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Acceleration Through a Holistic Support Model: An Implementation and Outcomes Analysis of FastStart@CCD

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Table of Contents

Overview

Originally designed for students who test into at least two levels of developmental education in a particular subject area (math, writing, or reading), FastStart@CCD is a compressed course program model launched in 2005 at the Community College of Denver (CCD). The program combines multiple semester-length courses into a single intensive semester, while providing case management, career exploration, and educational planning services to address challenges facing many students who test into developmental education. FastStart faculty, who receive support through a range of professional learning opportunities, also work to improve pedagogy and course content, with the philosophy that academic and student support services should be aligned and integrated in the classroom. The model provides students fewer opportunities to exit the developmental education sequence and has the potential to leverage expanded class time to diversify instructional activities and build more productive relationships among students and faculty.

This report describes the development of FastStart, its program features, and student perspectives on participating in the program. It also presents findings from a quantitative analysis of FastStart's math program that we carried out to examine student persistence, transfer, graduation, credit accumulation, and enrollment and performance in entry-level college courses. We find that the FastStart math program is associated with higher rates of enrolling in and passing college-level math courses but not with increased persistence or with increased accumulation of college-level credits. FastStart math students, despite progressing at an accelerated pace, seem to emerge from developmental education with a level of preparedness similar to those who took the traditional sequence. Our analysis suggests that FastStart makes it possible for students to complete the developmental math sequence and required gatekeeper math course more quickly than would otherwise be possible, without harming other long-term academic outcomes.

In the conclusion of this report, we discuss considerations for scaling and sustaining FastStart as well as implications for developmental education reform and for the improvement of community college student outcomes more generally.

1. Introduction

Community colleges are in the midst of a far-reaching movement to reform developmental education in response to research over the last decade showing that traditional remediation[1] has generated mixed results (Bailey, 2009; Bettinger & Long, 2005, 2009; Calcagno & Long, 2008; Dadgar, 2012; Hodara, 2012; Martorell & McFarlin, 2011; Scott-Clayton & Rodriguez, 2012). One potential reason for the disappointing results of the traditional developmental system is the length of time required for most students to complete it. A majority of community college students are referred to remediation in math, writing, or reading, and most of those are referred to sequences of two or more courses in the relevant subject (Bailey, Jeong, & Cho, 2010). Multiple developmental courses typically require more than one semester to complete, increasing the probability that students will be diverted by other challenges or obstacles (such as competing priorities at home, employment-related issues, or financial difficulties) before making substantial academic progress in college. Many students succeed within each developmental course they take but exit the sequence before completing it. Thus, the sheer length of developmental sequences may contribute to the fact that only a minority of students referred to developmental education ever complete a college-level course in the given subject (Bailey et al., 2010).

The realization that the length of remedial sequences may itself pose a barrier to completion has led to a growing number of acceleration models that aim to speed student entry into college-level courses. As Edgecombe (2011) describes in detail, acceleration models can include structural approaches that *compress* the sequence by combining two or more courses into one course, or they can *mainstream* students by integrating developmental students into college-level courses while providing them with some additional support. While changes to course structure and organization are typical of acceleration reforms, many accelerated approaches also include improvements in student services and counseling; a few incorporate significant modifications to pedagogy and course content.

[1] In this report we use the terms "developmental education" and "remediation" interchangeably.

In recent years, acceleration reforms focusing on students who test into the upper levels of developmental education or with explicit prerequisite requirements have become nationally recognized.[2] Fewer acceleration approaches explicitly target students who enter college at the very lowest levels of academic preparedness in math or English.[3] In this report, we examine FastStart,[4] a compressed course model at the Community College of Denver (CCD) originally designed for students who tested into at least two levels of developmental education in a particular subject (math, writing, or reading). The program combines multiple semester-length courses into a single intensive semester, while providing case management, career exploration, and educational planning services intended to address the affective and logistical challenges facing most students who test into developmental education. FastStart faculty also work to improve pedagogy and course content, with the philosophy that academic and student support services should be aligned and integrated into the classroom.

