled in at least one General Transfer (GT) course within their first semester compared to 74.7% of students prior to the redesign. With the corequisite CCR courses as an option, more students are enrolling directly into English 121 than in previous years (Khudododov, McKay & Michael, 2016). Pass rates in English 121 remain relatively the same as they were prior to the redesign. Pass rates were higher among students who took English 121 with corequisite support (Khudododov, McKay & Michael, 2016).

In math, students in the redesign cohorts enrolled in college-level math courses more quickly than before the redesign. According to the 2016 report, 9% of the redesign cohort enrolled in college-level math within zero semesters and 51% enrolled within one semester, compared to 1% within zero semesters and 28.2% within one semester prior to the redesign (Khudododov, McKay & Michael, 2016). After the redesign, there was a slight decline in student pass rates in 100 level math courses, with 82.8% passing prior to

the redesign and 76.4% passing after the redesign. The study did not report whether these students had taken developmental courses or had participated in a Soft Landing program. Students who took MAT055 enrolled more frequently in 100 level courses. For students who enrolled in developmental math, 79.6% of MAT050 students and 73.6% of MAT055 passed their 100 level math courses with a C or higher (Khudododov, McKay & Michael, 2016).

Overall, the success rates of developmental students in English, reading, and math have shown improvement since the implementation of the redesign. However, these early results only track success rates in initial college-level courses and not progress through the entire course sequence (Khudododov, McKay & Michael, 2016). Because the redesign is still relatively new, its overall impact on completion and transfer rates has yet to be determined.

Implementation of the Redesign at MVCC

Because the developmental education redesign offered the VCCS colleges some flexibility in how they implemented the new plan, it is important to understand the way the redesign is being applied at MVCC. Additionally, some changes have taken place since the redesign was first fully implemented at MVCC in the Fall of 2014, so it is important to understand the ways in which these changes have impacted developmental education at MVCC. This section explains the different facets of the redesign and how they have been implemented at the study site.

Placement Testing

When the redesign was first implemented at MVCC, the plan for testing was to change from the standard Accuplacer to a customized Accuplacer created by the College Board, according to the DETF chair. Before the VCCS had a chance to create a contract with the College Board, the College Board stopped doing customized tests, so the VCCS had to find a new company to design the placement exam. Ultimately, the VCCS found a local company that created a customized placement test specific to the VCCS colleges. According to the Testing Center Coordinator at MVCC, this placement test remained in place at MVCC until January 2017, when a contract issue led to the VCCS switching back to the Accuplacer.

In addition to the changes in the placement test itself, MVCC has taken steps to reduce the number of students taking the placement test in order to reduce unnecessary testing. The school has offered more options for exemption from the placement test. For math, these exemptions include qualifying ACT and SAT scores (23 in math for the ACT and 500 in math for the SAT), high school transcripts with a minimum of an unweighted 3.0 GPA where the student successfully completed Algebra II, Geometry or Pre-Calculus with a B grade or higher, successful completion (C or higher) of a college-level math class, or an earned Associate's degree (Mountain View Community College, 2016d). Students are also exempt from the placement test if they are taking courses outside of math and English for personal or job enhancement reasons rather than for completion of a degree.

After students take the placement test, they are given a printout that shows their scores and the courses that they are eligible to take. According to the Testing Center Coordinator, the computerized testing system uses a placement matrix to determine which courses students qualify for. When students do not place, the testing score printout states that there was no placement. After students receive their scores, they are referred to advising to make decisions about course enrollment. The first time a student takes the placement test, it is free of charge. All retests cost \$10 (Mountain View Community College, 2016d). Students who successfully complete the Math Bridge program are given a voucher to retake the placement test for free.

One concern raised about the redesign by the Testing Center coordinator at MVCC is the reactions of students who receive testing scores that indicate that they do not place into a course. Although she did not have the exact data on the number of students who leave school after taking the placement test, she estimates that up to a thousand students a semester take the test and never enroll. Of these students, she said that students who place into developmental courses or soft landing are the largest percentage. She feels that the new opt in option for developmental courses and the combination of testing and advising may help reduce this number, but those changes have not been in place long enough for the school to have any concrete outcomes.

Course Sequence

To implement the new course sequence, MVCC opted to wait until Fall 2014 to introduce the new courses in math. However, to ease the transition, the school decided to start offering the curriculum for MAT050 and MAT055 using their old course sequence

numbers, MAT 090 and MAT099 (Developmental Education Task Force, 2014). For English and reading, however, the school did decide to pilot the new corequisite courses (CCR 091 and CCR094) in Fall 2013, pairing these new CCR labs with their existing developmental courses (Developmental Education Task Force, 2014). At the time of this study, MVCC was implementing CCR092 with CCR094 as its corequisite option for English and reading, and MAT050 and MAT055 with MAT020, MAT025, and MAT 091 as its corequisite options for math.

In addition to the above courses, any student at MVCC enrolled in at least one developmental education courses is required to take AAA109, which is an Advanced Academic Achievement course (Mountain View Community College, 2016). This course is designed to prepare students for college and covers topics such as study skills, time management, career planning, critical thinking, diversity awareness, and communication skills. The AAA109 course also has an entrepreneurship theme, teaching students leadership skills to benefit them in their future careers.

Soft Landing

Because the focus of this study is on student experiences in the Math Bridge program, the discussion of Soft Landing at MVCC will focus exclusively on math and not on the Soft Landing as it pertains to English and reading. However, the end of this section will discuss some other assessment prep options being offered by MVCC beyond the Math Bridge program.

The Math Bridge Program. The primary soft landing option of which this study focuses is the Math Bridge Program. The Math Bridge program originated at the same

time the redesign was implemented, however it was not originally part of the redesign. MVCC's Workforce Development department and been working to get students through their GED classes and realized that the majority of those students were struggling in math. As a result, the department decided to offer a non-credit, fee-based course to help students build their math skills. According to the Career Pathways Coordinator, because the Math Bridge course was under development at the time of the developmental education redesign, it became the logical choice to become the school's soft landing option because it gave students who did not test into a math course an opportunity to build the math skills they needed to retake the test and place into a course. Additionally, students enrolled in MAT 050 or MAT 055 who need additional help can take the Math Bridge concurrently with their developmental math course.

Currently, the Math Bridge program costs \$55 and runs for 5 weeks on Saturdays (Mountain View Community College, 2016e). There are several Math Bridge sessions each semester, though the number varies depending on enrollment. On average, there are 4 Math Bridge sessions per semester, according to the Career Pathways Coordinator. Math Bridge is offered on two MVCC campuses, and the school is looking to expand it to a third campus. In the Math Bridge, students use a computer program called ALEKS, which helps diagnose the student's strengths and weaknesses in math, and then tailors the lessons to the individual student. Students can work at their own pace during the course, and each course has an instructor available throughout the session to answer student questions and offer help when needed. Additionally, student can access the ALEKS program from home to work on their skills outside of the on-campus sessions.

There are a number of ways that students might learn about the Math Bridge program. For students who take the placement test and have scores lower than the threshold for developmental math, the placement matrix that advisors and the Testing Center use recommends options such as the Math Bridge program and the Learning Assistance Center. These students are likely to learn about the program from their advisors. For students who place into developmental math or who opt into a developmental course, the math faculty typically bring Math Bridge flyers to the first week of class to distribute to students who may be struggling in their developmental math course. Students may also learn about the program by contacting the math department directly or through the Workforce Development website. According to the Career Pathways Coordinator, several hundred students are referred to her each semester by math faculty members who feel these students could benefit from the Math Bridge. However, she noted that only a handful of these students ultimately decide to enroll in the program.

Additional Assessment Preparation Options. Although the Math Bridge program is the primary recommended support service for students who need help building their math skills, MVCC does have additional program offerings. For students who test low in math, English, and reading, the school offers access to an Adult Basic Education program for students to work on all of these skills. Initially, this program was offered at a school off-campus, but recently MVCC has been able to offer the course on campus as well. At the time of this study, the school had referred about 40-45 students to the Adult Basic Education program.

Because MVCC has a high military veteran student population, the school has preparatory courses designed exclusively for veterans. First, the school offers Veterans Upward Bound, a free program for veterans that provides an academic refresher in subjects such as math, science, English, Spanish, and reading, as well as computer literacy and career advising (Mountain View Community College, 2016e). Additionally, MVCC offers Veteran's Math, which is similar to the Math Bridge program, but runs for 10 sessions twice a week, costs \$10, and is held in the education center of a local military base (Mountain View Community College, 2016e).

The final assessment preparation options for students are the school's Learning Assistance Center (LAC), library, and online Accuplacer study guides. The LAC offers peer tutoring in a variety of subjects, including placement testing tutoring. Furthermore, the LAC provides academic skills workshops and study skills help to aid students in preparing for the rigors of college-level work (Mountain View Community College, 2016d). For students who are studying for the placement test, the school's library offers study guides and review videos. Students also have access to online Accuplacer study guides through the school's website (Mountain View Community College, 2016d).

Redesign Outcomes at MVCC

After the implementation of the redesign, MVCC has seen dramatic improvement in how quickly students enroll in a 100-level math course. Prior to the redesign, only 1.2% enrolled in zero terms after the completion of developmental math and 26% in one term, compared to 28.2% and 31.1% respectively, after the redesign (Khudododov, McKay & Michael, 2016). There was, however, a drop-off in the percentage of redesign

students who passed a 100-level math course with a C or higher. In the cohort studied before the redesign, 79.7% of developmental math students passed 100-level math with a C or higher, compared to 67.5% after the redesign (Khudododov, McKay & Michael, 2016). Although developmental students under the redesign are moving into college-level math courses more quickly, fewer of these students are passing these courses with a C or higher. Because the redesign is still relatively new, the impact of the math redesign on overall completion rates for developmental students is not yet available.

For students who chose to enroll in the Math Bridge program, the program has shown to increase their chances of success in their math sequences. The majority of the students who did not test into a developmental math course went on to enroll in a math course after completing the Math Bridge (Mountain View Community College, 2016a). Of those students, the average pass rate for their math classes was 43%, which is higher than the 33% pass rate for those who did not participate in the Math Bridge. For students who placed into developmental or technical math, but below college-level math, their average pass rates for their future math classes was 68% compared to 13% for those who did not participate in the Math Bridge and 55% among those who took the Math Bridge concurrently with courses below college level (Mountain View Community College, 2016a). Among all of the students who enrolled in the Math Bridge, the pass rate for future math classes was 58% compared to 29% for those who did not enroll in the Math Bridge. For all students who enrolled in the Math Bridge program between Fall 2014 and Fall 2015, the average increase in placement test scores was from 39.2 to 52 (Mountain View Community College, 2016a).

Based on information from the students who participated in the study, students perceive the outcomes of the Math Bridge as positive as well. The students appreciate that the use of the self-paced ALEKS program allows them to master skills at their own speed rather than feeling rushed. The students also like that there is an instructor available during the sessions to answer questions when needed rather than acting as a lecturer. Additionally, the students appreciate having access to the ALEKS program off campus so that they can work on their math skills outside of the Math Bridge sessions. Overall, the students feel that the program has successfully helped them build their math skills and that the program is worth the cost and the time investment.

Recent Changes at MVCC

To understand what students are experiencing while navigating the enrollment, placement, and advising process, it is important to review some recent changes that the school has made that impacts these components of the student experience. First, according to the Testing Center Coordinator, a few weeks before the beginning of the Fall 2016 term, MVCC eliminated mandatory testing and placement for developmental courses and gave students an option to forego the placement test and opt directly into a developmental course. To do so, students must fill out an online waiver acknowledging their decision to opt out of the testing. This new arrangement means that students who do not test or students whose test scores place them below the recommended threshold for developmental classes can still enroll in these courses. These students are still required to take the AAA109 course (Mountain View Community College, 2016d). Students may not

opt into college-level courses. To enroll in college-level classes, students must either test into the course or pass the required prerequisite developmental course.

Another important recent change impacting the student experience at MVCC is the combination of testing and advising. Prior to Spring 2017, testing and advising were separate offices with minimal communication with one another, according to MVCC's advisors. In January 2017, these departments were combined into one and are now more integrated. The Testing Center Coordinator explained that the department has one director who oversees the operations of both testing and advising, and then each of these two areas has its own coordinator. According to the testing center coordinator and the advisors who participated in this study, there is now more communication between these two departments, but they still operate relatively separately and communication could be improved.

Student Experiences at MVCC

The answer to the research question "What do students who place into soft landing experience during the testing, advising, and enrollment process?" is a complex one. Although the recommended process for new incoming students at MVCC is to enroll, take the placement test, see an advisor, and then enroll in classes, students do not always follow this path. Each student has a unique experience negotiating the enrollment process. As MVCC has given students more options such as opting out of placement testing and developmental courses, students are making a variety of different choices in their college paths. The following sections outline each student participant's journey to the Math Bridge program to highlight these unique experiences.

Tyler. Tyler is an Army veteran who decided to go to college because his GI Bill would pay for his education. He initially started in 2009 in the Law Enforcement program with plans to go to the Police Academy. After his VA advisor walked him through the enrollment process, he went to the Testing Center to take the placement test. During the math portion, he struggled so much that he ended up clicking on random answers to get through it. Due to his low math scores, he placed into the lowest level math course, which at the time was before the redesign and was MAT030. He struggled through part of a semester of MAT030 until a problem with his veteran's benefits caused him to leave school. After changing his career goal to aviation, he returned to school in 2015. He once again scored low on the placement test, and then went to the college to speak to someone in the enrollment office, who ultimately referred him to Workforce Development and the Math Bridge program. After completing one session of the Math Bridge, he retook the placement test and scored so well that he tested out of developmental math and was placed directly into college math. After testing into college math, he transferred to a four-year university to complete his aviation degree, where he excelled in math. Ultimately, the government cut the funding for his program, so he was unable to complete it. However, he had recently been accepted into an engineering program at another university and is considering a return to college.

Adam. Adam enrolled in MVCC in the Fall of 2016 in the Licensed Practical Nurse Program. He opted out of taking the placement test because he had taken it earlier at a community college in another state and knew that he was not ready for college level math. After meeting with his advisor and sharing with her that he felt he needed help in

math, she recommended that he enroll in MAT055. By the second day of class, as the instructor was reviewing material that the students were expected to know, he realized that he was not prepared for MAT055. He returned to his advisor and she suggested that he take MAT050 instead. After one day in that class, he knew he was not ready for it either. He had remembered seeing a flyer for the Math Bridge program and had been given one by his MAT055 instructor, so he decided to drop MAT050 and give the Math Bridge a try instead. He then went to the Workforce Development office, and one of the staff members helped him to enroll in the Math Bridge program. At the time of the interview, he had successfully completed one Math Bridge session and was planning on enrolling in another before taking the placement test with the goal of skipping MAT050 and enrolling in MAT055.

Kelly. Kelly is a mother who decided to enroll in school after a bad job situation led her to have a mental breakdown. She decided she needed to get into a healthier job situation, and ultimately chose MVCC because of a family member who worked there, as well as its proximity to her home and its affordability. Her initial plan was to enroll in the Pharmacy Technician program. She initially went directly to the enrollment office to sign up, and then took the placement test, where she placed into MAT050. She started MAT050, but after the first day of class review she realized that she might not be ready for that course. She dropped the class and enrolled in the Math Bridge program after learning about it from her MAT050 instructor. After completing the Math Bridge program, she enrolled in MAT050 and at the time of the interview was passing the class with a B. She initially did not meet with an advisor until after she had started classes. At

first, she met with an advisor for the Pharmacy Technician program who explained to her the fast-paced nature of the program. Worried that the stress of such a program might not be healthy for her, Kelly decided to speak to an advisor for the English program instead and ultimately decided that was a better choice for her degree.

Jackie. Jackie is a single parent who had been out of school for several decades when she decided to enroll in college to increase her income and open herself to more career opportunities. She enrolled in MVCC's Business program with plans to transfer to a four-year university. She initially called someone in the enrollment office and once she learned that she could receive sufficient financial aid, she enrolled in the college. She took the placement test and placed into MAT050, which surprised her because she knew that math was a challenge for her. After meeting with her advisor, her advisor also recommended MAT050 as well as a college skills course that developmental education students are required to take. She talked extensively with her advisor about her career plans and became unsure about school after she learned that her starting pay after finishing her degree might not be much higher than she currently makes. Jackie enrolled in MAT050, but dropped after the first night of class revealed to her that she was not ready for that course. Her instructor recommended the Math Bridge course, and after talking to someone else in the math department about it, she enrolled online. At the time of the interview, she was doing well in the Math Bridge program and felt prepared to enroll in MAT050 the next semester. However, because of her changing work schedule, she was undecided as to whether she was going to be able to continue with school.

Brad. Brad decided to enroll in college after he lost his job of 28 years and decided that it would be a good opportunity for him to find a better paying job. He enrolled in a local workforce development program that would pay for his Heating, Ventilation and Air Conditioning (HVAC) program. He first visited the enrollment office and then met with an advisor who helped him enroll in his courses. Because of the workforce training program that he is in, he must follow a specific course plan. Brad opted not to take the placement test because he had been out of school for 40 years and knew he would need refresher courses before starting on his college level courses. His advisor suggested he enroll in MAT050. After struggling at the beginning of the course, his instructor suggested that he enroll concurrently in the Math Bridge program. He took this advice, and found that it helped him immensely in the class, which he was currently passing with a B at the time of the interview. He was also planning on enrolling in another Math Bridge session so he could continue getting the extra support. He is enjoying his experience in college so far and feels that he is on a good track to eventually graduate.

Bill. Bill's story is in many ways similar to Brad's. He had lost his job of 22 years and decided to go to college to find a new career. He also enrolled in the local workforce training program that would pay for his degree. He decided to major in Accounting with a possibility of studying Finance in the future. After enrolling at the college online with the help of his workforce training advisor, he met with an advisor at the college to get his classes approved. He passed on taking the placement test because he had not been in school for 25 years and felt that it was best that he start at the lowest level in math. He

enrolled in MAT050, but was struggling in the course within the first week. One of his friends in the class who was also struggling told him about the Math Bridge program, so he decided to enroll in it while staying in MAT050. He found the Math Bridge program to be extremely helpful, earning As and Bs on his exams in MAT050, which were some of the highest math grades he has ever earned. He also stated that he would likely enroll in another session of the Math Bridge program to help him further in MAT050. Bill is still on track to complete his Accounting degree and is confident that he will successfully complete the program.

Cindy. Cindy is the first in her family to go to college, which is one of the reasons she was inspired to enroll. She currently works in the construction industry and needs a degree to be able to move up in her career. She decided to start at a community college because it is affordable and is flexible for her schedule. She applied to MVCC online and then went to the campus to take her placement test. She tested into the lowest level for math, which did not surprise her because she had not taken a math course in 15 years. She initially decided to postpone math and take a couple of other classes instead. While she was taking other classes, she met with her advisor, who told her about the Math Bridge program. She decided to enroll in the Math Bridge after she learned that it would enable her to retake the placement test for free. Cindy found the Math Bridge program to be a great experience. After taking two Math Bridge sessions, she retook the placement test and tested into MAT055. Rather than enroll in MAT055, Cindy decided to take another Math Bridge session in the hopes of testing into college algebra. Cindy is

still on track for her degree, though she is considering changing from Construction Management to Business Management to give herself more career options.