We begin this report with a description of FastStart, including a discussion of its history, supports for students, and development of faculty. We then examine FastStart program features that appear to affect pedagogy and discuss students' perspectives on the program. Finally, we describe a quantitative analysis we performed of FastStart's math program[5] to examine student persistence, transfer, graduation, credit accumulation, and enrollment and performance in entry-level college courses. We find that the FastStart math program is associated with higher rates of enrolling in and passing college-level math courses but not with increased persistence or with increased accumulation of college-level credits. FastStart math students, despite progressing at an accelerated pace, seem to emerge from developmental education with a level of preparedness similar to those who took the traditional sequence. In the conclusion of this report, we discuss considerations for scaling and sustaining FastStart as well as the wider implications for

[2]These includes the Accelerated Learning Program (ALP), developed by the Community College of Baltimore County, and Statway, an initiative of the Carnegie Foundation for the Advancement of Teaching. See Cho, Kopko, Jenkins, and Jaggars (2012) for an outcomes analysis of ALP. Information about Statway is available at http://www.carnegiefoundation.org/statway.

[3]Project DEgree (http://www.projectdegree.org/) is a notable exception.

[4] The program's official name is FastStart@CCD.

[5] Although FastStart also includes compressed English and reading courses and linked developmental and college-level courses, the sample sizes for those courses were not large enough for quantitative analysis.

developmental education reform and for the improvement of community college student outcomes more generally.

2. FastStart: A Description and History

FastStart allows students to complete multiple developmental education courses within a single intensive semester. For example, under the traditional approach, a student referred to the lowest level of developmental math (Math 030: Fundamentals of Math) would enroll in that course in his or her first semester and would attend class twice a week for 75 minutes per session. After passing Math 030, he or she could enroll in Math 060 (Pre-algebra) in the following term, also for 75 minutes twice a week. Under FastStart, the same student would enroll in the "paired" course Math 030/060, which meets for two hours and 45 minutes twice a week for one semester. FastStart students must also satisfy a 25-hour per semester one-credit out-of-class lab, a requirement for all developmental math students. To do so, they can use CCD's learning labs (i.e., tutoring center), form study groups (which frequently meet before class and are facilitated by the instructor), or log time using designated instructional software (e.g., MyMathLab).

FastStart is housed in CCD's Center for Educational Advancement (CEA), the college's developmental education division. CEA offers a variety of courses and instructional support services across developmental math, English (writing), reading, and English as a Second Language (ESL). FastStart grew out of a 2004 workforce development collaboration with area employers to upgrade the skills of Certified Nurse Aides to the level of Licensed Practical Nurse (LPN). These workers needed to improve their math, writing, and reading skills in order to qualify for the LPN program. This was achieved through an intensive cohort-based bridge program, which paved the way for replication with CCD's traditional developmental education population beginning in fall 2005.

When FastStart began its pilot phase in fall 2005, it enrolled students across three course section pairings—one section pairing two levels of both English and reading (traditionally four stand-alone courses) and two sections pairing different developmental math courses. Course pairings were taught exclusively by adjunct instructors. Program

staff consisted of a project coordinator, funded at one-fifth full-time equivalent (FTE) through a grant; a full-time educational case manager, who was also supported through grant funds; and student ambassadors, who informally assisted the case manager with administrative duties.

The grant funding that seeded FastStart required evaluation of outcomes, and thus data collection and analysis were essential program management elements from the beginning. These data were made public through a series of reports (see Brancard, Baker, & Jensen, 2006; Bragg, 2009, 2010; Bragg, Baker, & Puryear, 2010), which suggested that FastStart participants outperformed non-participants across various short-term outcomes. A cost-benefit analysis also estimated that FastStart could generate revenue for the college through higher retention rates (Corash & Baker, 2009). Documentation of these early successes increased the profile of FastStart within and beyond the college, and it put the program leadership in a strong position to work with senior administrators at CCD to more fully integrate FastStart into the college both by transitioning the program from grant funding to the college's base budget and by expanding the reach of the program. By 2010, the costs of program coordination, case management, curriculum development, and the majority of ongoing professional development had all been transferred to the general fund.

As FastStart gained institutional traction, the program increased the offerings of popular pairings such as Math 030/060 and Math 060/090, as shown in Table 1. In addition, the program began to pair developmental English (writing) and reading courses with college-level courses. These "learning communities" (see Table 2) were designed to contextualize the skills students learned in English or reading, while supporting students to succeed in reading- and writing-intensive college-level courses. Over time, faculty participation expanded as full-timers began to teach FastStart sections. More recently, funding for the FastStart coordinator position increased to fourth-fifths FTE, and a second case manager was added. Student ambassadors, supported primarily through work-study funding, assist with general office tasks, including preparing the monthly newsletter and collecting and managing program data. In spring 2012, FastStart enrolled 587 students in 22 course sections. Projections for spring 2013 enrollment are between 700 and 800 students.

Table 1
FastStart Developmental Education Compressed Course Pairings: 2005–2012

Course Titles	Course Numbers	F05	S06	F06	S07	F07	S08	F08	S09	F09	S10	F10	S11	F11	S12
Fundamentals of Math/Pre-algebra (5 credits)	**MAT 030/060**	**1**	**2**	**3**	**2**	**3**	**2**	**3**	**2**	**3**	**2**	**3**	**3**	**4**	**3**
Pre-algebra/Introductory Algebra (7 credits)	**MAT 060/090**	**1**	**2**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**2**	**5**	**3**	**4**
Introductory Algebra/Intermediate Algebra (8 credits)	MAT 090/099						2	2	2	1	1	1	2	2	2
Fundamentals of Math/Math Study Skills (5 credits)	MAT 030 & AAA 090										1				
Pre-algebra/Introductory Algebra & Basic Composition (10 credits)	MAT 060/090 & ENG 090													1	1
Writing Fundamentals/Foundations of Reading & Basic Composition/College Preparatory Reading (12 credits)	ENG 060/REA 060 & ENG 090/REA 090	1	1	1	1	1	1	1	1	1	1	2	2	2	1
Writing Fundamentals/Basic Composition & College Preparatory Reading (9 credits)	ENG 060/ENG 090 & REA 090													1	1
Foundations of Reading/College Preparatory Reading & Basic Composition (9 credits)	REA 060/REA 090 & ENG 090			1	1	1	1	1	1	1	1	1	2	1	1
Advanced Composition in ESL/Basic Composition (6 credits)	ESL 053/ENG 090										1	1	2	1	1
Total Number of Pairings		**3**	**3**	**4**	**4**	**4**	**5**	**5**	**5**	**5**	**7**	**6**	**6**	**8**	**8**
Total Number of Sections		**3**	**5**	**8**	**7**	**7**	**9**	**9**	**9**	**9**	**10**	**10**	**16**	**15**	**14**

Note. Bolded course pairings are included in the quantitative analysis presented later in this report. The numbers in the columns represent the numbers of sections of each pairing offered in a particular semester.

Table 2
FastStart Developmental and College Course Learning Communities: 2009–2012

Course Titles	Course Numbers	F 09	S 10	F 10	S 11	F 11	S 12
Basic Composition/English Composition I (6 credits)	ENG 090/ENG 121				2	2	2
Basic Composition/English Composition I & College Preparatory Reading (9 credits)	ENG 090/ENG 121 & REA 090					1	1
Basic Composition & Public Speaking (6 credits)	ENG 090 & COM 115	1	1	1	2	2	1
Basic Composition &Intro to Literature (6 credits)	ENG 090 & LIT 115		1	1	2	2	1
Basic Composition & Intro to Political Science (6 credits)	ENG 090 & POS 105				1	1	
College Preparatory Reading & US History to Reconstruction (6 credits)	REA 090 & HIS 201				1	1	
College Preparatory Reading & General Psychology I (6 credits)	REA 090 & PSY 101				1	1	1
Basic Composition & American Government (6 credits)	ENG 090 & POS 111						1
Basic Composition & Art Appreciation (6 credits)	ENG 090 & ART110						1
Total Number of Pairings		**1**	**2**	**2**	**6**	**7**	**7**
Total Number of Sections		**1**	**2**	**2**	**9**	**10**	**8**

Note. The numbers in the columns represent the numbers of sections of each pairing offered in a particular semester.

Although FastStart enrollment has steadily grown, challenges to scaling the program have emerged. The program enrolls less than half of students referred to multiple levels of developmental education. The program leadership reports that a lack of student demand for FastStart sections, rather than a lack of faculty willingness or availability, is the largest barrier to expansion. Many eligible students have difficulty fitting FastStart's large blocks of instructional time into their college schedules. This may be particularly challenging for part-time students. FastStart's learning communities face the same obstacles. At times, proposed pairings have lacked sufficient enrollment at the start of the semester to run. Similar difficulties with scale-up due to student scheduling have been reported by other community colleges experimenting with blocked learning communities (Quint, Jaggars, Byndloss, & Magazinnik, 2013).