Desiree. Desiree is studying Molecular Biology with an ultimate goal of earning a Ph.D. in that field. She decided to start her college career at a community college because she had struggled in high school and did not have high ACT scores and did not feel ready for a four-year college. She went to the enrollment services to sign up and then met with an advisor to schedule her classes. After studying for the placement test on her own and taking it twice, she was disappointed in her math scores, which placed her into MAT050. She was initially misadvised on what math course she would need, not knowing that she would need MAT055 and not MAT050 for her major. Because she needs MAT055 to get into the college math course she needs for her major, her advisor suggested she enroll in the Math Bridge program concurrently with MAT050 so she has a greater chance to test out of MAT055 and correct the delay in completing her degree. She was disappointed that she did not learn about the Math Bridge program earlier, because she felt that she was wasting credits and financial aid on MAT050. She said she feels the Math Bridge has been helpful, and is confident that she will be able to test out of MAT055 the next time she takes the placement test. If she is successful, she will be on track to graduate in the upcoming fall semester.

Karen. Karen had to reinvent her career after she had surgery and was unable to return to her previous job. She decided to study Business Administration and went to MVCC to talk to someone in enrollment. After enrolling, she took the placement test, and scored low in math. After learning her math scores, Karen's advisor referred her to the

school's tutoring center to study to retake the placement test. She got math tutoring while taking other courses at the college. After doing the tutoring, she retook the placement test and once again did poorly. She then decided to contact the Math Department directly to find out if there were any other options, which is how she found out about the Math Bridge program. She then visited the Workforce Development department, which explained the program to her and helped her to enroll. Karen excelled in the Math Bridge program and when she retook the placement test, she tested out of developmental math and into college level math. Karen is still on track with her degree, although she did change her major to Medical Office Technology after deciding she wanted to give back to the medical community that helped her through her surgery.

Patricia. Patricia was working at a preschool when her boss suggested that with a college degree, she could become a head preschool teacher. She decided to enroll in school to earn an Early Childhood Education degree. To enroll, Patricia called the school's main number and got information on the enrollment process. She decided to take the placement test in English, but skip the Math placement test after someone at the school suggested that she not take both in the same day. Patricia also knew that math would be a challenge, so she wanted to study for it before taking the placement test. She contacted the tutoring center for help, and that is where she learned about the Math Bridge program. After learning about the program, she called the Workforce Development department and signed up for the Math Bridge over the phone. Patricia felt that the Math Bridge was very helpful in building her skills and was planning on enrolling in another session because she felt she was not yet ready to take the placement

test. At the time of the interview, Patricia had not yet met with an advisor, but she was planning to do so soon and she was still on track with her intended major.

The testimonies of these students show that each student has a unique experience navigating the enrollment, testing, and advising process at MVCC and each student took a different path to the Math Bridge program. These differing experiences are likely due partly to new choices introduced to students such as opting out of the placement test and into developmental math, as well as differing advice that students received from their academic advisors and other faculty and staff members they encountered during this process. Students also appear to be making choices suited to their own goals, skill levels, and life circumstances. Additionally, these differences in experiences appear to be impacted by student choice in communication methods during this process, such as whether they navigated the process online, over the phone or in person. What is evident from these experiences is that students have a strong degree of autonomy over their choices in the initial stages of their college experience, and the way that the school and its members communicate with them has an impact on the decisions they make.

Summary

In total, the VCCS developmental education redesign has been a major force for change within the community college system and within MVCC specifically. The redesign was intended to improve student outcomes and has shown some positive impacts on developmental students. However, there are issues within its implementation that may be hindering, rather than helping these outcomes. In particular, the elimination of lower-level developmental math courses and introduction of the soft landing option does offer

developmental students an acceleration through their developmental course sequences and can ultimately save them time and money. However, the soft landing option does pose an issue to student access and can be detrimental to students who do not place into a developmental math course. Although the main soft landing option for math at MVCC, the Math Bridge program, has shown great success in getting students prepared for higher level math courses, there appear to be limited numbers of students actually participating in the program.

CHAPTER FIVE: FINDINGS

This chapter covers the key findings of the study. There are three main sections to this chapter. First, I analyze the interview data through the theoretical framework of Clark's Cooling-out of Community College Students. Second, I analyze additional key themes that emerged during the interviews that fall outside the scope of the five key features of the theoretical framework and analyze these themes through Bandura's (2006) theory of human agency.

Theoretical Analysis – Cooling-out

In this chapter I have conceptually outlined the findings utilizing the theoretical framework of Burton Clark's Cooling-out of Community College Students. I focus on the five key features of cooling-out which are Alternative Achievement, Gradual Disengagement, Objective Denial, Agents of Consolation, and Avoidance of Standards (Clark, 1960). I have examined these features both from the student perspective and from the perspective of the advisors, Testing Center coordinator, and the Coordinator of Career Pathways. Although information from the Testing Center coordinator and Career Pathways coordinator also informed these findings, they were not as instrumental in applying the theoretical analysis because these two staff members do not interact as directly with students as advisors do. Therefore while valuable for building the case

description and understanding the enrollment and testing process, their transcripts were not as helpful in the theoretical analysis portion of these findings.

Alternative Achievement

The first key feature of the cooling-out process is alternative achievement. During alternative achievement, students are channeled from their initial academic and career ambitions into lower-level fields such as a vocational credential. For Clark (1960), the academic advisor and placement test scores are two of the key means by which community colleges channel students away from their ambitions.

Student Perspectives. At the time of this study, there was no evidence of alternative achievement among the student participants. Of the 10 study participants, six were still on track within their original intended careers. Four participants had switched majors or were considering switching majors, but none had switched to a lower-level credential and the majority of those who switched did so for reasons beyond academic ones.

Tyler, for example, began his studies planning for a degree in Law Enforcement. After becoming a finalist for a position in that field and ultimately not being offered that position, he decided that he was no longer passionate about law enforcement and decided to switch his degree to Aviation instead after doing some internet research on the topic. Tyler explained his reasoning for losing interest in Law Enforcement:

You know, when I first started school for law enforcement, when the VA failed to pay, just because of time requirement they paid, but it wasn't until after the drop date, so, the guys that didn't make their VA payments on time got dropped. In that

time I had gotten a job, and while I was working- I was working for American Medical Response on the ambulance- and I actually had the opportunity to test and apply for a law enforcement position in the town where I grew up. And when I did that I was number one of two candidates that they had under consideration, and at the very last minute a third candidate, who happened to be the police chief's nephew applied. And so, they filled the position with him, and to be honest it was one of those things where I thought about it and I was hurt in the military for a long time and I'm like, 'I'm kind of done chasing bad guys and running around.'

Karen began as a Business Administration major, but switched to Medical Office Technology after a personal health event inspired her to give back to the medical field. Cindy is currently studying Construction Management, but is considering a switch to Business Management because she feels that it will broaden her career options if she decides to leave the construction industry. According to Cindy:

Well, I did kind of go through a phase where, because I've been in construction forever and it was a very brief moment where I thought maybe I might want to get out. You know, now that I'm starting college this would be a good opportunity to possibly get out of construction because it's kind of hard as a woman in construction. But I decided that's what I'm going to stay in. I love it so I decided to go over into business management, I guess just in case, I mean, I don't want to, I guess say pigeon hole myself. I think that business management will allow me for possible, you know, different opportunities in the future.

Kelly originally enrolled with plans of completing a Pharmacy Technician degree, but said she was likely going to switch her major to English because the fast-paced nature of the Pharmacy Technician program was not right for her and she feels that an English degree will keep her open to a broader range of career options. None of these degree changes represent a move to a lower-status credential or career field.

Of the students who had changed or were considering changing degrees, only Kelly reported that meeting with an advisor influenced her choice. Kelly described her meeting with an advisor from the Pharmacy program.

And when I met with the pharmacy technician lady, she was very honest. She said it's very high-paced program, fast paced. Most students do 15 weeks program. We do 2 sets of classes in that 15 weeks. That was definitely part of my decision not to go that way because I came from a very stressful situation before that. And I don't think it's the best idea for me to jump back into that.

After this meeting, Kelly then met with an advisor for the English program to find out what her options were for an English degree. She decided to learn about the English program because that subject has always been a strength of hers and it is something she enjoys studying:

She [her advisor] also said that there's a broader range of things that I could do from the English degree, whereas if I had gone with pharmacy tech, I'd be very specialized. I mean there is some room for move in there, but it's definitely more specialized than the English would be.

Although Kelly was influenced to change majors by these meetings with her advisors, the decision was ultimately hers to make and she did not report feeling that anyone was trying to channel her away from one major and into another. Additionally, she was not changing to a lower degree level, rather she was switching to a different course of study in another program.

Other than Kelly, none of the other students reported that an advisor or anyone else at MVCC influence their major and career choices, and none reported that any attempted to counsel them away from their intended goals. Based on these student perspectives, it does not appear that Alternative Achievement is evident during the early stages of their college careers or that students are being cooled out of their academic ambitions by being tracked into lower-status fields. On the contrary, it appears that students are supported in their goals and are not subject to any external pressures to change majors or career trajectories.

Advisor Perspectives. Similar to the student perspectives, the advisors interviewed also did not suggest that they attempted to channel students away from their ambitions. Conversely, data from the advisor interviews suggests they work actively to help students reach their academic and career goals. Only when a student is greatly struggling in a specific major or with specific courses do they have a conversation about other options, and those conversations typically involve a discussion about changing to a different major rather than a lower credential.

Conversations about student goals typically start during the first advising meeting. All of the advisors interviewed indicated that this first meeting is important because it

sets the tone for students for the rest of their time at the college. During this initial meeting, advisors typically learn about the students, their goals, and their current life circumstances in order to give them the best guidance possible. This initial conversation also usually includes a discussion of the students' placement test scores. One STEM advisor explained her approach to meeting with students about their math placement and how the emphasis is on helping the student map a course to success rather than discouraging them from their intended field.

So students come in, they take the ACCUPLACER, they're immediately referred over to advising. And so they sign in, we look at their results. We definitely talk with the students about what those mean because sometimes they're looking at those results and they're like, they have two or three different math classes listed and they're like, 'What does this mean? Do I have to take all of those classes?' And so we definitely again, kind of start asking those questions, 'Well, you know, what program are you interested in. What, you know, what are you planning taking here when you're with us?' Especially if it's like a student who wants to do engineering. Okay. So if they placed into Math 050, and they are engineering, they have to get all the way over to Calc 3 and above. So, I definitely show them that our math flow chart so they can get a visual of 'Okay, I have to get from all the way over here on the right-hand side to all the way over here on the left-hand side.' So that way they can see 'Okay. Well, I got a lot of work to do.' And that's not by any means to discourage them. It's just to show them that math has to be a priority every single semester.

Other advisors reported similar encouraging conversations with students in regards to their math placement. One of the STEM advisors spoke specifically about students pursuing STEM degrees who place low in math.

We have a lot of students who come in wanting STEM degrees who place into 050. It can be discouraging, but I tell them ‘If you want to be an engineer, just do it.’ I think anyone can do what they want if they apply themselves. It’s possible, but it takes persistence.

In addition to encouraging students in their majors, the advisors also refer students to additional resources to help them through their required math courses.

We have students who take math 050 and 055 and then college algebra or pre-calculus depending on their major and it's possible when you let them know that it's not to deter them from seeking the major that they're interested in, but we do tell them that we do have great support systems in the math center. Then we have learning institute center and so those are free options for students on campus. If they are going to take a math class in their semesters then they could use those resources to benefit them on top of their in-class instructions.

These strategies that the advisors report using appear to contradict the idea of Alternative Achievement. Rather than trying to channel students away from their original aspirations and into lower-level degrees or credentials, it appears that the advisors are deliberately counseling students in ways that support their goals and offer them strategies and assistance for meeting those goals. This finding contradicts the theory’s proposition that advisors are one of the key agents of cooling-out and suggests instead that students are

experiencing supportive interactions with advisors rather than ones attempting to cool them out of their ambitions.

Another strategy commonly used by the advisors is to use their own experiences to show students that success is possible despite their placement scores. Several of the advisors reported that they also struggled in math, and they tell their students this in order to encourage them to continue with their intended goals. One advisor said,

Honestly, I usually go back to-- Where I come from, like I said I'm a very slow learner academically. I never did well with test taking, and so when I was in high school I never even thought I'd go to college. I didn't want to deal with testing, I didn't want to deal with a lot of work. That's my background and so I'd tell them that. And I'm like, 'But look at where I'm at.' Like, I got through and I ended up with a Masters and I'm really thankful for that. So I say that quite often to students. And you'll get through it.

The advisors reported that relating directly to students through their own past experiences helps students understand that they can be successful even if there are barriers such as their math placement currently in their way.

Although the goal for the advisors is to help guide students to their initial intended academic and career goals, they did acknowledge that sometimes it is necessary to discuss other options with students. In response to whether students change majors after finding out Math scores, one advisor said,

Not right away way. I personally have never had someone that's had that instant reaction, it's generally after they've attempted maybe one or two semesters of

math and they have struggled. So, not that it's a fact that they need that much math, but that they're going through the math and they see it as kind of a barrier, an obstacle that they can't get past.

Another advisor echoed this sentiment, saying she will talk about other options with students if they seem unable to get through their math sequence:

Of course, we do talk about other options too. Some students make it to algebra and then get stuck, so we discuss other degree options. We might talk about other STEM careers that might work for them, or we might discuss a switch to a non-STEM major.

Although the advisors do sometimes have conversations with students about other degree options, these options all seem to be lateral moves into different majors at the same degree level rather than a move to a lower degree or credential.

The counseling strategies employed by advisors appear to be consistent with the student testimonies about being supported in their majors. From these results, there appears to be no effort on the part of advisors to move students away from their goals and into lower-level achievements. Although the advisors did acknowledge that sometimes they need to have conversations with students about different degree options, this was presented as a last resort when all other attempts to help the students succeed in their chosen majors have failed. Additionally, even when these conversations are necessary, there is no indication that the advisors are channeling students into vocational credentials or other non-transfer programs. Instead, they are suggesting different majors at the same degree level that the student was already attempting to attain. Based on these results, it

does not appear that Alternative Achievement as a mechanism of cooling-out is significantly evident in the student experience with advisors at MVCC, nor was it evident with any of the interactions students mentioned having with faculty and other staff members.

Gradual Disengagement

In addition to Alternative Achievement, another key feature of the Cooling-out process is Gradual Disengagement. During Gradual Disengagement, students are moved slowly away from their goals and aspirations through smaller steps that slow their progress towards their goals (Clark, 1960). Gradual Disengagement was more difficult to assess in this study because it is a slow process and the students who participated were in different stages of their academic careers, with the majority of participants in the early stages of their programs. However, the perspectives of the students and advisors sheds some light onto whether students are being disengaged from their degree paths.

Student Perspectives. As previously stated, the majority of students interviewed were still on track for their original major and career goals, and those who had changed or were considering changing were doing so more for personal reasons than academic ones. None of the students reported that they felt that they were being moved away from their goals. Many of these students are still early in their college careers, however, so the outcomes of their academic careers have yet to be realized.

For Brad and Bill, their participation in a government-funded workforce training program means that they are required to stay on track with their intended degrees. They must follow a specific course plan in order to maintain their funding. Bill stated that he

would likely be unable to change degrees even if he wanted to, because he would have to reapply to the program and would lose the progress he has already made:

Yeah. I mean, this is my first semester, and yeah, like I said, being in the government program that I'm in, I don't know if I can change. I mean it would have to go through a whole new approval process and that could take a month, maybe more. So I would be out of school for a semester, in which case I'm not getting an unemployment check because I haven't worked. Because that's part of the [program name], too, is you collect unemployment for those-- that time you're in school as a full-time student.

Brad also said that he is staying on track with the program, and is working steadily towards his goal:

Yeah. Everything is fine, because they hold us accountable because every first of the month-- they call it a benchmark-- I have to turn in the grades, and the teacher has to answer like three questions, so we're held accountable to perform. And I'm just doing it because I want to do it. I mean I want to graduate, you know?

Both reported that the role their academic advisors played in their progress was setting them up with their required classes. Because both decided to stay in MAT050, their enrollment in the Math Bridge program did not create any additional delay in their progress.

Unlike Brad and Bill who decided to stay in MAT050 despite being overwhelmed at first, the majority of the other study participants either put off math or dropped MAT050 partway through the semester. This delay in their math courses could represent

a gradual push away from their intended majors, however none of the students reported feeling disengaged from their academic goals. Most of the participants are taking college-level courses to earn credits towards their progress in their other core subjects while they work on their math sequences. Patricia, for example, tested well in English and was taking some courses for which English was a prerequisite while she prepared to take the math portion of the placement test. Only Jackie had delayed her progress somewhat, taking only the Math Bridge and her AAA course while deciding her plans for the next semester. Because Jackie works full time and is a single mother, she is unsure if her schedule will allow her to proceed with her degree. Recent changes in her work schedule have made it difficult for her to attend class. According to Jackie,

I mean, my plan was to take my classes online, I don't know if that would have been any better, but I think I do more better in person. But then all of my classes ended up being in person. And then according to my schedule, my schedule at work changes, so I have this class come April, I'm probably only going to be able to make it to 30 minutes of the class. So again, I'm not quite sure how other people are working all those details out.

For Jackie, her decision to slow her progress was related more to her changing work schedule than her academic skills.

Based on these student experiences, it appears that none of the students interviewed are in a process of disengagement from their goals. Several of the students have been delayed in their degree progress due to their need for the Math Bridge program, but none reported being discouraged by this delay and none reported feeling

that this was going to halt their progress. Ultimately, it remains to be seen whether these ten participants will finish their degrees, so an eventual Gradual Disengagement as a function of cooling-out is still a possibility, but at the moment these students all appear to still be on track with their progress.

Advisor Perspectives. The results from the advisor interviews also do not suggest that gradual disengagement is being encouraged with developmental math students.

Although some students come to advisors saying that they feel unsure about their academic abilities and chances for success, the advisors work to help students overcome these feelings. All of the advisors who participated in the study indicated that their goal is to learn about the students and their current life situations in order to help them plan for success in college. The goal for advisors is to help students ease into college life and engage them more in the process rather than attempting to disengage them from it.

According to one advisor,

So we're-- if it's a first time student, a continuing student, I definitely want to kind of get a sense of why are they here? What brought them into our office, so just kind of hearing the story. And I understand that I might be the fifth person that they're telling this story to, but I think it's important that they come in and they say, 'Ok, well I just got out of jail, and I want to go back to school and make a better life for myself.' So let's start from square one, so let's go step by step what it is that you need to do to get there.

The idea of meeting students where they are by asking them about their life situations and helping tailor their college experience to their specific needs was present with all of the advisors who were interviewed. Another advisor stated,

Initially I kind of want to get to know where they're at. So it may be 'Hey, what are you looking at studying and why? What do you see as a short-term goal and your long-term goal? Do you see yourself transferring into a four-year college?' So questions like that, I ask usually within the first meeting. If they've gone to college before? If they plan on moving around a lot, because we have the transfer agreements here with [state name] schools. And sometimes military, I mean they move around a lot. And so that can be a factor to how, in terms of how I advise them.