Below we discuss FastStart's student support services and its framework for faculty professional development. The qualitative data were gathered in a two-day site visit to the Community College of Denver in April 2010. During that visit, we conducted

seven semi-structured interviews with faculty, administrators, and staff; one focus group with current and former FastStart students; three classroom observations; and reviews of various policy, program, and course-related documents.

2.1 Student Support Services

FastStart's leadership describes the program as a holistic support model. Students are supported through an array of academic, career, and personal advising services that span their FastStart experience. The FastStart case manager is critical to the program's support system, providing initial intake counseling, which includes recruitment, screening, and orientation; educational planning; and coordination of students' ongoing support. When a student is initially referred to FastStart by a college advisor or the testing center, he or she meets with the case manager for 30 to 45 minutes. During this session, the case manager explains the program and the demands of a compressed curriculum, helps the student to assess whether his or her schedule can accommodate the blocked-schedule classes, and discusses the student's educational and occupational goals. Case managers estimate that roughly one in ten students who complete pre-enrollment counseling withdraw from the FastStart intake process once they understand program expectations. After enrollment in FastStart, the case manager monitors each student's progress and intervenes as warranted. Case managers also visit classes and communicate regularly with FastStart instructors through early warning systems, staff meetings, and informal communication. Other critical case manager functions include referring students to additional services inside or outside of CCD when needed and helping students select their classes for the subsequent semester.

Typically, community colleges are able to provide approximately one counselor for every 1,200 students (Rosenbaum, Deil-Amen, & Person, 2009). FastStart's ratio of one counselor to 260 students, while certainly better than average, still represents a large caseload, posing some risk that students will fall through the cracks. To mitigate this risk, faculty are encouraged to use FastStart's extended class time to build stronger and deeper relationships with individual students and to help them to set academic goals and formulate plans. Classroom-based supports are bolstered by the infusion of career exploration and college know-how into the FastStart curriculum. Career exploration activities are integrated into some of the English, reading, and math courses to give

students sustained opportunity to develop not only academic and career plans, but also the requisite skills, behaviors, and dispositions to effectively execute those plans. Although counseling is not a formal part of the faculty job description (nor necessarily part of their skill set), FastStart facilitates a process for faculty to alert case managers to struggling students for appropriate follow up and services.

Initially, FastStart offered career advising in the form of workshops, but student participation rates were low. In response, the program adapted an existing student success course (AAA 101) into a 12-week one-credit co-requisite, which was mandatory for most FastStart students.[6] The course is designed to introduce students to college culture and to expose students to resources that can help them to attain their education and career goals. In 2009, the program also began to offer a career major fair, an event designed to connect students with advisors from different academic majors as a first step in enrolling in a specific program of study. This resource helps students to complete the AAA course's capstone project, in which each student develops an educational plan that includes the courses the student plans to take to reach his or her educational and occupational goals.

The duration and intensity of FastStart's case management model shares similarities and differences with other approaches to counseling and advising at CCD. The formal counseling function of FastStart is similar in scope to CCD's First Generation Student Success program, which typically has a 1:200 counselor-to-student ratio and like FastStart serves students for a short timeframe. In contrast, CCD's TRIO program (with a typical ratio of 1:100) and Denver Transfer Initiative (DTI, with a typical ratio of 1:45) maintain relationships with students over multiple semesters (i.e., until transfer or graduation). This type of sustained interaction may be critical to helping students to effectively update and execute academic and career goals over the long term (Karp, 2013). Accordingly, we term the formal case management aspect of FastStart as "light touch" in contrast to the "intensive" long-term services provided by TRIO and DTI.

[6]Students with prior college experience and students taking FastStart courses during the evening are exempt from this requirement.

2.2 Faculty Development

FastStart is intrinsically a structural reform: It alters the structure and organization of classes, which can be accomplished without changes to pedagogy or course content. Nevertheless, FastStart has leveraged two mechanisms to strengthen teaching and learning in developmental education. First, program leaders introduced an extensive faculty development program grounded in a supportive and collaborative professional environment that encourages pedagogic experimentation. Second, the course structure itself provides opportunities for pedagogic innovation and interactions not afforded by the traditional course organization, which will be discussed in the next section.

Faculty development has been an important feature of FastStart since its inception. Program leaders believe that faculty need support in order to maximize the benefits and navigate the pitfalls of compressed and linked developmental education course structures. Over time, faculty development evolved from a relatively informal and small-scale endeavor into a collection of more sophisticated and robust professional learning opportunities grounded in instructors' day-to-day work.

During the first few years of FastStart, staff meetings and classroom observations conducted by the program coordinator were the primary vehicles for faculty development. Staff meetings, held three times a semester, provided a venue to discuss specific students as well as logistics (i.e., room scheduling and use of the case manager). Classroom observations, which were part of CCD's faculty evaluation process, also operated as informal mentoring opportunities. FastStart's original coordinator was the senior chair of the CEA division as well as a seasoned ESL instructor; she drew on her expertise in experiential learning and contextualization to engage FastStart instructors in meetings and observations.

More recently, faculty development has expanded to include a range of professional learning activities and has been structured in ways that encourage sustained and collaborative participation. The FastStart coordinator still meets one-on-one with each instructor to provide targeted feedback and resources. Additionally, instructors, the coordinator, case managers, and the project director meet as a group at least two times each semester to discuss program plans and to review outcome data, among other activities. Discipline-specific "idea meetings" and workshops (e.g., using an iPad for

instruction) also are scheduled as warranted throughout the semester. FastStart has embraced some innovative faculty development approaches as well. For example, instructors are encouraged to partner with another faculty member teaching the same subject for structured observations and feedback. Full-time and adjunct faculty periodically assume curriculum development responsibilities. Some instructors have contributed written reflections about their FastStart teaching experiences to a publication shared among program faculty and other CCD colleagues.

These and other faculty development activities are structured to encourage sustained and collaborative faculty participation. Critical to that structure was the choice early on to compensate FastStart faculty to participate in most professional learning opportunities. The importance of this incentive cannot be overstated, particularly for adjunct faculty who otherwise may not be able to afford to participate. In FastStart's early years, professional development was entirely subsidized by grant funding. Today, the majority of these costs for adjuncts are borne by the college's Teaching and Learning Center.

Notably, much of the recent focus of FastStart faculty development has been on strengthening curriculum and pedagogy. The program leadership shaped this focus by encouraging faculty inquiry; they sustain it through *authentic* professional development—that is, professional development activities that are meaningfully integrated into instructors' daily work.[7] Bragg and Barnett (2008) contend that embedded professional development is more impactful for faculty than are tangential activities, such as workshops or conferences. And according to Bickerstaff and Edgecombe (2012), the most effective professional learning opportunities are designed and implemented in ways that directly connect to the specific challenges faculty confront day-to-day in their classrooms. In the following section, a discussion of key pedagogical features of the FastStart classroom, we provide some examples of how authentic and embedded professional learning structures lend support.

[7] We borrow *authentic* from Wehlage, Newmann, and Secada's (1996) notion of *authentic achievement* for students, which emphasizes the construction of knowledge, disciplined inquiry, and value of learning beyond school.

3. Pedagogy in a Reformed Context

FastStart seeks to fundamentally alter the teaching and learning environment by leveraging expanded instructional blocks to give students sustained practice in skills and behaviors associated with longer term academic success and by explicitly addressing the linkages between students' social well-being and their classroom performance. To understand how FastStart's theory of action is operationalized, we visited classrooms and interviewed several faculty. Our analysis affirmed existing findings about pedagogy in FastStart, including Bragg and Barnett's (2008) observation that FastStart's compressed course structure allows faculty to spend less time on review and engage challenging material in greater depth. Additionally, we found that: (1) extended instructional blocks created opportunities for faculty to incorporate a more diverse array of instructional activities; (2) a practitioner culture that values risk-taking gave FastStart faculty a safe space for pedagogical experimentation and increased their willingness to share; and (3) strong relationships among faculty, and between faculty and students, was both a precursor to and an outcome of a potentially powerful pedagogy. In the sections below, we discuss each of these findings in more detail.