This particular strategy of learning about students before making advising decisions speaks more to an advisor goal of helping students gradually ease into the college experience rather than gradually easing them away from it. Among the advisors, there was a great focus on not only the academic skills of incoming students, but also their need to learn how to navigate being college students. This sentiment is best summarized by the words of one advisor:

Well, advising, I really agree with the theory that advising is teaching because that's really a lot of what we do, teaching students about not only requirements for the degree or the school but helping them navigate the college experience, helping them learn how to be independent and advocate for themselves and their education. So definitely, I feel that advising is teaching.

This perspective of advising as teaching appears contrary to the principle of Gradual Disengagement. In contrast, this perspective appears to be one that gradually engages students in the college experience and helps to slowly move them towards success in college rather than away from it. This process is in direct contradiction with cooling-out, as it functions to retain developmental students rather than push them away from their ambitions.

Gradual Disengagement is a slow process that can be difficult to identify, but based on the results from the participants, it is not an evident process at MVCC. Indeed, there are barriers to success that can slowly discourage students, such as placement or poor course performance. However, without knowing the exact reasons why some students drop out of school or change to lower-level credentials, it remains unclear as to whether this is happening with some students. Based on the results from both students and advisors, there appears to be more of an effort to ease students into the college experience and set them up for success rather than to slowly move them away from their goals. This contradicts Clark's (1960) proposition about the role of advisors in gradually cooling students out of their ambitions. Outside of advising, students may still encounter forms of gradual disengagement in their interactions with other staff members and faculty, although none of the student participants reported experiencing this. For students who are delayed by their need for developmental math, only time will tell if they ultimately achieve success.

Objective Denial

Another key feature of Cooling-out is Objective Denial, in which counselors distance themselves emotionally from the Cooling-out process by using objective criteria to move students away from their goals (Clark, 1960). Although MVCC does use objective criteria such as test scores to determine student placement and course sequences, the study data do not strongly indicate that MVCC is attempting to emotionally disconnect from students. On its surface, the addition of the soft landing option for developmental students may seem like a form of objective denial because it uses test scores to create an objective barrier in denying students access to developmental courses. However, the inclusion of the opt-in option for students further diminishes the use of objective criteria for student placement and allows students to access developmental courses regardless of their placement test results. Additionally, students are able to bypass the placement test and enroll directly into a developmental course, removing the objective use of placement test scores altogether. Although the placement test is still required for students to access college-level courses, the student participants in this study were not discouraged by this requirement and instead welcomed the additional support provided by the Math Bridge program. For some, the new placement process may be a form of Objective Denial, but this did not appear to be the case among the study participants.

Student Perspectives. For students at MVCC, placement scores no longer represent hard criteria that require students to enroll in specific courses. The school's efforts to reduce placement testing and the introduction of the opt-in option for

developmental courses give students more options to take control of their education and use placement scores as suggestions rather than hard criteria. If students were required to take the placement test and participate in the soft landing option based on their test scores, this could be viewed as a form of objective denial. By giving students more latitude over their testing and placement choices, the school positions soft landing as an option rather than a mandate, thereby lessening the use of objective criteria.

Most of the study participants who took the placement test did not view their test scores as any kind of setback because they already knew that they needed help in math. The objective criteria of the placement test scores did not create an emotional barrier for these students. Additionally, these students initially enrolled in MAT050 or MAT055, which are higher level courses than the Math Bridge. It was the students themselves, and not their test scores, that made the decision to leave those courses in favor of the Math Bridge, indicating that these scores were not functioning as a form of Objective Denial.

Although several of the participants did end up withdrawing from a developmental math course, they did not find the experience to be a disconnection from their intended goals. Adam, for example, spoke to his math teacher about his decision to withdraw and found the experience to be highly encouraging, stating,

Even the professor gave me options when I told her I was going to withdraw from the course. She was there in the classroom, helpful to me. She didn't say, 'Goodbye. Good luck to you.' She said, 'Well, here's your options.' She tried to keep me on course.

Adam's experience with his instructor also speaks to fact that the availability of options for struggling students provides more routes to success than just the developmental courses. Students who struggle in developmental math have somewhere to go for help, which may help them feel more supported by the college, rather than being objectively distanced from it.

Additionally, the students who had met with an advisor reported mostly positive experiences. For some, they already knew what their plans were, so the advising meeting mostly involved setting them up with their courses. According to Brad,

She [his advisor] was super nice and informative, answered all my questions for me. Pretty much knew what was going to be expected and I was just real happy.

Cindy also reported a positive first advising experience. When she took her test scores to her advisor, her advisor told her that she would have to start in the lowest level for math, but that she could work her way up to college level. When asked about her overall feelings about the advising experience, Cindy said, "It was very helpful. At least my academics for my degree, yeah, for sure. She just kind of told me what classes I'm going to need to take and she suggested good pairings of classes and whatnot."

Overall, the participants felt that the advisors were knowledgeable, helpful, straightforward, and were quick to respond to their questions. The students did not report that their advisors helped them to negotiate any negative emotions stemming from their placement test scores, but this may be because these students had also reported that they were unsurprised by their scores and therefore were already motivated to do what needed to be done in order to succeed.

Although most of the students said that the advisors were helpful in getting them signed up for their classes, Desiree said she was not happy with her first advising session. She said that she was misadvised about which math class she needed, and that the first advising session was pretty clinical. “She just gave me the basics of what I should take for my first semester. Didn't really talk to me about long term goals,” reported Desiree. Desiree’s experience demonstrates that some of the advisors may be more focused on the mechanics of the course plans, and perhaps more could be done in order to get advisors to connect more emotionally with their students.

Based on these findings, students do not appear to be experiencing Objective Denial during their advising sessions at MVCC and that this is not a mechanism functioning to cool them out of their goals. Most of the students reported feeling strongly supported by their advisors. However, Desiree’s perception of her advising experience does suggest that some advising sessions are more unemotional and detached than others. This may be impacted by the current emotional states of students and whether they need that emotional support. It may also be impacted by the goals of the advising session. If students already know what they want to do and just need help enrolling in classes, the emotional tone of the advising meeting may reflect this.

Advisor Perspectives. In contrast to the idea of Objective Denial, advisors at MVCC also have not reported any indication of distancing themselves emotionally from students and the barriers to their success. Several advisors reported that they actively try to reframe placement testing for students into something positive rather than negative. The advisors reported that how students say they feel about their test scores influences

the approach they take to advising those students. One advisor explained some of the various reactions she gets when students come in with their test scores:

Some of them, it's just so different. I've gotten reactions like, 'I'm glad. You know what? I'm just glad I know. The test is done, it's over. Just please put me in the class that I got placed into.' I've gotten that, and then I've also gotten, 'My gosh, I can't place higher. I'm stupid.' I've gotten things like, 'Well I knew I would do really good in English, but I knew I would suck at math. But at least now I know.'

These advisors perceive that some students view their placement scores as mere indicators of where they need to go from that point, whereas others view these scores as discouraging indicators of their intelligence and a barrier to their ability to be successful in college. These reactions also speak to the amount of encouragement that students might need during their advising sessions. Some students may need emotional support from their advisors, while others may just need a road map of which courses to take to get back on track. The students who say that they view their scores as a barrier to success may see their placement test scores as objective criteria that deny them their academic goals, however because these students are referred to an advisor, they are provided access to the emotional support needed to diminish the potentially negative impact of their placement test scores.

For the students who need emotional support, the advisors reported a number of strategies that they use to reframe the placement test as something other than a pass or fail test and spin it in a more positive light. For example, one advisor said,

So a lot of students, and I talk to the students about this too, they always come in and they're like, 'Well I didn't pass the test.' And so I always encourage them to think of it as this is just a snapshot of where you're at academically right now. So we have to put you into where you're at right now and move you forward. And I also talk to them about how these college prep classes, I don't like using the term remedial or dev ed because to me that has a bad connotation or leaves a bad taste in your mouth.

In addition to steering away from pass or fail terminology or referring to college prep courses as remedial or developmental, this advisor uses a house analogy to reframe the experience for students. She connects this analogy to her own experiences to further humanize the conversation for the student:

So I always talk to students about how my husband and I are getting ready to buy a house this year, and so you know, we probably wouldn't buy a house if the foundation had cracks, holes, or something like that, and the student typically agrees, or like, 'No. God, no. I wouldn't buy a house that had holes, or where the foundation was cracking, or anything like that.' And so I tell them, 'Well, would you do the same thing with your education?' And so, they're like, 'Well, no.' I'm like, 'Well that's what these college prep classes are doing, the 050 and the 055. They're filling in the cracks and the holes in your educational foundation, so that way you can be prepared when you go into Math 121, or Math 120, or whatever it is your math is.' And so they kind of think, 'Oh, okay.' So it kind of puts a little--

it puts it in a little bit more better of a perspective for the students I think, and so they are a little more open to taking those classes.

The house analogy not only frames the placement scores more positively for students, it also moves away from a deficit perspective of the student's abilities, putting the emphasis on the educational foundation rather than on the student's own abilities. Another advisor also spoke to the idea of reframing the pass or fail mindset for students with low placement scores. She emphasizes the placement aspect rather than the scores themselves. Additionally, she integrates a discussion of the student's course plan into the conversation to map out a path to success despite the student's test scores:

Some of them get high anxiety like, 'Well, I must not be that smart because I didn't get into this class.' And I think it's really just good that we refer to it as 'placement,' not like, 'You passed or failed,' you know. I think they go into a test thinking that. But based on their scores and you know we have a chart to see what course that they placed into, and how that works into their specific degree plan.

Echoing the sentiments of these advisors, another advisor also emphasized the importance of putting a positive spin on test scores to help students view them differently if they say they are feeling disappointed about their results. Rather than referring to test scores as hard criteria, she frames it in a way that the student can see how their placement fits into their degree plan:

Sure, well honestly, so it's pretty common at the community college since we don't have any entrance requirements, it is pretty common that we don't always see those high achieving students. So if I do see some of those low scores I don't

phrase it as, ‘Oh, you placed into the lowest class.’ or-- I always try to place it into a positive, like, ‘Hey, you placed into this class which is the minimum pre-requisite.’ So I always phrase it as, here's the good thing about your results whether or not you felt you could have done better, but at least you have the results that we can work with.

This strategy frames college success as achievable no matter what a student’s test scores might be, and uses the scores as a basis for encouragement rather than criteria to discourage students from their goals.

Based on the findings of this study, it is apparent that objective criteria such as test scores are still a barrier to success for some students and may discourage them from continuing with their college ambitions. However, these barriers appear to be more strongly connected to the testing and placement practices at MVCC rather than advising. Although the school does not mandate placement for soft landing or developmental courses, students are still required to place into college-level math through either testing or one of the exemption options. This may qualify as a form of objective denial, as it represents a set of hard criteria that students must meet in order to access college-level courses. Like the introduction of the opt-in option, however, the college’s attempt to offer more routes to exempting students from the placement test does suggest a move away from objective denial within the testing practices at MVCC. For students who test poorly, the “no placement” results that soft landing students receive is an emotionally detached message that could discourage students before they receive their scores. The Testing Center staff generally give the students their scores and explain the placement, but are not

trained in giving the kinds of emotional support that the advising staff provide. If members of the testing center staff are not offering supportive messages to students and are instead channeling them directly to an advisor, the students may view the “no placement” score as a representation of their inability to be successful in college, thereby serving as a form of objective denial. Without more information from the Testing Center staff, it is unclear exactly what types of messages these students are receiving, so the presence of Objective Denial within the Testing Center is not definitive. The advisors themselves appear to be highly emotionally supportive of students in their goals and ambitions, working to keep them on track with their plans rather than guiding them away from those plans. If Objective Denial is occurring, it is potentially occurring within the Testing Center rather than within advising.

Agents of Consolation

The fourth key feature of Clark’s (1960) theory of Cooling-out is known as Agents of Consolation. With Agents of Consolation, the primary actors are the academic advisors who work to change the academic aspirations of students. From both the student and advisor perspectives, there was not any evidence of an effort by advisors to change the goals of their advisees and cool students out of their academic aspirations. On the contrary, advisors appear to strongly support the aspirations of the students they serve. However, the data suggest that there may be more that advisors can do to help their students meet their goals.

Student Perspectives. When asked about their first meeting with their advisors, the student participants largely reported a positive experience. Overall, they felt that their

advisors were helpful and guided them well in making their course selections. Kelly summarized her experience during the enrollment and advising process:

Honestly, everybody that I talked to was very supportive and very-- I never talked to anybody that was like, 'Oh, you shouldn't try this,' or anything like that. I thought everybody was pretty good. And I haven't talked to everybody by any means, but the people I did talk to were very supportive and very helpful. And if they didn't know, they definitely pointed me in the direction to somebody that might know. And that was priceless.

Other students in the study reported similar levels of support from their advisors.

Additionally, students like Karen, Tyler, and Adam who spoke directly with someone in the Workforce Development department while signing up for the Math Bridge course also felt highly supported. According to Adam:

It was convenient. It was [employee name] who helped me enroll. They helped me out. They said I could wait. Even though I pay out of my pocket, they said, 'If you have financial aid coming, we can wait.' And so they give me credit. And so when I got my Pell Grant I paid them. But they did it, helping me enroll, and the class rules and all that, sending emails and everything that Math Bridge was starting.

As discussed previously, Kelly is the only student participant who reported that meeting with advisors influenced her to change her degree plan. However, in Kelly's situation, the advisors simply laid out the degree plans for her and she ultimately made the decision

that she thought was best for her and her future, indicating that the advisors were not functioning as Agents of Consolation for Kelly.

Although the students in the study reported positive advising experiences, there may be some room for improvement to help keep students on track with their goals. Most of the students who enrolled in MAT050 before learning about the Math Bridge did so on the advice of their advisors. The fact that advisors are recommending students into classes at a higher level than they might be prepared for could indicate an attempt to help students move more quickly through their developmental sequences and into college math, which contradicts the role of advisors as Agents of Consolation. However, inaccurate placement testing could also be the reason for this. Although it appears that the advisors have the best interests of their students in mind, by not telling students about the Math Bridge in the first meeting, the advisors may have inadvertently delayed the progress of these students, particularly the ones who dropped their MAT050 course. The advisors seem to be trying to get students placed in the highest course possible in order to expedite their progress, not realizing that the students may not be ready for these courses. This appears to be a supportive move on the part of the advisors, however if this higher placement does hinder student progress, it could be an unintentional mechanism of the cooling-out process.

Advisor Perspectives. When asked about their roles in advising developmental students, the advisors all reported a strong degree of support for the students and their aspirations. Even when students are questioning themselves and their abilities, the advisors are encouraging them and working to help them succeed. There was no

indication from advisors that they are acting as Agents of Consolation who try to channel students away from their ambitions. Some advisors did mention that sometimes they have to have conversations with students about other alternatives, but only as a last resort. For example, if a student has struggled to pass the same course over multiple attempts, the advisors might talk to the student about degree options in a similar career field or perhaps a field of study that is better suited to that student's strengths. Overall, the advisors spoke about the various strategies they use to support students in their goals, and that appears to be the primary focus of the advising meetings.

One advisor, for example, was highly supportive of the idea of encouraging student autonomy and success. She described her role as one that guides students throughout their college careers, stepping in when needed to help motivate the students to be successful. This advisor discussed her philosophy:

So I feel that as advisors we are just here to kind of help them along the way. And so, you know, students come in and they're excited and they're nervous and they're scared and so that's what we're here for. We're here to kind of show them the ropes. And so I definitely want to help empower students to take ownership and responsibility for their education.

She then continued by explaining her strategy for empowering students:

And so it's just trying to make sure that they understand that as long as they're they work hard and they're determined, they can work through this. It doesn't have to be something that they get upset about. They have a choice. They can embrace it and work through it, or they can choose to feel sorry for themselves. So, yeah, I

think that's just the biggest challenge trying to instill some hope and good feelings in the students to make sure they understand that no, it's okay. You'll be okay. Another advisor uses her own struggles early in her education to empathize with her students. She explained how she tries to help students who report that they are feeling overwhelmed, particularly in the early stages of their education:

I try to understand where they're at outside of school because I struggled at the beginning of my college education with thinking I could be a full-time student, a full-time employee and it was just a lot. And I'm also a slow learner academically, and so I try to kind of gauge where they're at. And there have been a few instances where I'm like, 'No, it's okay. You don't need to rush.' If you think that it's going to be that overwhelming, then maybe kind of just get your feet wet for the first few semesters because you're still learning how to become a college student.

These statements suggest a high degree of empathy and encouragement among advisors who are deliberately working to push students closer to their goals rather than consoling them out of their ambitions.

Overall, it does not appear that members of the MVCC staff, particularly advisors, are acting as Agents of Consolation who cool out the college desires of soft landing students. Instead, these advisors are serving as counselors to help students through the college experience. Rather than discouraging students who are worried about being successful and allowing students to accept their negative feelings about their abilities, these advisors are attempting to empower students to be successful and pull them out of a

negative mindset. Non-advising staff members such as the Workforce Development staff, are also supportive of student ambitions. Based on these findings, it does not appear that Agents of Consolation is a factor cooling developmental students out of their college ambitions.

Avoidance of Standards

The final key feature of cooling-out is Avoidance of Standards. This part of the cooling-out process involves counselors appealing to concrete standards rather than ambiguous ones in order to properly classify and place students (Clark, 1960). This approach involves appealing more to clearly defined standards such as test scores while failing to value less-definable student characteristics and strengths such as motivation level. Avoidance of Standards allows students to be placed outside of their ambitions and may create a barrier to meeting the standard necessary to move beyond this placement, ultimately cooling students out of their academic goals.

Student Perspectives. Data from study participants indicates a move at MVCC from defined standards such as test scores to more flexible pathways for students to their college-level courses. Two key changes at MVCC point to this finding. First, students are no longer required to place into a developmental course. Instead, students can choose to opt into a developmental course as long as they fill out an online waiver indicating that they acknowledge that the course they are opting into is not for credit and that they will be required to sign up for the AAA109 course that is designed to help them build skills critical to college success. With the opt-in option, placement and classification is minimized and students are given more autonomy over their academic futures.

Additionally, MVCC's mission to reduce placement testing also shows a step away from traditional classification. Students are given more options for ways to place into college level outside of the placement exam. Though these efforts do indicate a move away from the use of clear standards that channel students away from their goals, thereby contracting the use of Avoidance of Standards as a mechanism of cooling-out at MVCC, placement is still required for college-level courses so those harder criteria do persist.

Several of the student participants had decided to utilize the opt-in option and were undeterred by their need for developmental math. Brad, for example, described his reasons for skipping the placement test:

I talked to my counselor and I-- since I've been out of school for four years - I had taken algebra when I was in high school because I could have went to college if I wanted to. I just thought that it would be better for me to take these two refresher classes. She kind of agreed with me and it's probably a good thing I did.

Bill reported a similar reasoning for why he skipped the placement test and opted into developmental math instead of trying to test into a college-level course:

Well, because I haven't been in any kind of school for 25 years, so I figured I would start at the bottom. Because with math, I'm in Math 050, which is way I'm doing the Math Bridge. But I never took pre-algebra or even algebra in high school. I took career math, and consumer math, and general math, and all that stuff.