3.1 Extended Instructional Blocks

FastStart courses are scheduled in extended time blocks. For example, most of its paired math courses meet for two hours and 45 minutes twice a week. To maintain student engagement over long class periods, FastStart faculty found they needed to expand and diversify their instructional repertoire. They also had to engage in structured lesson planning to ensure that the array of instructional activities aligned with one another and met specific learning objectives. For example, a seasoned CCD math instructor integrated group activities to diversify instruction within her FastStart courses. She reported:

> You have to change it up a lot. If you've got three hours, you can't just lecture for three hours. We'd all be wiped out at the end. So I think that I've found that the students really enjoy and benefit tremendously from being able to have instruction time and then work in groups.

She confessed that she prepared more activities for each class than she was ever able to get through. But such preparation ensured a certain pedagogical nimbleness in which instructional activities that engaged students with content, with one another, and with the instructor in a variety of ways could be deployed as warranted.

New FastStart students were unaccustomed to extended instructional blocks. Therefore, instructors sought ways to ease students' transition during the first few weeks of the semester. A first-year FastStart instructor described her experience of "dragging" students through the last hour of class during the first few weeks and the pedagogical adjustments she made to address the end-of-class lull: "It pushes you, because you have to think about how [you] can change gears enough times so that they still have steam at the end of the class." This particular instructor began each class with a math trivia game called "Wits and Wagers" that students could work on individually or in groups to kick-start mathematical problem solving.[8] She transitioned into the day's lesson prepared with strategies to optimize the long instructional block. She described the need for flexibility to us in an interview: "I will compress parts and expand parts because I know they don't need as much time on section 1 as they do on section 4. So I might go through 1, 2, and 3 as quickly as I can, so we can spend a lot of time on 4." She frequently incorporated group activities designed to leverage peer teaching, and she circulated around the classroom working one-on-one with small groups of students. Typically, she would ask students to explain what they did and did not understand about a problem and then utilize the other students at the table to help clarify a concept or procedure. Students also were asked to write narratives describing the steps they used to solve particular mathematical problems, which were retained on index cards but also could be shared with classmates in poster-type report out activities.

3.2 Pedagogical Experimentation and Risk Taking

The FastStart program encourages a practitioner culture that values risk taking and gives faculty safe space for pedagogical experimentation. Research suggests that substantive instructional improvement is unlikely to occur in the absence of this type of

[8]For the lesson we observed, the trivia questions was "How fast (in mph) do your nerve impulses leave your brain?" Students wrote their guesses on paper and submitted them to the instructor. The student with the closest guess was declared the winner. (Correct answer = 170 mph.)

professional culture (Bryk, 2009; Stigler & Hiebert, 1999). The emergence of such a culture may be a reflection of the FastStart program leadership, which emphasized pedagogical improvement from the outset, and of the faculty who are attracted to this type of developmental education innovation.

Participants in our faculty focus groups suggested that teaching in FastStart is in some ways more demanding, or at least requires different behaviors, than teaching in traditional developmental education courses. They described successful FastStart faculty as willing to invest the time and energy in teaching and professional learning opportunities, able to adapt to changing circumstances, and open to working with one another. Faculty who are interested in working this way are likely to be attracted to the challenge that FastStart represents and are likely using in part the structured professional development opportunities available to contribute to the culture of risk taking and pedagogical experimentation. As a math instructor noted:

> Seems to me you kind of need to like change. Because if you like everything just the way it is, I don't know if that will work well for FastStart. Because you have to keep changing it up during class to keep it moving. You have to like that transition. And to say "Oh, I see students need something else. I have to try something new." And I don't see how someone who doesn't like change could be successful.

Although few faculty made such an explicit link between being adaptable in the classroom and success, they frequently mentioned a willingness to try new instructional techniques.

Within FastStart, risk taking and experimentation are not exclusively individual pursuits. Rather, they tend to occur collaboratively. For example, two instructors from the distinct disciplines of math and English worked together to create a ten-credit Math 060/090 & English 090 learning community, which they team-taught in spring 2010. Their preparation began with extensive conversations regarding the two instructors' respective teaching philosophies and how those philosophies were shaped by differences in their disciplinary training and lived experiences. They described the process of understanding each other's "cultural locations" as a Black man and a White woman as generating particular vulnerabilities. Yet after engaging in these challenging discussions

and seeing the extent to which their teaching philosophies aligned, the English instructor felt that the actual lesson planning became easier. Once the course began, they described success at integrating mathematical analysis into writing assignments but struggled to effectively integrate instructional delivery. An exception was a math lesson in which the math instructor introduced new concepts and the English instructor worked with students to develop and record definitions of those concepts. Creating additional opportunities for instructional collaboration was a lingering objective of this faculty duo, and the expanded instructional blocks gave them space to experiment with different approaches.

Collaborative lesson development and refinement was another example of how faculty simultaneously contributed to and leveraged FastStart's distinct professional culture. Math faculty described using a collaborative process to create lessons that enhanced student engagement.[9] Guided by a research question and mathematical objective, a group of instructors planned a lesson together, then tested and iteratively improved it. Specifically, one instructor would teach the lesson, the rest of the group would observe the lesson, and the full group would reconvene to discuss what did and did not work. Based on this feedback and other inputs, the lesson was revised and delivered again. During the focus group, faculty who participated in one such process recounted that the initial version of the lesson did not play out as expected. Students became frustrated because they did not know what to do and were not able to reach the mathematical objective. The instructor piloting the lesson did "some quick adjusting" during the class but acknowledged significant flaws in the lesson as originally conceived. When the group reconvened, they discussed how the lesson played out and decided that future iterations would include more structure and guidance for students. There was no sense from the math instructor who delivered the lesson that he was embarrassed by a process that made his classroom practice so public. Rather, he seemed energized by the opportunity to revisit the lesson with his peers, refine its content and delivery, and re-teach the refined version. Importantly, these types of collaborative activities appeared to increase FastStart faculty's willingness to share challenges and potential solutions around teaching and learning with their colleagues.

[9]This collaborative process, known as Japanese lesson study, is described in detail by Yoshida (1999). Additional analyses by Lewis and Tsuchida (1998) and Fernandez (2002) are illuminating.

3.3 Relationships and Instructional Delivery

The expanded instructional blocks that are the hallmark of FastStart's compressed course structure enable a mutually reinforcing interplay between relationship building and instructional delivery, which may have positive effects on students' academic and social experiences. The relationships students build by virtue of spending significant time together can be leveraged in service of particular pedagogical goals. Likewise, the extended class periods may provide FastStart faculty more latitude in constructing instructional activities that encourage the development of deeper relationships among students. Leveraging relationships to shape pedagogy—or conversely, using pedagogy to build relationships—requires purposeful enactment on the part of instructors.

Several FastStart faculty discussed implementing activities that were designed to foster the development of relationships among students. The math and English instructors co-teaching the Math 060/090 & English 090 pairing described spending considerable time at the start of the semester "building community" among the students in their course through activities and group discussion. For example, teams of students worked together to create particular shapes from long pieces of rope while blindfolded and built free-standing structures using straws and tape under specified constraints. The English instructor who led these particular exercises noted, "Great connections are made about everyone's work looking different, working together, needing a foundation and base, asking for help; situations come up that are out of our control, and how do we deal with it." The discussions that followed these activities surfaced issues of identity and connections "… about who we all are: goals, visions, and how we are an interdependent group that helps each other." The strong student relationships generated from these types of team-building exercises created the conditions necessary for students to productively engage in experiential learning activities and to work effectively in groups—an important foundation since experiential and group activities were employed by both faculty members throughout the remainder of the semester.

In each FastStart class we observed, students worked together in groups on activities that required them to come to consensus, provide feedback to one another, or explain their answers to classmates. For example, students in a course combining multiple levels of reading and writing paired off and worked on an activity to distinguish

between commonly confused words (such as “capital” and “capitol”) and then presented clarifying definitions and examples of correct usage to the whole class. Students in the English and math learning community worked in small groups to provide feedback on various parts of an argumentative essay draft, such as the thesis, use of supporting data (which reflected the integration of math), and the conclusion. These activities required students to talk intimately and publicly, be constructive, show tact, and brainstorm original ideas. Their cooperative work generated potential vulnerability, on the one hand, and opportunities to build connections, trust, and confidence, on the other. These types of interactions can be the basis of meaningful relationships, and it is not clear whether they would have developed in the absence of these instructional activities.