Adam also spoke about his reasons for opting out of the placement test:

Yeah. Because I was going to school in [city name] recently and I had taken the placement test there. So I already knew pretty much where I needed help. So I could opt out because I knew I was going to need remedial math and science, I think.

For students like Bill and Brad, the option to skip the placement tests represents them determining their own needs and skill levels rather than relying on the institution to do so. For Adam, who had already taken a placement test before in another state, the opt-in option allowed him to avoid being classified as a developmental student by the MVCC Testing Center. Because of the opt-in option, there is less of an emphasis on student classification and placement and more of an emphasis on student choice, which contradicts the use of Avoidance of Standards as part of the cooling-out process at MVCC. Students who previously might have felt placed away from their ambitions now have more autonomy to choose a path that best suits them.

Advisor Perspectives. Like the students in the study, advisors also demonstrated a de-emphasis on student classification and placement, suggesting that Avoidance of Standards is not a clear mechanism of cooling-out at MVCC. Rather than focusing on placement test results, advisors attempt to reframe the test scores so students feel they can be successful. The advisors also try to stress other student strengths, not as a means to channel students out of their ambitions, but as a means to help students move forward in their degree progress while they bring their math skills up to college level. Advisors also avoid framing student placement as a deficit to remove the onus of failure from the individual student and to frame their placement in a more positive light.

One advisor spoke about her approach to advising students who do not place into college-level courses and her strategies for reframing the placement:

Students, obviously, they get a little point of view is, they talk about, 'Oh I failed the test' so I always tell them, 'I have a Master's degree.' I took the placement test just so I can talk to students about it. I said, 'I tested into Math 50' and then they kind of start to laugh. So I'm like, 'Don't feel bad about that.' I said, 'We see this every single day.' I said, 'Students typically have placed into some kind of English class, whether it's 092 or 094 and English 121 or 121 by itself.' So they place somewhere but it's always math. Math seems to be that tough subject for everybody. So I always tell them... I always tell students, 'Don't feel bad about this. Math is not my strong suit either.' I said, 'Why do you think I'm a counselor?' And so, we just...I just try to lighten the mood with those students and try and tell them, you know, 'We see this all the time. I don't like math.' because I sucked at math and, you know. So I try to give them my own experiences with that-- so to make them feel a little bit better.

Another advisor shared a similar approach with students regarding placement:

The opt-in came at the same time as the [new placement test]. I don't know if they were related. It just happened at the same time. I actually took the [new placement test] and the math section was horrible. I think I placed into 050. I like to tell students about that because it makes them feel better about how they placed.

This perspective is important departure from Clark's (1960) conception of Avoidance of Standards that fails to recognize diverse student skill sets. Instead, this advisor uses a

student's placement into college-level English as well as her own experiences to try to help students feel that they are capable of college-level course work, even if they still need some help in math. Furthermore, the advisor uses her own experience of struggling in math to show that success is still possible for students at the developmental level.

Another strategy advisors use to frame developmental placement more positively for students is to show that a developmental placement is still a form of placement. Even for students whose test scores place them below the threshold recommended for MAT050, the advisors suggest that placement into soft landing such as the Math Bridge still means that they did place somewhere. They also emphasize that the placement test results do not suggest a student's lack of potential to succeed, nor do they suggest that the student is at fault for these results. Rather, there may be several reasons a student had low placement scores. According to one advisor,

Well, like I said earlier, I try to phrase it in a positive light. I do tell them that 'Hey. Yes. Technically you can fail this test and you didn't fail you might not have done as you could have, but at least you placed into a class, and that's still a positive result. It might not have been the class you were hoping for, but the test designs are a matter of a few things. One, either you don't know the material, or two--you might've known the material, but it's been a while, and maybe you didn't, you know, take your time or study enough.' So, if they feel that it was either of those cases, then certainly they come to see that, maybe it's just a current reflection of my skill level now, and not as my overall capacity.

Another advisor spoke about a meeting with a student who was despondent over her placement scores:

So there was one [student] in particular that I advised a few months back who was so stressed about not being able to get into the class that was needed as a pre-req, and at one point she was on the phone with her mom while she was talking to me, crying, because her mom was like, ‘You better find that math class. You better figure out a way to get into this course.’ And so finally I talked to her mom, and her, and I said that instead of putting so much pressure on the student that I think it would be best if she not worry about math and English, because that's a lot for a new student, and I recommended the Bridge program.

These statements demonstrate that advisors are not viewing students from a deficit perspective or putting the blame for their struggles in math onto them. Instead, they are showing students that their test scores do not reflect their overall abilities and there are options available to them to help build the skills they need to be successful in college. These statements challenge the notion that advisors at MVCC are using Avoidance of Standards as a mechanism to cool students out of their ambitions because the advisors are able to recognize the unique skills sets of students and use those to try to bolster students to feel capable of success in college.

Although developmental students often come to advisors discouraged by their placement, particularly in math, the advisors do not seem to be using Avoidance of Standards as a means to cool students out of their academic ambitions. Instead, advisors are reminding students that placement scores are only a small piece of their overall

academic puzzle, taking the stigma away from the developmental or soft landing categorization. Additionally, advisors are using other student strengths to help them move forward in their programs while they are working on improving their math skills, finding other standards by which to support and facilitate student success.

Theoretical Summation

Overall, the findings of this study do not suggest support for Clark's (1960) cooling-out theory, particularly that his five key features of cooling-out are functioning to deter developmental students at MVCC. While it is evident from data from the school and interview participants that many students who place into soft landing or into developmental courses are exiting school and not continuing to pursue their college ambitions, this attrition does not appear to be related to advising practices at MVCC. Due to the existing attrition among developmental students at MVCC, it is possible that these features may be functioning in other practices within the college, but those practices are beyond the scope of this study. Overall, these students do report feeling supported in their ambitions and are not being discouraged away from their degree and career choices. The advisors are working to support the academic aspirations of students, and policy changes at MVCC also indicate that the school as a whole is deliberately implementing new practices within enrollment and testing designed to help students successfully achieve their goals.

The finding that the behavior of staff members at MVCC, particularly advisors, is directly contradicting the five key features of cooling-out is significant because it suggests that advisors are not key agents of student attrition as originally suggested by

Clark (1960). New methods of advising developed after Clark first proposed his theory may be more effective in retaining students than in previous advising practices. Advisors appear to play an important role in supporting student goals and motivating developmental students to persist in school, however based on the information shared by the Testing Center Coordinator, potentially a thousand or more students each year never talk to an advisor after receiving their placement scores. Cooling-out therefore may still be occurring, but not within advising. Getting students to meet with an advisor is therefore an important factor in student retention. Although the theory does give room to critique the overall process of placement as a feature of cooling-out, it does not include student interactions with testing center staff, a key piece to the cooling-out puzzle that warrants further interrogation. If advising practices can change from a cooling-out function to one that works directly against cooling-out, then perhaps other institutional practices, such as within the Testing Center, can similarly be amended to help more students achieve their academic goals.

These findings do not mean that Cooling-out is not happening at MVCC, however. Student attrition among developmental education students remains a challenge for community colleges such as MVCC. What these findings suggest is that outside of advising, there are other institutional practices impacting student success and the study data do not fully answer what institutional practices may contribute to cooling-out outside of the enrollment, testing, and advising process. Additionally, an update to the theory may provide more relevant ways to interrogate how cooling-out manifests in these practices.

Factors Impacting Student Participation in the Math Bridge Program

Because student attrition at MVCC remains an issue and does not appear to be happening through the Cooling-out mechanisms that Clark (1960) identified, it is important to examine reasons beyond the five key features of cooling-out that could help explain why soft landing students might be leaving school instead of utilizing the Math Bridge program to help them through their math sequences. In addition to the analysis of the five key features of cooling-out, several other key themes emerged that may help to illuminate why some students choose to enroll in the Math Bridge programs and others do not. These themes can help to expand the theory to understand additional factors outside of the five key features that contribute to the cooling-out of developmental students. Although the theoretical analysis did not find support for cooling-out among the study participants, the fact remains that there is still significant attrition at MVCC, and completing a degree is still a struggle for academically under-prepared students. These themes speak to some of the factors beyond the key features of cooling-out discussed in the theory that may be impacting developmental student retention, particularly why students who need the Math Bridge might not choose to enroll in the program and may instead leave school after taking the placement test or struggling with developmental math. The five key themes that emerged are academic self-awareness, motivation, time, cost, and need for information.

Academic Self-Awareness

The first major theme that emerged among study participants is academic self-awareness. All of the students who were interviewed had a solid understanding of their

current math skill level when they decided to enroll in college. Some of the participants opted not to take the placement test because they already knew they would need help in math before attempting a college-level course. None of the participants who took the placement test reported being surprised by their low math test scores.

Because they knew that they would need help in math, several students opted not to take the placement test and instead enrolled directly into the lowest-level math course, MAT050. Adam had already taken a placement test at another school, so he did not feel the need to retest. Patricia just felt that she was not yet ready for the math portion of the placement test and decided to delay taking it. For some students, the decision to skip the placement test was based on the number of years it had been since they had taken a math class. Brad talked about what led to his decision skip the test:

I just signed up. Because yeah they have-- I just signed up. Depending on, like for me I've been out 40 years, so I went back to talk to my counselor. My counselor and I just talked about it and thought it would probably be best if I just take 050 because I really don't remember much of algebra. In my lifetime I really never used algebra. Finding X, Y, and B and all that stuff I've really never-- so that's why I took it.

Brad was not the only student who shared this sentiment. Tyler's awareness of his own math skill level is a major factor that influenced his decision to enroll in community college rather than a four-year school. According to Tyler,

Knowing that I was going to struggle with at least one subject, knowing it would be math, I figured I needed to go somewhere where I could, kind of, take a credit

here and a credit there and make sure that I don't, you know, totally blow a semester at a four-year school when it's really expensive.

The academic self-awareness of the students who opted out of the placement test helped these students be comfortable with the idea of needing a college-prep math course before enrolling in college level courses and is a likely factor that helped to keep them in school rather than cooling them out of their ambitions. These students reported that they knew that taking a refresher course would be beneficial to them in the long term and did not feel stigmatized for needed developmental math.

A similar level of academic self-awareness was found among the students who did take the placement test. "I went into it with, to be honest with you, with just a very low expectation for myself, because like I said, I'm just not a math person," said Tyler, who had struggled on the placement test. Cindy was likewise unsurprised by her scores. According to Cindy, "I think it was kind to be expected -- I just hadn't done any type of real math for 15 years." Jackie also knew that math was a challenge for her, stating "From about, I mean, I'm not a math person, I think that's putting it nicely. Barely scraped in the first time I took the classes." In addition to not being surprised by their scores, the students were largely not disappointed by them. "I knew I was rusty in math, so I didn't feel bad," said Karen, "Everyone has their strengths and weaknesses, and math happens to be one of my weaknesses." Furthermore, these students saw their test scores, not as a setback, but as an indicator of what they already knew. Despite not testing well in math, these students were not discouraged in pursuing their degrees. Adam, for example, framed his testing experience in a positive light:

I wasn't surprised because I knew when I took the math test and I was like, wow, I couldn't answer one question. Science was over my head. The English I did well. I'm doing well on my English class here now. So I mean, I was okay. It was just my math and my science. I knew I'm going to have to sharpen up more.

The awareness of their math skill levels helped these students persist rather than being cooled out because they already knew that they would need help in math before the placement test and were still motivated to pursue a degree. These results suggest that the students who are likely to persist through Math Bridge and developmental math are the ones who are already aware of and who have accepted their current math skill level.

Several comments from student participants who opted out of the placement test also speak to their academic self-awareness. For Adam, he had opted into MAT055, and knew on the first day of class that he was not ready for it. Adam shared this experience and what led him to the Math Bridge:

And then when I got into math that's when I knew I was over my head. So we tried to put me in a lower class - I think I was in 055 - so I went to 050 but still the term got too far deep on the second day. So I sat in there for a couple of minutes, and I said, 'Nah, this is still way over my head.' And I said, 'You know what, I think I need that Math Bridge class.'

Adam correctly assessed his own needs for additional help in math, which led him to enroll in the Math Bridge program. After completing one session of the Math Bridge, Adam knew he was still not quite ready for MAT050, and decided to sign up for another

Math Bridge session first. Bill also had a similar experience to Adam that demonstrated his acute awareness of his math skill level. According to Bill,

So going into pre-algebra, I mean, that first week I was in class, I mean, a lot of it was like Japanese. It was. And one of my friends, who's also going to college for the same reason, that I worked with, he found about the Math Bridge. He told me about it. I figured, 'Yeah, that would be a useful tool for me.' So that's why I take the Math Bridge, just because I've been out of math and never taken algebra and pre-algebra. I was thinking I could use all the help I can get.

Adam and Bill's statements echo the experiences of the other students who had enrolled in MAT050 and then realized they were not yet ready for that class. Each of the students who had originally enrolled in MAT050 was aware on the first day review that they were not fully academically prepared to take that class.

Academic self-awareness is an important theme that emerged with the student participants because it demonstrates student attitudes towards their skill levels in math. Because these students already knew that math was a potential hurdle for them, they were able to accept it as a challenge to overcome rather than a barrier to success. This appears to be an important mindset for students to be able to visualize their success and persist through their math sequences rather than being cooled out by the need for additional math courses. Students who are less aware of their academic needs may be more discouraged upon learning that they need developmental education before enrolling in college-level courses. Further understanding of the role of academic self-awareness and which practices further discourage less academically self-aware students could add to the

cooling-out theory as one of the factors that retains developmental students rather than cooling them out of their college aspirations. This could be a factor impacting student attrition, particularly after placement testing, and suggests a need for new interventions after testing to prevent the cooling-out of students who are discouraged by their placement scores.

Bandura's (2006) theory of human agency helps to explain the role of academic self-awareness in student decision-making processes. A key component of agency is self-reflectiveness, where people are able to reflect on their own thoughts and behaviors and use this reflection to make any necessary corrections to achieve their goals. Based on this supposition, students who are able to cognitively reflect on their own academic skill levels will accept their academic difficulties and take the actions necessary to overcome this difficulties, such as by signing up for the Math Bridge program. Students who are less self-reflective may not have the same skill level in turning their thoughts into this type of corrective action. Additionally, Bandura notes that people who have high levels of self-efficacy are more optimistic and are more likely to take deliberate actions to achieve their goals, which may help explain why the student participants who reported optimism about their chances of college success took the step to enroll in the Math Bridge program despite their placement scores or perceived need for additional help in math.

Motivation

In addition to being academically self-aware, students who chose to enroll in the Math Bridge program also demonstrated a high level of self-motivation. In order to

succeed in college, students must be able to visualize themselves doing so. Although each student in the study reported different factors influencing their motivation levels, the common theme among the participants is that something in their lives, whether intrinsic or extrinsic, was motivating them to persist, despite being at the developmental level in math.

There are several reasons why students felt motivated to succeed in college. Cindy, for example, said that she was motivated by her experience as a first-generation college student, stating, “One of the reasons was, I guess because no one in my family has gone to college and graduated. And there's kind of this cycle I wanted to change. So it's really important to change.” Kelly reported that being able to overcome her mental health struggles helped give her a mentality to succeed:

I think that everything that I've been through thus far has definitely put me in a different mindset. If you had asked me-- if all this had happened to me last year, I'm not sure that I would have kept going, but through everything that's happened through-- I mean, honestly, I go to therapy every week because it's put me in a different state of mind. I was more apt to-- okay, so this is a step back, but this doesn't have to be the end. Oh, here's another step back. This doesn't have to be the end. You know what I mean? Whereas, like I said, a year ago it might have sent me into a total meltdown, and I would have just been like, ‘Whatever, I'm not doing it.’ Through everything that's happened, I'm definitely different because of it. And so that's made it easier to progress, I guess.

Adam found motivation his first semester of school while reading the textbook for his AAA109 academic skills class:

I was reading my book last night and it was on motivation. Self-motivation and such. So I could relate to these are the guys that-- they would start talking about in one area, and I said, 'Oh, that sounds like me.' And it said, 'You're the guys that do this and don't succeed.' And then I said-- when I read the other side and it was, 'You're the guy that would succeed.' I said, 'Well, that's me too.' I said, 'It just matters if I want to apply myself.'

While each student participant had different goals and different motivations for reaching these goals, each one had something influencing their will to succeed and each felt that eventual success in their degree programs was attainable. This level of motivation appears to be a critical component helping to keep these students progressing through their programs despite the potential roadblock of needing to bring their math skills up to college level.

In addition to sharing some of the factors influencing their motivations, these students shared some advice for students who may feel discouraged by their need for developmental courses:

Kelly: I would just say, in general, don't get discouraged, you know what I mean? I think that, like you said, a lot of people come to obstacles and they're like, 'Oh, forget it.' I would say keep trying because had I not kept trying I would still be struggling. Probably with only one eyeball left in. But yeah, just don't get discouraged. It can happen, I think.

Karen: Don't let fear stop you. It's okay to ask for help. You can do this.

These positive attitudes about success appear to be highly motivating these students to succeed. Similar to the views presented regarding academic self-awareness, these students seem to view their developmental status as a challenge that can be overcome rather than a barrier to success. Because placing students into remediation is one of the mechanisms that Clark (1960) says cools out students, these positive attitudes about developmental placement appear to be working against the cooling-out process. Students who choose to leave school when they do not place into a course in math may be ones who do not have these same levels of confidence in themselves and in their academic abilities. This suggests a need for more understanding of the motivations of developmental students who persist and what types of mindsets may be holding back the ones who do not, which could shed more light on some of the factors impacting which students are cooled out and which students are retained. Greater knowledge in this area could help clarify which institutional practices are impacting student motivation and prevent the further cooling-out of students who do not share this level of motivation.

The role of motivation in student decision-making can also be explained by Bandura (2006). As stated previously, those who are optimistic are more likely to display self-efficacy by taking intentional steps to reach a goal such as students signing up for the Math Bridge program to help them reach their college-level math courses. Additionally, Bandura notes that humans display self-reactiveness by making plans and taking deliberate steps to achieve their desired future rather than sitting back and waiting for the outcome to happen on its own. The students in this study appear to be highly self-reactive

in that they were motivated to create action plans and see those plans through rather than abandoning their goals. The students who are not motivated to persist after learning that they need developmental courses may not have this same level of self-reactiveness.

Time

The next major theme that emerged that may explain why some students enroll in the Math Bridge program and others do not is time. Findings from students and advisors indicate that students often report a sense of urgency to complete their programs as quickly as possible, and tend to be discouraged when anything delays their progress. These delays could function to cool students out of their college ambitions. Developmental courses automatically delay students in their college-level math sequences at least one semester, and the Math Bridge course, if not taken concurrently with developmental math, can further delay students in their progress by at least one semester.

Several of the student participants expressed their sense of urgency to complete their degrees. Karen, Adam, and Kelly all said that they felt that they were at a point in their lives that they could no longer delay a college education in order to reach their career goals. Adam explained two of his main reasons for deciding to earn a college degree:

Well, one is there's-- I've got to have it. There's no way around it. Two is my age.

At my age I can't procrastinate any longer on what I want to be when I grow up.

For Adam, the degree is not only necessary for his future nursing career, it is also imperative that he not wait any more time to pursue the opportunity.

Like Adam, Desiree also expressed a feeling of urgency to complete her degree. Because she eventually wants to earn a Ph.D., any delay in her progress is a significant setback. Desiree explained her displeasure at finding out that she would not be graduating as quickly as she thought she would be because of needing a developmental math course:

Well I'm supposed to graduate in December, but when I talked to the first counselor it was originally going to be graduating in summer, and then when I found out that I'd have to take another math course, 055, that would put me out to spring 2018 so I just wanted to not waste any more credits, not waste any more money and just graduate as soon as possible.

Desiree's statement speaks to the pressure that students often feel to complete their degrees as quickly as possible so they can move on to their other goals.

For Jackie, time was also an issue in that she was struggling to balance all of her obligations. She felt that there was not enough time for her to have a larger course load, which would help her progress more quickly through her program. Because of her struggle finding the time to complete her course work and negotiate her outside-of-school obligations, she reduced her course load to just the Math Bridge program and her AAA109 class. According to Jackie,

It's just a lot in a short period of time. And I only did the AAA and the math parts. I don't know if maybe just like, you know, a four hour class or something to kind of ease you into that a little bit because it was very overwhelming at first. I think I've kind of got where I don't feel like I'm totally sinking, but I still feel like I'm just kind of keeping my head above water, just with two. So just kind of, you

know and they said for every credit hour is so many hours of study time and that sort of thing. I haven't been able to figure out how people are doing that. How are you working full-time, going to school part-time, and you have a family, and keeping up even with what to do, let alone getting the assignments done?

Jackie's perception of time suggests another reason why some students might not take the step to enroll in the Math Bridge program. They may find that it is difficult to keep up with the program and their other courses.

Additionally, students may not want to take any course or program that does not count towards their degree progress. Students who are delayed in their degree are less likely to graduate than those who are not delayed, and the longer a student stays working on a degree, the less likely that student is to graduate. This is especially problematic for students who are required to take additional semesters to complete their developmental course sequences, which is why developmental students are less likely to graduate than non-developmental students. As a result, developmental students who learn that they need to participate in the Math Bridge program in order to work their way into college math are more likely to be cooled out of their ambitions. Although the Math Bridge program is designed to accelerate students through the developmental math courses, it may actually serve as an unintentional mechanism of cooling-out.

Although these students felt a sense of urgency to complete their degrees, they did feel that the program was a worthy time investment. Several of the students, such as Patricia were considering enrolling in a second session of the Math Bridge:

It's been a great experience for me. The instructor has good concern for students and didn't make me feel like I was stupid. I don't know if I am ready for the placement test yet though...I might take another practice test first, and if I still need help I will probably do the bridge program again.

Echoing this sentiment, students such as Bill, Brad, Adam, and Desiree all felt that the program was a valuable time investment and were considering enrolling it in for another session. One of the reasons students report that an additional session is valuable is that the ALEKS program assesses their current skill levels and uses that to generate the lesson content. The program is also self-paced so students can work through areas they struggle with most and skip over skills they have already mastered. This means that students who participate in the Math Bridge program multiple times are building new skills each time rather than repeating content they have already learned. The Math Bridge sessions are also 5 weeks each, which means a student can participate in the program multiple times in one semester without being delayed any additional semesters more than they already have by needing the program. This finding is important because time to completion can be a barrier for students, yet the students in this study are willing to devote a semester of their time to the Math Bridge program because they understand its value in helping them move more quickly into their college-level math. This suggests that the students who view the Math Bridge as a potentially time-saving program are less likely to be cooled out of their ambitions than those who view it as an unnecessary delay in their degree progress.

In addition to the student perspectives on time, the advisors also acknowledged it as a potential barrier to student success. Several of the advisors spoke about how discouraged students reported feeling when they realize they have to take additional courses that will delay their progress. One advisor spoke about the sense of urgency that students have when they come in to discuss their degree plans;

You know, students are all about, 'Well what's the quickest way I can finish this degree? How much time is it going to take me to finish this degree?' I never answer that question for students because it's up to each individual student. If they fail a class, obviously they're going to have to repeat it. If they test into 050, that's going to add some time to their program. The students are always trying to know, 'How do I get out of these classes?'

The advisors explained that because community colleges are often referred to as two-year colleges, students report feeling immense pressure to complete their degrees in two years. However, the advisors noted that most students who complete typically take at least 3 years to finish their degrees and it can be detrimental to students to feel a need to rush through their programs. In order to complete an Associate's degree in 2 years, a student would have to take 15 credits a semester for four semesters. Not all students can handle that large of a course load every semester, particularly those who have other life obligations such as jobs, families, and military service. These obligations outside of school may prevent students from being able to accommodate a full course load, and may hinder their class performance, thereby delaying their degree progress. Students who are delayed in being able to complete their degrees may end up becoming discouraged about

their prospects of graduating, or may exhaust their financial aid before being able to finish their required courses. These factors can contribute to students dropping out of school without having completed a degree, thereby cooling some students out of their goals.

In addition to the factors noted above, the advisors shared how a student's major can impact the length of their college experience, particularly students in STEM or medical fields that require a long math course sequence. For example:

I think the hardest part-- not necessarily for math because students typically will accept their low-level placement in math and they are not eager to get into high level math or things that have math prerequisites unless they're a student who wants to take science that has math prerequisites. That can be difficult if they're a nursing major and they can't take general college biology because of their math score so you have to kind of explain to them that these classes are meant to help them be successful in their next level and not to prolong their time here in their program.

Another advisor shared a similar perspective:

The biggest challenge has to do with their major. For example, the pre-med or engineering students when we have that conversation of, 'okay you need to get through Calculus III and it's going to take you seven semesters.' So those are generally the hardest conversations because they get overwhelmed that they need that much math and it's going to take that long. It can be a barrier in the sense it delays some of their classes. So it's harder when you have those longer majors

versus someone who needs Career Math or Statistics. It's definitely harder for them to kind of swallow that when they realize, 'Oh I have nine semesters of math after this.'

According to the advisors, when students find out how many semesters of math they are required to complete and how long it will take them to get through their math sequence, they often say they are discouraged about their prospects of ever graduating. That many semesters of math may seem an impossible task. Adding developmental math and the Math Bridge on top of the existing math requirements is often discouraging to students who hope to finish quickly. These courses are not for credit and do not count towards a student's degree plan, so students often try to find ways to bypass these courses even if they are necessary to building that student's skill level.

To help students navigate the time issue, the advisors attempt several strategies. One advisor said that she gives students options for other classes they can progress through while they work on math so they are not feeling delayed in their program. For example, while a student is working through their math sequence, they can be progressing through their other core requirements such as English, history, arts, and electives. Another advisor tries to help students understand that the most important thing is for them to have a manageable course load rather than trying to rush through and taking on more courses than they can handle. These strategies are important because they could help counteract the cooling-out of students who feel discouraged by delays in their degree process.

The sense of time to degree completion is an important factor that may help explain why more students do not take advantage of the Math Bridge program and why some students are cooled out of their college ambitions. Because it does not count towards their degree and they earn no college credit for it, many students view it as something that will further delay their progress rather than something that may help them progress more efficiently through their math classes. The delay that students face in enrolling in their college-level math classes may be an unintentional mechanism of cooling-out. Although the new math course sequence and the Math Bridge program are intended to help students get into college math more quickly, students who view the program as an unnecessary delay may be cooled out of their desire to continue in school. Both students and advisors reported a sense of urgency to complete their degrees as quickly as possible. For most of the students in this study, the Math Bridge was a necessary step towards success. For some, it even accelerated their progress, such as Bill and Brad who were progressing smoothly through MAT050 thanks to the Math Bridge, and Karen, who was able to bypass developmental math altogether thanks to the program. This important theme showcases a need to reframe the perception of time and course progression for developmental students so they view developmental courses and the Math Bridge as helpful rather than harmful to their degree progress. This would help the Math Bridge program become a more efficient pathway to student success rather than a mechanism of cooling-out.

Another important consideration for the role of time in student decision making is Bandura's (2006) concept of the role of forethought in human agency. Bandura argues

that people are able visualize the future and anticipate potential outcomes of their actions. The students in this study all appear to be quite aware of their future goals and the future steps required to achieve those goals. Although the Math Bridge program and developmental math courses may add more time to their degree progress, they are nevertheless able to understand what their specific path to success is and which actions they need to take to realize this desired future. The students who report being discouraged when they realize how long it will take them to complete their math sequences, may be less able to visualize themselves as achieving this desired future and based on Bandura's propositions, would therefore be less likely to be motivated to take the steps to achieve this future. This could further explain why some students participate in the Math Bridge program and others abandon their college ambitions before doing so.

Cost

Another major theme that emerged during this study is the cost of programs such as the Math Bridge. Like the previous theme, this one illuminates why some students may be discouraged from participating in the Math Bridge program. For the students who participated in the study, the \$55 per-session cost of the Math Bridge program was a worthwhile investment. For students who do not enroll in the Math Bridge program, cost may be a key discouraging factor.

According to the participants, cost was an important consideration for them when enrolling in college. For students like Bill and Brad, the fact that the government was paying for their tuition through the workforce program was a major motivating factor for them to enroll in school. Many of the participants noted that they chose to start their

college careers at MVCC because it was more cost-effective than other schools. Jackie also noted the importance of funding in her decision making:

About school in general - No, once I knew the money was there, I kind of figured out what to do from there. Just for me, I wasn't going to take out loans and go into debt, so that was really step one for me. But if I couldn't get the funding, I wasn't going to do it.

Because cost is an important consideration for students enrolling in college, it is also an important consideration for students who need supplementary courses that do not count for college credit, such as developmental education and the Math Bridge program.

Despite their acute level of cost-consciousness, when the student participants shared their thoughts on their investment in the Math Bridge program, they felt that it was worth the money. Several students commented on their feelings towards the cost of the Math Bridge. Kelly, for example said that if she had known about the Math Bridge prior to enrolling in MAT050, she definitely would have opted for the Math Bridge instead:

Because I probably would have just done the Math Bridge, even though it was a course that I paid for, it was totally worth it. I never would have made it through that class without it, I don't think.

Brad reported that he felt that the Math Bridge program was very reasonably priced, stating “Oh, yeah. Fifty five bucks is nothing.” Bill likewise said he felt the course was a worthy enough investment that he was planning to take the course a second time:

I was talking to my friend that I take the Math Bridge with now, and I think we've both decided that we still need it, so we'll be doing it again. Which says a lot for

the Math Bridge program. If I didn't feel that it was beneficial I wouldn't waste my time and spend the extra 55 bucks to do it again.

Like Bill and Adam, Cindy said that they felt that the course was worth the money and she felt it would save her more money in the long run because she is planning to skip MAT055 and save on the tuition for that course. According to Cindy,

I decided to try this route obviously to save money was the initial reason why I jumped into it. And then it ended up being just a really great program I feel. Not only helped save me money, but really wrapped my head around it before I dove into the process.

As to why some students might not enroll in the Math Bridge program despite its low cost compared to the tuition costs of developmental courses, Tyler had this to share:

I think a lot of college students who are looking at the cost of things are actually only interested in, 'I'm only going to pay for what I'm going to have, what's going to benefit me on my transcripts.' I would hope though, that guidance counselors are able to skirt around that one and tell them, 'Hey with your scores, you really, really should consider it,' and if it's still 55 bucks, I'm afraid it is worth the investment ten times over.

These perspectives are critical to understanding the motivations for students who decide to enroll in the Math Bridge program. Those who view it as an investment and a potential cost-saving decision are the ones who are willing to enroll in the course. The fact that the Math Bridge costs money yet does not count towards a student's degree may be a deterrent to students who would benefit from taking the course, which could ultimately

lead to the cooling-out of these students. Students who choose not to enroll in the Math Bridge program may not see the potential long-term cost savings that the program can provide, particularly if it enables them to skip their developmental math courses. These findings suggest a greater need for students to understand the true costs and benefits of the decisions they make regarding their paths through college.

The role of cost in conversations about the Math Bridge program is important to understanding the cooling-out process. Clark's (1960) theory does not directly address the role of college expenses as mechanisms of cooling-out, however the cost of the Math Bridge program may be one of the ways in which MVCC is unintentionally structuring student attrition. If the cost of the program is viewed as a burden for students rather than something that can save them money in the long term, students may be discouraged enough to abandon their academic aspirations. The Math Bridge is designed to be an inexpensive option for students to either skip developmental math or only have to take one developmental math course, which would save students money in the long term and is far more inexpensive than the cost of tuition for the original four course math sequence. Although the cost of the program intends to help retain more students, it could unintentionally cool out students who are not made aware of its value.

The cost of the Math Bridge program is also an important factor in Bandura's (2006) propositions about the role of forethought and self-efficacy in the theory of human agency. Like with their perceptions of time, the student participants seem to be looking at their potential future outcomes when deciding to enroll in the Math Bridge program. These students reported viewing the cost of the Math Bridge program as an investment

towards their long-term goals, indicating a strong degree of forethought. They were able to visualize their future and use the Math Bridge fee as an investment in realizing that future. This also speaks to the self-efficacy of these students. Bandura notes that people with high self-efficacy will see obstacles as conquerable when faced with difficulties. While the cost of the Math Bridge program is an obstacle, the students with high self-efficacy will not let this cost be a barrier to their success. This may explain why some students are not participating in the Math Bridge program. Students with low self-efficacy may view the cost of the Math Bridge program as an unsurmountable obstacle and will give up on their college ambitions because of this barrier.

Need for Information

The final key theme that emerged outside of the theoretical framework is the need for information. This, perhaps more than any other of the themes, may be the greatest contributing factor to why some students who could benefit from the Math Bridge program do not choose to enroll in it. Put simply, students are not made aware of the existence of this program early enough in the enrollment process. This is problematic not only for students who may be immediately discouraged by their test scores and leave school without meeting with an advisor, but also for those who decide to opt out of the placement test and into a developmental math course.

Of the ten student participants in the study, seven of them started in MAT050 or MAT055, either because of their placement test scores or because they decided to opt in. All seven of these students did not know about the Math Bridge program at the time they enrolled in MAT050, and all seven of them said that they struggled in their math course

from the very first day of the class. Six of these students learned about the Math Bridge program from their math instructors, and one learned about it from a friend in his math class. Of these seven students, four ultimately enrolled in the Math Bridge after dropping MAT050, and three enrolled in the Math Bridge concurrently with MAT050. The other three students took a different path to finding out about the Math Bridge. Patricia had not yet seen an advisor or taken the math placement test; she found out about the program when she contacted the tutoring center for help. Karen found out about the program after testing poorly on the placement test several times and ultimately contacting the math department after her visits to the tutoring center were unsuccessful in helping her improve her placement scores. Cindy, who was the only student to find out about the program from an advisor, shared how she found out about the program:

They told me that I had to start off of course at the bottom and then work my way up. And then, she actually kind of just-- cause at that time when I asked her about re- testing, and she had told me that I could write the school board and all that kind of stuff and plead my case but, you know, and they're pretty firm and not letting people retest. And then she kind of dropped the Math Bridge out there but it wasn't anything that she was really like, 'This is what you could do, this is what you could do to retest or this is the chance you have to retest,' and really push it. She kind of threw it out there as like, 'This will help you.' I don't know, it was just kind of a casual thing.

Although Cindy did learn about the program from an advisor, it was at first only casually mentioned, and she said her advisor did not make a concerted effort to sell her on the

program and its benefits. It is unclear why this advisor only made casual mention of the program since Cindy was clearly in need of additional support to prepare to retake the placement test. This kind of omission and lack of effort to give specific information about the program could be impacting student retention, particularly among those who are frustrated by their placement test scores and are seeking help with retesting. Although Cindy was not cooled out by this experience, other students may be.

Several key findings emerged from the study participants to explain why so many students who need the Math Bridge program are not enrolling in it. First, prior to the combination of testing and advising into one department, there was little communication between the Testing Center and advising, which means that students who took the placement test and received scores stating that they do not place into a math class were often not told that the Math Bridge is an option for them unless they took their test scores to an advisor. The advisors likewise reported little communication between these two departments, though they did have a Testing Center liaison who would communicate changes within those departments. One advisor summarized these relationships:

So we do have one of our advisors is considered the testing liaison. So she is always the one at the meetings, she's the first one to communicate any changes to the scores or any of the processes. So that definitely helps because we didn't have that prior to this year; we just kind of communicated down from the leadership, but now that we have that liaison we're always up to date with the testing center. Math Bridge, not directly because I know Workforce Development has kind of been reshaped and revamped.

Another advisor noted that communication between advising and testing had been limited prior to the merger, but was slowly improving:

So it's been really nice because we're all actually in the same office now since they did the remodeling down at the [main campus name] and now we're actually in the same office. So it's nice to be able to-- now that we're all in one department and we all kind of answer to one director. It's nice to kind of be able to walk over, I mean being able to walk over and ask questions. And so I think it's just kind of fortified that relationship that we've always had. I think, I mean, I have always had a good working relationship with testing and so I think it has just, kind of, made that even better that we're all in one department now. So it's nice that the Advising has gotten training on how to type in exemptions and show a test which is something that we have haven't done before. We haven't been able to do that before. So that's nice. And then Testing has learned some of the Advising pieces. So we're kind of starting to integrate our services, which is really nice.

According to the coordinator of the Testing Center, although the Testing Center employees were trained in how to help students interpret their test scores, they typically referred students to the advisors for additional support rather than discussing options with them inside the Testing Center. After the merger of the Testing Center and advising, there has been more communication within the two departments, and the Testing Center does have copies of the Math Bridge flyer. Additionally, the Testing Center coordinator reported that their employees now have more extensive training on how to discuss test scores with students and transition them to their advisors. Because this merger has only

been in place since January, it remains to be seen how these changes will ultimately impact Math Bridge enrollments.

Another key reason why students may not immediately learn about the Math Bridge is that both testing and advising use a placement matrix to determine course placement. Students who test below the threshold needed for developmental math are recommended into the Math Bridge program, but students who bypass the placement test or who test into MAT050 or MAT055 are not informed about the program because the placement matrix does not suggest that they need it. Even students who do place into a developmental math course may still need additional support, but may not be informed about the Math Bridge program because of their placement scores.

In addition to not being informed about the Math Bridge program at the Testing Center or within their initial advising sessions, students are also not told what concepts they need to already know before enrolling in MAT050 or MAT055. This can be especially problematic for students who bypassed the placement test and opted directly into developmental math. These students may be enrolling in a course they are not yet prepared for. When asked about whether or not students are told what these courses cover, one advisor said,

No, the only things that we give them is the course description in the catalog, which is very vague and kind of foreign language to anyone if you're not confident in math, so I would think it would benefit students a lot to have the math faculty develop some sort of sweet, little paragraph that explains how do you know that you're ready for math 050 or how do you know that you're ready

for math 055. Something like that versus if you know that you're not ready for this, it may be that Math Bridge may be a better option because some students, I think, are just relying on that it's the lowest level of math so they go into it thinking, 'Well I'm at the lowest level so I think I'll be successful,' and that may not always be the case because it's a combination of two developmental math classes, kind of.

Because students have demonstrated an awareness of their own academic needs, it is reasonable to assume that they would be able to assess their own readiness for a developmental math course if given more information about what these courses cover and what they need to know before these courses in order to be successful in them.

One of the most salient issues that happened with student participants is that the majority only found out about the Math Bridge program after struggling with their developmental math course. Each of these students reported that they knew that they were not ready for the class on the very first day of the course when the instructor was reviewing material they should know. Several students spoke about this experience:

Adam: The professor come in late, but 10 minutes of his lecture, and he said, 'But I don't have to tell you all that because you all know that part already in the math process.' And I was like, 'Well, no.'

Kelly: They placed me into math 050. I was not ready for math 050 by any means. It's been years, like 15 plus years, since I had taken any kind of math course of any kind. I ended up dropping the first-- I started to take it in the summer of 2016. That was a bad idea, taking it in the summer, because it's a more condensed class

and because I had no background for it. She went over the first part of it like it was a review, and we're just going to run right through this because you guys know this. I didn't know any of it. None of it. And I panicked and ended up withdrawing, but then they told me about the Math Bridge class, which helped me tremendously, immensely, because it was a review of things that they assumed that I had known. And I might have known them at some point, but right now I did not know them. Or, right then. I didn't know them at all.

Jackie: I was after the first night of the review because I was not ready to take that class. Because I was lost after about 10 minutes, and I just thought, 'I'm in trouble, and if I don't understand the reviews, then it's not going to get any better.'

After struggling on the first day of the class, the majority of these students spoke to their instructors, who gave them the information about the Math Bridge program. None of these students had heard about the program prior to this encounter with their instructors. Of all of the students who participated in the study, only Cindy learned about the Math Bridge program from an advisor, who only mentioned it casually to her rather than giving her detailed information about it. Other participants, such as Tyler and Karen, learned about the program after contacting the school directly to ask for help. Although it is unknown how many other students drop developmental math after the first class session, it is likely that there are those who do drop and never learn that the Math Bridge program is an option for them, leading these students to be cooled out of their college ambitions.

Each of the students who struggled in their developmental math course expressed frustration about not knowing about the Math Bridge program earlier. These students all

indicated that had they known about the program, they might have opted to do that instead of enrolling directly into a developmental course. According to Tyler,

If had known about that, I definitely would have considered it as an option before taking a risk of failing a class because nobody wants to fail; it's not good for your self-esteem, it's not good for your academic record, and nobody wants to do that. I really would have considered it had I known about it ahead of time.

Jackie and Desiree also felt it would have been to their benefit to find out about the program earlier:

Jackie: Because from talking with someone in the math department, she's like, 'Yeah, even if you test into it, you probably want to start at a level below that.' And we're talking about my English. So that would have been helpful to know before I bought the book, and everything for the math because I probably would have done that on my own anyway-- just knowing some of them I can figure out without necessarily even understanding what I'm doing, if that makes sense.

Desiree: I was a little disappointed that I didn't find out about it earlier because that would've saved me from having to waste credits and financial aid. But I'm glad it's there cause if you're in a situation like me where you're too advanced to be in the course you need to be to get into the course that you should take, it helps you to with getting the skills you need to retake the test to get into the class that you need to be in.

These sentiments not only reflect a need for information, they also echo earlier findings about students being sensitive to the time to completion and cost of their college

educations. These students said that they feel that knowing about the Math Bridge program earlier could have saved them both time and money, issues that collectively may contribute to the cooling-out process by creating barriers to success for these students.

As to how and when students wish they had learned about the Math Bridge program, the general consensus is they wished they had found out about it in their first advising meeting rather than finding out about it elsewhere. For Bill, he felt that knowing about it beforehand would have helped him through the early parts of his MAT050 class:

I would say for especially people like me that haven't been to school in many, many years, and they could use a little extra help, especially with the one-on-one type time that you get doing the Math Bridge, I think it would be good to inform people, whether it be through your student advisor or something that your math instructors can tell people about because I had to ask my math instructor if she thought it was good, but she teaches that so. She said 'yeah if you think that you need the help and the extra practice,' then yeah it would be a good thing for me. She kind of pushed me a little bit too. But yeah, if [Brad] hadn't found out about it, we probably both would be struggling. I think it would be a good idea to have the advisors or the math instructors let people know the first day of class that we're going to dive right in and do stuff.

Several other students indicated that they felt the advisors had more of a responsibility to tell them about the program. Some even reported feeling that the advisors might not have been aware of the program and that is why they were not told about it at their advising appointments. For Jackie, she said that she felt that even though she tested into MAT050,

it would have benefitted her to know that the Math Bridge program was an option she could utilize for additional support:

And that should be included in the advising had they've gone over the placement scores with you. You scored here, this is what we recommend, but this is another option for you to consider if you don't really feel very confident going into Math 050.

Desiree and Karen also said they felt that advisors needed to be more informed about the details of the Math Bridge program:

Desiree: I would definitely suggest that all of the advisors talk and get same information. So if I'm seeing one advisor, and I have questions, they're not getting frustrated and sending me off to another advisor.

Karen: Advising needs to know about this. If I had known about it earlier, I definitely would have taken the Math Bridge instead of wasting my time failing the placement test over and over.

These students all reported feeling that their advisors were unaware of the Math Bridge program. Yet, when interviewed, all of the advisors knew about the program. The disconnect does not appear to be due to the advisors' knowledge of the program, rather it appears to be how the advisors are assessing who needs to be told about it. Because the advisors are relying on a placement matrix to guide their recommendations and because they are trying to help students get through their math sequences, they are recommending students into courses that they might not yet be prepared for.

The unintentionally withholding of information from students is a critical piece of the enrollment, testing, and advising process at MVCC that could be contributing to the cooling-out of developmental students. Students who would benefit from the Math Bridge program, but never learn about it may abandon their college ambitions without knowing that this valuable resource was available to them. Because a large number of students never talk to an advisor after taking the placement test and because advisors are relying heavily on a placement matrix that only suggests the Math Bridge program for certain students who test poorly, it is likely that there is a significant number of students being cooled out of their academic goals by these practices. Clark (1960) notes that cooling-out is largely an unintentional structuring of failure for students. This withholding of information appears to be an unintentional consequence of the placement matrix and the opt-in option; advisors are attempting to enroll students in the highest-level course possible to help them progress more quickly through their degree programs, not realizing that these students are not academically prepared for a class like MAT050. Although the theory does not specifically discuss the withholding of information as a mechanism of cooling-out, this lack of access to information is likely one of the forms of structured failure that Clark references in the theory.

Bandura's (2006) theory of human agency also helps to explain why this need for information is so critical to student success. Bandura notes that people make intentional choices to realize their desired goals, and that they do not always make these decisions independently. Making strategic decisions often involves collective agency, wherein people pool their knowledge and resources to help each other. In the case of students in

the Math Bridge program, the people that students encounter during their college careers are critical to them being able to exercise collective agency. If students are not being told about the Math Bridge program by people such as Testing Center staff and advisors, they do not have access to the necessary information to make intentional decisions. Some of the students in this study used their self-efficacy to reach out directly to contacts at the college to seek out the information they were looking for about where to get extra help in math. Without this use of self-efficacy, these students may never have learned about the program. For other student participants, Bandura's fortuitous events played a role in how they learned about the Math Bridge program. These students happened to hear about the program from their math instructors or from a friend in the class. Had they not been fortunate enough to encounter people who told them about the program, they might never have known of its existence. Given these results, it is likely that there are students struggling in math who do not have the self-efficacy to directly seek out the information they need or who did not have the fortuitous event of encountering someone who could tell them about the program.

Summation of Additional Themes

Although this study did not uncover evidence of Clark's (1960) key features of Cooling-out at MVCC, it did uncover several important factors that are influencing students' decisions to enroll in the Math Bridge program. The students who enrolled in the program were highly academically self-aware and motivated to succeed. They were not discouraged by their need for additional support in math because they already knew they would need help and viewed it as a challenge that could be overcome rather than a

barrier to success, demonstrating a high degree of both self-efficacy and self-reflectiveness. This may not be true for students who abandon their college ambitions after the placement test. Students who are disappointed and discouraged by their scores may never make it to an advisor or any other staff member who can give them the motivation and encouragement that they need. The students in this study also saw the time and cost value of the program, feeling that ultimately these investments would help them to be successful in school. This viewpoint demonstrates clear forethought and intentionality of choice among these students. For students who choose not to enroll in the Math Bridge program, the time and cost of the program may be a barrier. A program that costs money and takes five weeks to complete may not appeal to students who are looking for the quickest and cheapest way to complete a degree. The biggest barrier, however, appears to be that students are simply unaware of the program and often do not find out about it until after they are already struggling in a developmental math course. The students who did find out about the program did so through either demonstrated self-efficacy and fortuitous events. Findings suggest several reasons why students who need the Math Bridge program never enroll in it and are instead abandoning their college ambitions.

Although these additional themes are not directly part of Clark's (1960) key features of cooling-out, they nevertheless help to understand how cooling-out is manifesting in other ways among developmental math students. Students who persist through their math sequences despite their need for the Math Bridge program and developmental math appear to have high levels of self-awareness and intrinsic

motivation. These qualities may help explain why some developmental students are cooled out of their ambitions while others are not. This opens the door for expansion of the theory to understand why some students persist despite the mechanisms of cooling-out present in community colleges. Furthermore, these themes illuminate what mechanisms of cooling-out might exist outside of Clark's existing theory. Time, cost, and a lack of relevant information all factor into student success and persistence. The cost of the Math Bridge program can be a financial barrier for some students, particularly those who are unaware of the potential savings it provides by eliminating their need for multiple semesters of developmental math. The time investment in the Math Bridge program also helps to accelerate students through or past developmental math, but many students may see it as an unnecessary delay in their progress towards a degree. While not designed as mechanisms of cooling-out, both time and cost may function as such, albeit unintentionally. Perhaps the most salient finding in these themes is the lack of information that students receive regarding the Math Bridge program. Advisors and the Testing Center do not appear to be intentionally withholding this information; rather, they are discussing the Math Bridge program only with students with low placement scores, not realizing that those with higher scores or those who opted out of the placement test would also benefit from this program. Students who never find out about the Math Bridge program cannot benefit from it and may be cooled out of their college ambitions as a result. While these findings do not contradict the cooling-out theory, they do suggest a need for its expansion to fully understand some of the key factors influencing student retention and persistence.

Summary of Findings

Although this study set out to determine whether soft landing is another mechanism of cooling-out of community college students, these findings do not suggest that cooling-out is happening through the mechanisms identified by Clark (1960). Based on the interviews with students and staff at MVCC, Alternative Achievement, Gradual Disengagement, Objective Denial, Agents of Consolation, and Avoidance of standards are not salient practices at MVCC. Instead, the school and its staff appear to be actively working to support students in their academic aspirations rather than channeling them away from these goals. This does not mean that cooling-out is not happening at MVCC, as attrition does remain an issue, but it does not appear to be happening in the ways that Clark identified.

Because cooling-out through Clark's (1960) mechanisms does not appear to be occurring at MVCC, it is important to understand what else might be happening within the institution to impact student success rates. For soft landing students, academic self-awareness, motivation, time, cost and a lack of access to information all appear to be impacting which students persist through the Math Bridge program and who does not. The messages that advisors are giving students do not appear to be hindering student aspirations, but the information that the advisors are not giving to students about the Math Bridge could be, which means that cooling-out could still be manifesting within the testing and advising practices at MVCC. Bandura's (2006) theory of human agency underscores the importance of self-efficacy in making intentional, goal-driven choices, which also helps to explain why some students are participating in the Math Bridge

program and others are abandoning their college ambitions. These findings suggest critical components impacting student enrollment in the Math Bridge that will need to be addressed if student success is to be fostered more efficiently at MVCC.

CHAPTER SIX: DISCUSSION

In this chapter I discuss the meanings and implications of the findings of this study. First, I review the ways in which this study did or did not answer the research questions and how these findings connect to the current literature. Second, I discuss implications of the findings of this study including implications for practice, theory, emerging theory, and both institutional and public policy. Third, I offer practical recommendations for changes at MVCC. Fourth, I discuss suggestions for future research related to the topic of this study.

Research Questions

Research Question 1: What do students who place into “soft landing” experience during the testing, advising, and enrollment process?

This is a complex question to answer because the experiences of these students vary greatly. Originally, MVCC had a linear process for enrollment. Students would fill out the application, take the placement test, see an advisor, and sign up for classes. Recent changes at MVCC have created different pathways for students through this process. Therefore, students are having unique experiences, although there are similarities across these experiences.

Students at MVCC access enrollment information in a variety of ways. Students may get information from people they already know at the school. They can also access

information on the website. Other students contact the school directly over the phone or in person. Regardless of method of contact, these students were all given the information they needed to successfully complete the initial steps in the enrollment process.

Because of the new opt-in option for developmental courses, soft landing students are experiencing the testing and placement process differently. Students who are below a high school math level take the placement test and receive a “no placement” result indicating that they are not yet ready for developmental math. Other students place into a developmental math course despite not yet being academically prepared for it. Soft landing students who might have received a “no placement” result but decided to bypass placement and opt directly into developmental math often find themselves struggling in the course early on and are likely to drop out. Although these placement experiences differ greatly, the most salient theme among these experiences is that while students are given more freedom of choice in their college paths, they are not always given access to all of the information necessary to make the best choices for themselves. This can leave students feeling frustrated and discouraged about their academic futures.

The changes MVCC has made in the testing and placement process for incoming students are in alignment with the current literature surrounding the inaccuracy and stigma of placement testing. Because placement tests do not always accurately measure college readiness (Armstrong, 2000; Asmussen & Horn, 2014; The National Center for Public Policy and Higher Education, 2010), MVCC is offering new options for student placement, such as the placement testing exemptions and the opt-in for developmental courses. The college’s decision to change from the Accuplacer to the CCPT and back to

the Accuplacer reflects the uncertainty of what type of placement test is the best choice to determine college readiness and how to align these standards across state curricula (Dougherty & Reid; Flores & Oseguera, 2013; Wilson, 2012). These changes within MVCC are a clear contributor to the differing student experiences and demonstrate the uncertainties reflected in the literature about which placement practices are most effective.

Students at MVCC also navigate the advising process differently. Some choose to see an advisor before taking the placement test or deciding on a degree path. Other students postpone seeing an advisor, choosing instead to navigate the enrollment process on their own. Most students appear to still choose to see an advisor after either taking the placement test or opting out of it. Overall, students have positive experiences with their advisors, who are encouraging of their academic and career goals and provide both emotional support as well as practical guidance on course selection. What appears missing in this experience is a more detailed discussion between students and advisors about the student's academic skill levels and the options that are available to them beyond what their placement scores may have suggested. Students are often left struggling in developmental math courses because they were not made aware of what they needed to know before enrolling in these classes. A discussion of the Math Bridge program is largely missing from these conversations, leaving students unable to access information that may help them be more successful.

The positive interactions developmental students at MVCC are having with their advisors are important because of the strong impact advising can have on student success

(Grubb, 2001). These encouraging experiences are particularly important for developmental students, where advising can be challenging (Grubb, 2001; Hollis, 2009; Moore, 2005). Rather than being steered into vocational programs by their advisors as some of the literature suggests (Clark, 1960; Grubb, 2001), these students are being encouraged in their current academic and career goals. However, because developmental math students are not always being provided with information about the Math Bridge program by their advisors, their performance in school could suffer as a result. This lack of information could be due in part to the fact that advisors rely on an advising matrix that might not suggest that a particular student needs the Math Bridge program, or it could be the result of students not always sharing their specific academic needs with advisors as Moore (2005) suggests.

Research Question 2: What role does placement into “soft landing” play in the academic aspirations of community college students?

This question became somewhat difficult to answer due to the new testing and placement practices at MVCC. Based on information from the Testing Center Coordinator, it does appear that students who receive a “no placement” test result may be discouraged by this outcome and leave school before learning about soft landing options such as the Math Bridge program. This finding is supported in the current developmental education literature that suggests that students who place into developmental courses often feel stigmatized and discouraged by these results (Deil-Amen & Rosenbaum, 2002). Additionally, because of the minimal communication that has taken place between testing and advising, many students are not given information about the Math Bridge

program at the Testing Center and have to see an advisor first. This is important because as mentioned earlier, effective advising is key in retaining developmental students (Grubb, 2001; Hollis, 2009; Moore, 2005). If a student never makes it to an advisor, that student may never learn about the Math Bridge program. Placement into soft landing likely discourages the academic aspirations of some students, causing them to abandon their dreams of achieving a college degree.

The introduction of the opt-in option for developmental courses has also shifted the role of placement at MVCC. While students must still test high enough to place into a college-level course, they may choose to bypass the placement test and opt directly into a developmental course. This change could be both beneficial and detrimental to students. For students who choose to opt into a developmental course, it could remove the stigma of placement test scores suggested by Deil-Amen and Rosenbaum (2002), Deil-Amen (2011) and Hellmich (1993), and leave students feeling more empowered in their choices. Rather than feeling discouraged by their placement, students may appreciate the autonomy to choose which class they feel ready for and not feel as if they are somehow “less than” their college-level peers. If students who opt into these courses can successfully complete them in one semester, they can also save themselves time and money and move more quickly into their college-level courses. This accelerated pathway is critical to student success because existing research suggests that the longer a student spends trying to get into college-level classes, the less likely that student is to graduate (Adelman, 1998; Attewell, Lavin, Domina & Levey, 2006; Asmussen & Horn, 2014; Bahr, 2012; Bettinger & Long, 2009; Kowski, 2014). However, this new policy could

have some negative consequences for students. Students who opt into developmental math may not yet be academically prepared for these classes. As Moss, Yeaton and Lloyd (2014) suggest, students who are on the threshold between college-level math and developmental math perform better if they first take developmental math. It stands to reason that the same would be true for students who take the Math Bridge before enrolling in developmental math. If these students struggle early on in what is officially the lowest-level math course that MVCC offers (MAT050), they may feel as if they are not capable of being successful in college. Also, the students who drop MAT050 or MAT055 after struggling may never learn about the Math Bridge program and how it can help them be successful in these classes.

Overall, the students in this study who participated in the Math Bridge program found it to be an asset to improving their math skills and were not discouraged by their need for it. These students demonstrated a high awareness of their academic skill levels and likely would have chosen to participate in the Math Bridge program earlier had they known about it before they attempted MAT050. Among the students who took the placement test, none were particularly disappointed or discouraged by their scores.

These findings suggest that placement into soft landing can complicate the academic aspirations of students. However, the bigger issue may be how the school communicates the meaning of the placement and the options for students rather than the placement results themselves. A testing printout that says “no placement,” the limited communication between testing and advising, lack of information about the Math Bridge program after placement, and the way that the testing center employees are

communicating with students about their placement scores are all factors that could impact whether students choose to stay in school or leave. This may be an unintentional mechanism of cooling-out that deters students from continuing with their college plans. Although these practices are not directly part of Clark's (1960) key features of cooling-out, they could offer a valuable extension to the theory. Changes to these practices may be necessary in order to ensure that MVCC is doing everything that it can to support students in their academic aspirations.

Research Question 3: What role does advising play in the academic aspirations of community college students placed into “soft landing?”

Based on the findings of this study, advising appears to play an important role in the academic aspirations of students who need the soft landing option in math, consistent with the existing literature highlighting the importance of effective advising for developmental students (Grubb, 2001; Hollis, 2009; Moore, 2005). Advisors serve not only as a gateway to information about the degree programs and their requirements and facilitator of building student schedules, they also provide counseling and support for students' academic and career ambitions. Overall, advisors appear to have a positive impact on students, however there may be some negative impacts as well.

Based on the findings of this study, it appears that advisors are actively encouraging and supporting the academic aspirations of all students, including those in need of the soft landing option for math. Experiences from both students and advisors suggest that the advisors are not trying to disengage students from their ambitions and instead are attempting to help students succeed regardless of their current academic skill

levels. This encouragement is important because it helps to prevent students from being tracked away from their ambitions, as is sometimes the case with developmental students (Crisp & Delgado, 2014). Even in more math-heavy fields such as the STEM fields, the advisors are telling developmental math students that they can be successful in those fields. Some advisors did acknowledge that conversations with students about other degree options are sometimes necessary, however these conversations typically only happen after students have exhausted all other options to bring them to the academic skill level needed for their current majors.

From the student perspective, advising also appears to be a supportive process. Although some students in the study had decided to change majors, none did so at the encouragement of their advisor and none had decided to change to a lower-level credential as Clark's (1960) theory and Grubb (2001) suggest. The decisions students made to change majors were due to outside factors such as life changes or expanded career options. Most of the students in the study felt that the advisors were supportive of their goals and effectively helped them to navigate the enrollment process. These encouraging conversations are key to student success because as Bahr (2008) suggests, advising can have a positive impact on developmental math students and this effect is the most positive among students who are the least prepared, which in MVCC's case includes the students in need of the Math Bridge program. The students in the study did not discuss much in the way of emotional support from their advisors, but this could be due to their own intrinsic motivations and lack of a need for such emotional support.

Although overall advisors seem to be a critical component in supporting the academic aspirations of students, some issues came to light in this study that could negatively impact these aspirations. First, advisors appear to be relying greatly on the placement matrix to determine the best courses for students, and therefore may be recommending that students enroll in courses that they are not yet ready for. This is a critical finding because any form of misadvisement is particularly damaging to the success of developmental students (Hollis, 2009). Advisors do not appear to be having conversations with students who opt into developmental courses about their skill levels and whether or not they are academically prepared for these courses. Additionally, because there are vague course descriptions for developmental math courses, the advisors may not have access to the information necessary to effectively recommend the best classes to students. Advisors also are limiting conversations about the Math Bridge programs to students with “no placement” test scores rather than sharing information about this program with all developmental math students. These practices may negatively impact the academic aspirations of some students, particularly those who struggle early on in developmental math classes because as Hollis (2009) suggests, advisors not only need to be emotionally supportive with developmental students, they also need to be specific and detailed when advising students and help students connect with support services on campus when needed.

Research Question 4: What roles do placement into soft landing and advising play in the “cooling-out” function of community colleges?

Despite the interesting and important findings of this study, this remains a challenge. Cooling-out is difficult to determine because it is an unintentional mechanism of community colleges, and there are multiple factors that ultimately influence student outcomes (Clark, 1960). While this study did not uncover evidence of the features of cooling-out identified by Clark, it did uncover critical information that may be impacting student attrition rates, particularly among soft landing students.

Placement into soft-landing does appear to be potentially consequential for student persistence. Hundreds of students each semester are leaving MVCC after taking the placement test, and one of the reasons why this is happening could be that students are discouraged by their placement scores, which is consistent with the literature regarding the stigma of developmental placement (Deil-Amen & Rosenbaum, 2002; Deil-Amen, 2011; Hellmich, 1993). The “no placement” results that students receive in the Testing Center could be a highly discouraging message for students, leading them to feel that they are not college material. Additionally, many of these students never make it to an advisor after receiving their test scores, suggesting that they may not be given emotional support or vital information about resources such as the Math Bridge program within the Testing Center itself. Because effectively advising developmental students is critical to their success (Bahr, 2008, Grubb, 2001, Hollis, 2009; Moore, 2005), it is important that students be connected with advisors after receiving their placement test scores. Students who do not talk to an advisor after taking the placement test appear to be less likely to continue in school than those who do meet with an advisor. Therefore, placement into soft landing can be a detriment to student success, ultimately leading

some to be cooled out of their ambitions. The introduction of the opt-in option may help to retain more students, as it removes the stigma of soft landing or developmental placement. However, its long-term impact on student success has yet to be determined.

For students who do need the soft landing option and ultimately decide to pursue it, the Math Bridge program appears to be keeping students from being cooled out of their ambitions. Students are able to utilize it either concurrently with a developmental math course, to test out of a developmental math course, or to prepare for a developmental math course. Although the math Bridge program is not officially a developmental course, it functions much like a developmental course in that it prepares students for higher-level math skills. To that end, this program's success does support the existing literature about the positive impacts of extra academic preparation for students who need it (Attewell, Lavin, Domina, & Levey, 2006; Bettinger & Long, 2005; Weissman, Silk, & Bulakowski, 1997; Kowski, 2014; Moss, Yeaton & Lloyd, 2014). The current success of the students who participate in the Math Bridge program suggests that it is effectively helping to retain more students. However, the low participation levels in the program suggest that some students may be cooled out without ever enrolling in it. Additionally, while the students who participate in the program are enrolling in college math more quickly than before the redesign, it is too early to know whether this program is effective in improving graduation rates among developmental math students. Because participation in developmental courses has been shown to improve retention from the first year to the second, but does not necessarily lead to student completion (Bremer, Center, Opsal, Medhanie, Jang & Geise, 2013; Esch, 2009), it is unclear whether or not the Math Bridge

program helps to prevent the eventual cooling-out of developmental math students. The early outcomes of the program, however, are promising.

Contrary to the impact of placement testing, students at MVCC do not appear to be cooled out of their ambitions by their advisors. In contrast, advisors appear to be supporting students' academic aspirations and giving them guidance that encourages them in these endeavors rather than trying to move students away from these aspirations, which directly contradicts the features of cooling-out suggested in Clark's (1960) theory. Soft landing students who decide to change their academic ambitions are merely moving to another major at the same degree level, and are often doing so for personal, rather than academic reasons. The advisors adopt the mindset that any student who is motivated enough can be successful and that students should be supported in their ambitions. This may mean that if students are being cooled out of their ambitions, it is happening for reasons outside of interactions with advisors.

Practice-Based Implications

There are several important implications of this study. First, since student attrition among developmental math students remains an issue and advising practices do not appear to be a major factor in the cooling-out of these students, it is clear that other mechanisms within MVCC are factoring into this attrition. Throughout this study I have identified some of the reasons that soft landing students may be abandoning their academic ambitions, but there are likely other factors within the college as well such as life factors outside of the classroom, interactions with faculty, access to academic support services outside of the Math Bridge program, and interactions with other students, among

others. These additional factors were not a significant part of this study, yet they still have implications for MVCC in terms of areas for future research and interventions to improve student success. In this study, I focused specifically on the initial stages of the student experience and how these impact student participation in the Math Bridge program. It will be important for MVCC to uncover what additional factors influence student success after students have completed the Math Bridge program.

Another major implication focuses on placement practices at MVCC. If students are being discouraged by their placement test scores, then more students may be lost at MVCC if placement practices and communication within the Testing Center remain the same. The introduction of new options to bypass placement testing may help mitigate some of the issues caused by student reactions to placement scores, however there will still be students who take the placement test and receive disappointing results. Additionally, the combination of Testing and Advising could have a positive impact on communication between these two entities and could help move students more smoothly between them without losing as many students along the way.

In addition to the placement practices and MVCC, another key implication is the outcomes for those students who are not informed about the Math Bridge program. If testing and advising staff members continue to use the same placement matrix to determine their course enrollment recommendations and which students to inform about the Math Bridge program, more students who either opted in or were advised into developmental math courses may end up struggling in MAT050 or MAT055 and leave school without ever learning about and participating in the Math Bridge program.

Students who are not informed about what they need to know in order to be successful in these courses will likely continue to enroll in classes for which they are not yet academically prepared.

Students not learning about the Math Bridge program could also be problematic for the program itself. This lack of informing students hinders enrollment in the program. Sections of the Math Bridge program have been canceled in the past due to low enrollment, and this valuable program may not be sustainable if more students do not enroll. Students may also not realize the value of investing time and money in such a program because of the way that it is advertised to them. Since students are now able to opt into a developmental course and bypass Math Bridge, its enrollments could be further impacted as a result.

A final practice-based implication of this study is the mission of community colleges themselves. Because community colleges serve multiple functions, it can be challenging for them to meet the various needs of all of their students. It is important for schools such as MVCC to determine what their intended goals are and what they need to do to effectively meet these goals. If degree and credential completion are to remain as two of the key components of MVCC's mission, then the implementation of developmental education programs, advising practices, and testing practices should be closely examined to determine the ways in which they might be revised in order to effectively achieve this mission.

Theoretical Implications

This study also has significant implications for Clark's (1960) theory. Although it is still true that developmental students in community colleges struggle to succeed and developmental education is a barrier to student success, the theory does not explain the breadth of changes over time to the practices within community colleges. The theory of cooling-out may still have merit, but it is in need of a serious update. Some needed areas of change or expansion of the theory include modern advising practices, current financial aid practices, attitudes towards vocational fields, changes to placement testing procedures, and the role of modern technology in the community college student experience.

First, Clark's (1960) theory relies heavily on advisors as some of the main arbiters of cooling-out, but that does not appear to be happening at MVCC. New models of advising have emerged since Clark first put forth this theory that have significantly changed how advisors are impacting student success. Advising practices may be more effective in retaining developmental students today than they were in Clark's time. The theory needs to be amended in order to accommodate these new practices.

Second, while Clark's (1960) theory includes a number of different mechanisms of cooling-out, it does not account for modern institutional practices. The high cost of tuition today compared to Clark's time is greatly impacting the success of developmental students, particularly when they have to pay for courses that do not count for credit towards their degrees. The results of this study show that cost is often a deterrent for students who want to pursue a college degree. Additionally, the theory could be expanded

to include the role of time to completion delays, such as the need for remediation, as part of the Gradual Disengagement process and the costs associated with these delays. The theory would benefit from an addition that covers the role of tuition costs and financial aid practices in the cooling-out experience.

In addition to changing advising practices, Clark's (1960) theory does not account for changing perceptions of career and technical education fields. The cooling-out theory largely centers on the channeling of students from transfer fields to vocational non-transfer fields. Clark paints vocations as inferior to other degree fields. Today, however, students can earn associate's degrees in career and technical programs rather than just certificates. At MVCC, for example, associates degrees are available in fields such as Automotive Collision Repair, Culinary Arts, Wildland Firefighting, HVAC, Machining Technology, and Welding. Some of the VCCS colleges are even preparing to offer baccalaureate degrees in some career and technical fields. In Clark's time, students transferring to these programs may have been seen as a step down, however today they can lead to highly lucrative and fulfilling careers. Although it remains important for students to be supported in their intended academic and career goals, the theory should be amended to give career and technical education a more positive view and students who switch from a transfer degree to a non-transfer degree should not be considered as cooled out as long as the degree level does not change. The theory could accomplish this while still viewing overall attrition and the channeling of students from degree programs to certificate programs as part of the cooling-out process.

Another valuable expansion to the cooling-out theory is the inclusion of current placement testing practices and their role in cooling-out. While placement testing is included in Clark's (1960) theory as one of the phases of enrollment that impacts cooling-out, the theory does not include modern changes to the testing process such as testing exemptions. Additionally, while the theory heavily discusses the role of counselors in the cooling-out process, it lacks the inclusion of the role of communication between testing center staff and students. A strong addition to the theory would include the interactions of testing center staff with students after they receive their placement test scores and the role this plays in shaping students' academic ambitions.

While Clark's (1960) theory is clear in some of the types of mechanisms that function in the cooling-out process, the theory does not account for what factors help underperforming student succeed in college despite these structured systems of failure. Factors such as student academic self-awareness and intrinsic motivation could be helping students to overcome these systemic barriers to success. More insight into these factors would add value to the theory, and help future scholars understand new ways to combat the cooling-out process in community colleges.

Another key change that has happened within community colleges since Clark (1960) first proposed the cooling-out theory is that student demographics have changed dramatically since this time. In 1961, 63% of college students were male and 37% were female, whereas in 2016 enrollments were 57% female and 43% male (National Center for Education Statistics, 2016b). The age of students has also increased dramatically in the past several decades, as larger numbers of older adults are enrolling in college. In

1970, adults 35 and older accounted for 8.9% of the total college student population, which rose to 18.7% by 2016 (National Center for Education Statistics, 2016a). In addition to sex and age, there have been major shifts in the racial demographics of college students. In 1976, 82.6% of college students were white, 9.4% were Black, 3.4% were Hispanic, and 1.7% were Asian or Pacific Islander. By 2014, these percentages had shifted to 55.6% White, 13.8% Black, 15.7% Hispanic, and 6.2% Asian or Pacific Islander (National Center for Education Statistics, 2015a). These shifts are significant for Clark's theory because while the theory does include underprepared students as the primary targets of cooling-out, it does not account for the role of student demographics in the college preparation process. Because Black and Latino students are overrepresented in developmental education, the theory should be updated to reflect how education privileges some racial groups over others. Additionally, the theory should consider the impact of the aging of the student population, and how cooling-out might manifest among older students who may be in need of refresher courses.

A final needed update to the theory is the role of modern technology in the college student experience. Students at MVCC are accessing information about the school and its services in a variety of ways, and the use of college websites and email communication likely shapes their experiences and perceptions. The theory should be updated to account for the ways in which modern communication media utilized by community colleges are impacting student ambitions and success. This would include both the information that students are accessing as well as the information that might be withheld from students intentionally or unintentionally. Indeed, the theory still has merit

because unintentional mechanisms within community colleges are continuing to hinder student success, but the theory is in need of an update that weighs it against current practices and institutional changes within developmental education in community colleges.

Implications for an Emerging Model

Although Clark's (1960) cooling-out theory is still a valuable tool for analyzing the mechanisms in community colleges that may be impacting student success rates, the findings of this study also lay the groundwork for a new framework to study the experiences of developmental education students. The rival codes and findings that contradict the suppositions in Clark's theory give room to create a model of analysis that addresses mechanisms outside of the features of cooling out that are impacting student success. Drawing on Bandura's (2006) theory of human agency, this framework could build a method of analysis of understanding the agency exercised by developmental education students specifically.

This new framework would utilize the emergent themes of academic self-awareness, motivation, time, cost, and need for information to add understanding to the factors that influence developmental student decision-making as they navigate the early stages of their college careers through their developmental courses. This new model would also include the stigma of developmental education placement and the role that this stigma plays in this decision-making, as that is not a concept broadly addressed by the existing literature. Additionally, the model would offer space to examine specific intentional community college practices like the VCCS developmental education

redesign and how these practices are influencing the student decision-making process.

This new framework would be a strong supplement to Clark's (1960) theory, as it would not only provide a way to understand additional barriers to student success not included as part of the cooling-out process, it would also provide valuable information about what factors are aiding student success. Knowing this would give community college policy makers valuable information to make intentional decisions about which practices would be most effective in helping developmental education students to achieve their goals.

Institutional Policy Implications

The findings of this study not only have strong implications for practices at MVCC and for Clark's (1960) theory of the cooling-out of community college students, they also have broad policy implications for the VCCS and other community colleges across the country. First, as many community colleges across the United States are revising their developmental education programs to improve student outcomes, the practices and outcomes of the developmental education redesign at MVCC could serve as a model for what does and does not work for developmental education. Although there is no one-size-fits-all approach to developmental education, as seen in the different ways the VCCS schools are implementing the redesign, there is still value for policymakers in looking to what other schools are doing and what the outcomes of those changes are. Likewise, the VCCS policymakers may continue to use inspiration for other state redesigns as they modify their own developmental education programs.

Second, the findings of this study have broad implications for how schools negotiate major changes within their developmental education programs. At MVCC, the

developmental education redesign has been shown to have some unintended consequences for its students and these consequences are potentially increasing developmental student attrition. The experiences of students in the redesign at MVCC demonstrate that policymakers should consider the unanticipated outcomes of broad policy changes such as the developmental education redesign. This could help mitigate these detrimental outcomes in future policy changes.

Third, the outcomes of this project have clear implications for how the flow of information manifests during major institutional changes. Often, the work of policymakers happens behind the scenes and is not communicated to students even though they are strongly impacted by these policies. The lack of information shared with students about the redesign is clearly impacting students at MVCC. Students were not clearly informed about the redesign and its rationales and how these changes would affect them, nor did they have any input into the design of the new program. This has led to students not understanding how programs such as the Math Bridge are actually saving them time and money rather than slowing them down as the original developmental course sequence would have. There is a clear need for more transparency between policymakers and students, as well as greater dissemination of information to help students understand these broad policy changes and what it means for their academic careers.

Fourth, this study has significant implications for financial aid practices at community colleges. The onus of funding developmental education often falls on the students, even though systemic forces such as ineffective primary and secondary

education are the reasons for their need for remediation. Students are paying tuition for developmental courses even though they are not at fault for needing those courses.

Although the Math Bridge program can save students money in the long term, students still have to pay for it and MAT050 and 055. The study data and current literature suggest that cost is a barrier for many students and can hinder their academic success, particularly for low-income students who are already struggling financially. It is important for policymakers to consider how developmental courses and assessment preparation programs such as the Math Bridge are funded and whether states or colleges should be bearing this responsibility rather than the students.

Finally, the study findings have clear implications for placement testing practices. Because placement test scores do not always accurately predict a student's overall success in college, policymakers should consider practices such as the opt-in option at MVCC are beneficial to developmental students. Also, because some of the student participants in this study struggled in MAT050 even though they tested into it, the effectiveness of community college testing and placement policies is brought into question. Determining how to effectively place students has long been a part of the conversation surrounding higher education policy, and the results of this study clearly add more insight into that conversation.

Public Policy Implications

In addition to implications for institutional and system policies, the findings of this study also have broader public policy implications. First, the fact that so many college students are still in need of developmental education courses suggests a need for

clearer national standards as to what constitutes college readiness. Although the system studied for this project has made strides to reduce the time spent in remediation and to help more developmental students complete a degree, this need for remediation still persists. There exists a need for a broader national conversation about K-12 to college alignment and whether a set of national standards would help students be more effectively prepared for college level coursework when they enroll.

In addition to the national college readiness standards, the findings of this study suggest a need for broader conversations about placement practices in colleges and universities. There are disparate policies across the nation about whether placement testing should be optional or mandated, leading to inconsistent outcomes among developmental education students. As colleges such as MVCC attempt to reduce placement testing and other schools may be abandoning placement testing altogether, it is important to consider whether there should be consistent national standards regarding placement practices, and whether colleges should be using placement tests or relying on other criteria such as high school GPA.

Not only are readiness and placement standards important implications of this study, there are also strong implications for college funding. Because of the low completion rates of developmental education students, colleges in states with performance funding models may see their funding impacted by their developmental education programs. This type of funding model may not be the best option for community colleges because if schools with high percentages of students in remediation are struggling to help these students complete school, they may not receive the funding

necessary to improve these programs. Nationally, it is important to consider whether performance funding models are the best options for community colleges and whether it is in the best interests of these schools for states to create laws regarding performance-based funding. College funding is also important in light of recent efforts in some states to find the funds to offer free tuition to students, which could help lift the cost burden of students in developmental education. Additionally, it will be important for state governments and lawmakers to consider the potential impact of the new federal government administration and what future federal funding changes might mean for community colleges and developmental education students.

Practice-Based Recommendations

Based on the findings of this study, I have determined several recommendations for the school to consider. These recommendations are designed to give students access to the valuable information they need to make the best decisions for themselves and to encourage more struggling students to take advantage of the Math Bridge program. These recommendations are also suggested to improve communication throughout the enrollment, testing, and advising process.

The first recommendation that I have for MVCC is to provide students with information about the Math Bridge program at the beginning of the enrollment process. This should become a standard practice rather than only disseminating this information to specific students. For students who decide to take the placement test, the Testing Center should distribute copies of the Math Bridge flyer to all students who do not place into a math course so those students immediately know that they have access to help before

they meet with an advisor. Because some students may become discouraged upon not placing into a course, knowing that the Math Bridge program exists may encourage more students to continue with school. It would also be helpful for the Testing Center staff to be trained more on some basic advising practices so that they can be more encouraging to students who are disappointed by their test scores. If the testing software allows it, it might also be advisable to change the testing results output from reporting no placement to reporting placement into Math Bridge or other suggested assessment preparation options. Because some students are opting out of the placement test and would not have access to the Math Bridge flyer at the Testing Center, a link with information could be included on MVCC's placement testing section of the website, particularly on the page that students must visit in order to opt in to a developmental course. This way, students who opt in who might not be ready for MAT050 or MAT055 will know immediately that they have an option for additional support.

My second major recommendation is for students to be given more information about what concepts they need to know in order to be successful in MAT050 or MAT055. The findings of this study suggest that the course descriptions on their own do not give enough detail for students to know whether or not they are prepared for these courses. I suggest a simple handout that explains the requisite knowledge needed for each of these two courses as well as key concepts covered by the Math Bridge program. I suggest that the math faculty members who teach these courses be the ones to generate these descriptions since they are the ones teaching these courses. The handout can be distributed by advisors and math faculty, as well as posted on the MVCC website. I

recommend that students who are choosing to opt into a developmental math course be required to read through the information on the handout before they choose to enroll in one of these courses. If students are going to be given the autonomy to opt into developmental math, they need to be given access to the specific information that will best help them to make an informed decision.

A third recommendation to improve outcomes for developmental students at MVCC is to amend the advising matrix so that students who test into soft landing are not the only ones informed about the Math Bridge program. Students who place into MAT050 and MAT055 can benefit academically from participating in the Math Bridge while they are enrolled in these courses, as some students in the study have demonstrated. Additionally, students who opt into a developmental math course can benefit from taking the Math Bridge as a co-requisite option. I suggest that advisors tell all developmental math students about the Math Bridge program regardless of their placement scores so that these students know that they have access to additional support if they find themselves struggling on the first day of class, as many participants in this study did. This can be as simple as presenting students with the Math Bridge flyer and explaining the program during the first advising meeting as these students are enrolling in their courses for the semester.

Because time and cost have been an issue for some students, my fourth recommendation is that the school more clearly articulate the time and cost benefits of the Math Bridge program to students. Advisors should be able to explain to students the time and money they can save if they participate in the Math Bridge program because it can

help them either pass developmental math on the first try or allow them to bypass developmental math altogether. Ultimately, this could save students a semester or more of time and tuition costs, so students should be made more aware of these benefits. Additionally, the school is currently working on offering Math Bridge sessions at different times and on more campuses, so I recommend they continue the endeavor to provide more choices to students who are considering enrolling.

In addition to these recommendations, the school should track the changes students make to their majors or degree programs to see if any students are moving from transfer to non-transfer programs. Although the Math Bridge program is not considered an actual class at MVCC, it should be included within this pathway tracking to give the most relevant information on student paths. As part of this process, I also suggest that the school interview opt-in students to find out what their motivations were for opting in rather than taking the placement test and compare the success rates of opt-in students to those who took the placement test to determine whether the addition of this option is impacting student success rates positively or negatively.

Future Assessment and Research

This study yielded some interesting results that also generated more questions to be answered in the future. To answer some of these questions, I offer several suggestions for future assessment and research both at MVCC itself and the entire VCCS. This future assessment and research can shed light into some key issues not addressed by this project.

First, the focus of this project was on students who participated in the Math Bridge program. While the findings of this study uncovered some of the motivating

factors relating to why some developmental students stay in school and others leave, this study did not directly address the students who had left. If the school has access to information about students who took the placement test yet did not enroll in college, I suggest the school perform an exit interview study to find out some of the reasons why these students are leaving and generate new ideas for encouraging more of them to stay. This may be difficult due to IRB constraints and limited access to these students, but I feel that it is an important project to clearly answer some of the questions about the impact of placement and advising on students who test into the soft landing option at MVCC or any of the other VCCS schools.

Second, future research should examine overall retention and completion rates among developmental math students. Community colleges, particularly those such as MVCC with redesigned developmental education programs, should directly track the paths these student are taking to completion as well as the paths for students who drop out before completing a degree. This can help pinpoint what the exit points are for students who drop out and what paths are more successful for students who are able to complete their degrees. As an extension to this study, the school could follow up with each of the ten student participants several years from now to determine whether they ultimately graduated or whether they were eventually cooled out of their college ambitions.

Because MVCC is only one school in a large community college system and each school is experiencing different outcomes of the redesign, I suggest a broad study across all VCCS institutions to help determine which practices are successful and which are

unsuccessful, particularly how the schools are addressing the soft landing option for developmental math students. Although each school functions differently and practices at one school might not work at another, it is important for these schools to share information to generate new ideas for policies that can increase student success.

Although there exists substantial research regarding the role of placement testing in student success, there is a lack of research into specific testing center practices and how those impact student outcomes. I suggest future research into the relationship between testing centers and advising departments and how they interact with one another. Within this area of research, there needs to be specific study of how testing center staff are communicating with students in regards to their test scores and how that communication impacts student retention. A study that interviews or surveys students who do not matriculate after taking the placement test would greatly add to our understanding of the relationship between testing center communication and student outcomes.

Another important area of future research that is needed is more insight into the role of stigma in developmental student success. While the participants in this study did not report feeling stigmatized by their developmental student status, there are likely students who do abandon their ambitions due to feeling stigmatized by their developmental course placement. More research is needed into this stigma, particularly if other community colleges redesign in similar ways to MVCC and create potential barriers to accessing developmental classes by implementing programs such as the VCCS soft landing option.

The final recommendation I have for future research, is to update Clark's (1960) theory of cooling-out based on current practices within community colleges. The basic premise of the theory seems to still have merit, but the mechanisms of cooling-out have changed significantly over the past five decades as community colleges have evolved. Using cooling out as one of the frameworks for this study was useful in uncovering specific institutional practices at MVCC that appear to be helping to support students in their goals. More research into the practices of community colleges that are hindering student success can provide new ways of viewing cooling-out and uncover new ideas for how to combat it. One way that this might be accomplished is through additional future research applying other theories to the study of developmental education student experiences, like Bandura's (2006) theory of human agency. More research applying this framework could give new insight into the agency and self-efficacy of developmental education students, which is critical to understanding the types of institutional interventions that could bolster their success. Additionally, this use of Bandura's framework could also add to the research on the role of stigma and what that might mean for the self-efficacy of developmental education students.

Conclusion

This study helps to understand the implications of developmental education redesign for community college students, both locally at MVCC and the VCCS, and across the United States. This study has strong implications for future practice, policy, and research, and adds to the current developmental education narrative. The findings of this project helped to answer the research questions about the ways in which the VCCS

developmental education redesign is impacting students at MVCC. Students in the Math Bridge program experience the enrollment, testing, and advising process in a number of different ways, which demonstrates why it is difficult to create policies tailored to the needs of all students. The introduction of new choices for developmental students is giving them more autonomy over their choices, yet these students are not always provided with the specific information needed to make the most appropriate choice for themselves.

Although in this study I did not find clear evidence of Clark's (1960) five key features of the cooling-out of community college students, I did uncover other themes that help to understand how cooling-out may be manifesting among developmental math students at MVCC. Overall, the students in this study have not shown to be in a cooling-out process, despite their need for the Math Bridge program. Developmental math students at MVCC appear highly academically self-aware and motivated to succeed. These students are also strongly supported in their ambitions by their advisors, and the lessening of objective criteria such as placement testing helps to keep students from being cooled out. However, the time and cost investments of the Math Bridge program as well as the lack of information about the Math Bridge program being disseminated to students may be some of the factors advancing developmental student attrition. Therefore, while cooling-out among developmental math students at MVCC does not appear to be occurring as a result of Clark's five key features, there is evidence supporting that it is happening through other mechanisms at the college.

These findings have clear implications for policy and practice both at MVCC and across the nation, as well as implications for the theory itself. There are new strategies that MVCC can employ to mitigate some of the unintended consequences of the redesign and to encourage more students to take advantage of the Math Bridge program. Policymakers can look to the current practices at MVCC and these findings to further conversations about which institutional practices are most effective in helping to support the success of developmental students. The theory can be updated and expanded to add to this narrative about how to prevent the cooling-out of community college students. Additionally, this study has opened the door to several areas of future research that can contribute to the existing developmental education literature.

Designing a developmental education program is a difficult task for higher education policymakers and institutional leaders. Although community colleges are committed to student success, high attrition rates remain a problem, particularly among developmental education students. Redesigned developmental education programs like the one at MVCC are moving community colleges forward in the process of student retention, but are not universally effective. In this project, I have uncovered some institutional variables that are helping these students to succeed and others that may be holding students back. By continuing to study community college practices that impact student success, schools such as MVCC can hopefully one day see drastically improved outcomes for developmental education students.

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APPENDIX A: INTERVIEW PROTOCOLS

Interview Questions for Students

1. Tell me a bit about your background. What inspired you to decide to enroll in college? Why did you choose this school? What was your intended major and career goal when you first enrolled?
2. When you decided to enroll, what were the first steps you took? How did you learn about the enrollment process?
3. After you took the placement test, what did the testing center tell you about your scores? What advice were you given about how to proceed? How did you feel when you received your scores and learned you did not place into a math course?
4. Tell me a little bit about the first meeting you had with your advisor. What did they say when you showed them your placement test scores? What advice did they give you? What did they say about your academic and career goals? How did you feel about this advising session?
5. What was your reaction when your advisor referred you to the workforce development department?
6. When you first met with the workforce development advisor, what options and advice did they give you? How did you feel during this meeting?
7. What influenced your decision to enroll in the Math Bridge or Adult Basic Education program? Tell me about your experience in the program. How have you felt about this experience?
8. Have your academic and career goals changed at all since you first enrolled? Why or why not?
9. Is there anything else you would like to share?

Interview Questions for Advisors

1. What is your primary role within the college? What would you say is your philosophy of your position?
2. What is your strategy for advising a student for the first time? What are the goals of the first advising meeting? What information about your students is important for you to know in order to advise them effectively?
3. Tell me about what happens when students bring you their placement test scores. How do the scores influence the advice you give? In what ways?

4. Some students do not score high enough on their placement tests to place into a developmental math course. What advice do you give to these students?
5. What are some of the ways that students react upon learning that they did not place into a course? How do you manage these reactions?
6. After the developmental education redesign was implemented, were you given any specific guidelines for how to advise the students who don't place?
7. What communication do you have with the Testing Center or Workforce Development Department about how to transition students through the enrollment process?
8. What do you think is the biggest challenge in advising students who do not place into a course?
9. Is there anything you would like to share?

Interview Questions for Testing Center Coordinator

1. What is your primary role within the college? What would you say is your philosophy of your position?
2. How many students take the placement test each semester? Of those students, how many do not test into a developmental math course? Is there any other data you can share?
3. What information do students receive regarding their scores once they finish the placement test? What does the score sheet say when students do not test high enough to place into a course? What advice are they given on how to proceed?
4. After the developmental education redesign was implemented, were you given any specific guidelines for how to advise the students who don't place?
5. What, if any, training do the testing center staff have for how to advise students after they receive their scores?
6. What is the communication between the Testing Center and the academic advisors or Workforce Development Department to help transition students through the enrollment process?
7. Is there anything else you would like to share?

Interview Questions for Workforce Development

1. What is your primary role within the college? What would you say is your philosophy of your position?
2. How many students are referred to you each semester because they did not test into a math course? Of these students, how many enroll in Math Bridge? How many enroll in Adult Basic Education?
3. What is your approach to advising students who are referred to you?

4. How do students typically react when they learn about the Math Bridge and Adult Basic Education options? How do you manage these reactions?
5. Of the students who are sent to you for math, how many enroll in Math Bridge and Adult Basic Education? How many of these students successfully place into a course after retaking the placement test?
6. After the developmental education redesign was implemented, were you given any specific guidelines for how to advise the students who don't place?
7. What is the communication with advisors or the Testing Center relating to how to effectively advise the students who do not place?
8. Is there anything else you would like to share?

Interview Questions for Developmental Education Task Force Chair

1. Tell me about your role on the Developmental Education Task Force. How did you become involved in the project? What were your primary duties?
2. How was the task force formed? What was the main objective of the task force?
3. What were the main issues in the developmental education programs in the college system that the task force was designed to address?
4. What types of literature and resources did the task force use in its decision making processes? Was the redesign modeled on any existing developmental education programs?
5. Tell me a little about the decisions behind the main components of the redesign. What was the rationale behind the new placement test? The new course sequence? The soft landing option?
6. Which elements of the redesign are system-wide and which were left up to individual institutions? What was the rationale for designing these elements this way?
7. Why did the task force decide to create a cutoff for placing into a developmental course? What did the task force decide should be the options for students who did not place into a course?
8. What, if any, changes have there been the developmental education enrollments and outcomes in the community college system since the implementation of the redesign?
9. Is there anything else you would like to share?

APPENDIX B: RECRUITMENT EMAILS

Recruitment Email for Students

Dear [Name]

My name is Megan Rector and I am a doctoral student in the Higher Education program at the University of Denver and [REDACTED] I am writing to invite you to participate in a research study about the experiences of students who enroll in the Math Bridge program.

You are eligible to participate in this study if you meet the following criteria:

1. Are a degree- or credential-seeking student.
2. Your Math placement test scores placed you into the Math Bridge or Adult Basic Education Program.
3. You enrolled in the Math Bridge or Adult Basic Education program within the last year.

If you decide to participate in the study, we will schedule a time to meet on campus for a one-hour interview. Interviews will be audio recorded and all personally identifiable information will be kept confidential. As compensation for your time, you will be entered into a drawing to win a \$100 Wal-Mart gift card.

Participation in this study is voluntary. If you would like to participate, please email me at megan.rector@du.edu to schedule an interview or if you have any questions about the study. Questions can also be directed to my faculty sponsor, Dr. Judy Marquez-Kiyama at judy.kiyama@du.edu.

Thank you for your time.

Sincerely,
Megan Rector

Recruitment Email for Advisors, Testing Center Director, and Workforce Development Director

Dear [Name]

My name is Megan Rector and I am a doctoral student in the Higher Education program at the University of Denver and [REDACTED]. I am writing to ask for your participation in a research study about the experiences of students who enroll in the Math Bridge program.

As part of the study, I am interested in speaking to key staff members involved in the testing, advising, and enrollment processes. As (an/the) (academic advisor/Testing Center Director/Workforce Development Director) your role can offer valuable insight into the student experience.

Participation in the study involves a one-hour on-campus interview. Interviews will be audio recorded and all personally identifiable information will be kept confidential.

Participation in this study is voluntary. If you would like to participate, please email me at megan.rector@du.edu to schedule an interview or if you have any questions about the study. Questions can also be directed to my faculty sponsor, Dr. Judy Marquez-Kiyama at judy.kiyama@du.edu.

Thank you for your time.

Sincerely,
Megan Rector

Recruitment Email for Developmental Education Task Force Chair

Dear [Name of Task Force Chair]

My name is Megan Rector and I am a doctoral student in the Higher Education program at the University of Denver and [REDACTED]. I am writing to ask for your participation in a research study about the developmental education redesign, specifically students who enroll in the [REDACTED] Math Bridge Program.

I was referred to you by [REDACTED] and suggested that you would be an excellent contact for information about the Developmental Education Task Force and background on the redesign. Your participation in the study would involve a one-hour in-person interview. The interview will be audio recorded and all personally identifiable information will be kept confidential.

Participation in this study is voluntary. If you would like to participate, please email me at megan.rector@du.edu to schedule an interview or if you have any questions about the study. Questions can also be directed to my faculty sponsor, Dr. Judy Marquez-Kiyama at judy.kiyama@du.edu.

Thank you for your time.

Sincerely,
Megan Rector

APPENDIX C: CONSENT FORM

University of Denver Consent Form for Participation in Research

Title of Research Study: Developmental Education Redesign: A Case Study Analysis of the Cooling-out Function of Community Colleges Among Students in Soft Landing

Researcher(s): Principal Investigator: Megan Rector, Doctoral Student, University of Denver

Faculty Sponsor: Dr. Judy Marquez-Kiyama, Associate Professor,
University of Denver

Study Site: [REDACTED]

Purpose

You are being asked to participate in a research study. The purpose of this research is to learn about what students who enroll in the soft landing option for math (Math Bridge Program) experience during the testing, advising, and enrollment process.

Procedures

If you participate in this research study, you will be asked to participate in a one-hour interview. The interview will be audio recorded.

Voluntary Participation

Participating in this research study is completely voluntary. Even if you decide to participate now, you may change your mind and stop at any time. You may choose not to continue with the interview for any reason without penalty or other benefits to which you are entitled.

Risks or Discomforts

Participation in this study involves minimal risks. Potential risks and/or discomforts of participation may include some discomfort with answering questions of a personal nature.

Benefits

Possible benefits of participation include the potential improvement of outcomes for academically underprepared students. The results of this study will be shared with the faculty and staff at PPCC and may be used to improve the enrollment and advising processes for students.

Incentives to participate

For participating in this research project, you will be entered into a drawing for a \$100 Wal-Mart gift card. The drawing will be held when all of the interviews have been completed, which is anticipated to be at the end of the Fall 2016 semester. You will be notified via email of the results of the drawing.

Confidentiality

The researcher will keep all personally identifiable information confidential and utilize pseudonyms to keep your information safe throughout this study. Your individual identity will be kept private when information is presented or published about this study. Only the principal investigator will have access to personally identifiable information. All digital voice files, interview transcriptions, and other data will be kept on a password-protected computer.

The research records are held by researchers at an academic institution; therefore, the records may be subject to disclosure if required by law. The research information may be shared with federal agencies or local committees who are responsible for protecting research participants.

Questions

If you have any questions about this project or your participation, please feel free to ask questions now or contact **Megan Rector** at megan.rector@du.edu or **Dr. Judy Marquez-Kiyama** at judy.kiyama@du.edu at any time.

If you have any questions or concerns about your research participation or rights as a participant, you may contact the DU Human Research Protections Program by emailing IRBAdmin@du.edu or calling (303) 871-2121 to speak to someone other than the researchers.

Please take all the time you need to read through this document and decide whether you would like to participate in this research study.

If you agree to participate in this research study, please sign below. You will be given a copy of this form for your records.

X

Participant Signature

Date