Notably, the emergence of strong functional relationships, whether as a precursor to or an outcome of particular pedagogical approaches, had powerful implications for the roles of FastStart instructors and students. Faculty reported having more time to know the academic needs and personal circumstances of the students as well as to trust these students to direct larger portions of classroom learning. Students described formal and informal opportunities to interact with classmates and become more comfortable teaching one another. This dynamic appeared to extend beyond the classroom. In a written reflection on the structure of a learning community, an English and a math instructor who co-taught a FastStart pairing wrote:

> The students not only take it upon themselves to help each other during structured classroom activities—the more advanced students explaining concepts to their classmates in small groups, struggling students actually getting up to move about the room on their search for help from advanced students—but these same peer groups can be seen outside of class in the Academic Support Center, working on assignments for both classes and seeking help, as study groups, from tutors. These peer groups have become so effective, in fact, that most classroom activities can be tossed back onto the students with little need for continued guidance and instruction from the instructors. (Lindstrom & Rippetoe, 2012, p. 2)

4. Student Perceptions and Experiences

> I think that if you can survive FastStart, then you can survive anything.
>
> – FastStart student

Our analysis of students' perceptions and experiences related to FastStart draws on data collected through a focus group we conducted during our site visit to the Community College of Denver. Focus group participants were recruited by FastStart program administrators on a voluntary basis. Students received a gift card of nominal value in exchange for their participation. The focus group was comprised of ten students, seven women and three men, who were previously or currently enrolled in at least one FastStart course pairing. The majority of focus group participants were Latinas ($N = 5$), but there were also White ($N = 3$) and Black ($N = 2$) students in attendance.[10] Focus group participants were asked questions based on a semi-structured protocol. Their answers were audio-recorded, and detailed notes were taken from the recording. The notes were then analyzed for themes.

Overall, students who participated in the focus group expressed very positive sentiments about FastStart. They were drawn to the program because they believed FastStart saved time, allowing them to progress to the coursework in their degree programs more quickly. These students also felt generally well-informed upon entry and adequately supported while in FastStart to complete their course requirements, despite the compressed timeline. They spoke of gaining confidence and self-awareness that would benefit them beyond the program. Below we present data on three topics about which students spoke extensively: the intake process, interactions with instructors and peers, and the perceived impact on learning and preparedness for college.

4.1 FastStart Intake Process

Students reported typically learning about FastStart through a college advisor and being routed to the dedicated FastStart case manager for more targeted counseling about the program. This intake process clarifies expectations around attendance, workload, and

[10] This demographic breakdown is similar to that of the FastStart program overall.

adherence to deadlines, such that students who enroll in FastStart have a fairly clear understanding of what is required. An older male student who came to CCD after working in a warehouse for ten years felt that the FastStart orientation process "set you up for success." He learned he could not miss class and had to stay current with his homework "because if you don't, you're done."

Advisors in special programs, such as TRIO, may refer students to FastStart as well (although the number of referrals from these programs was small, as discussed later in the quantitative analysis findings). A young Latina described how her TRIO case manager recommended she enroll in FastStart in the spring after reviewing her strong fall semester grades. Although her performance in the courses was stellar, this student initially had reservations about FastStart and her abilities:

> I was actually really scared about it. I like to be self-paced. I don't like to be in fast-paced classes. I feel like they challenge me more. I guess I was like not really … expect[ing] myself to do so great in this class. But I did. I had low expectations for myself, which I shouldn't have had.

Absent the referral to FastStart, it is unclear whether this student would have had the opportunity to engage an academic experience with the potential to disrupt her low expectations of her own abilities. Such an "experience of earned success" may be critical to build apprehensive students' confidence and enhance their commitment to college (Bickerstaff, Barragan, & Rucks-Ahidiana, 2012).

4.2 Interactions with Instructors and Peers

Participants in the focus group generally described trusting, collaborative, and productive relationships with instructors and peers in their FastStart courses. While students agreed that these relationships contributed to their positive experiences in FastStart, they provided varied feedback regarding which interactions were most impactful—while some emphasized the role of their instructors, others highlighted relationships with other students.

Several students attributed their success to their instructors. A male student in his 30s, who enrolled in college after 15 years as a construction worker, was particularly struck by his math instructor's willingness to tailor her instruction to students' different

learning needs. He observed that "[s]he's really attentive," taking the time to find out each student's strengths and weaknesses and provide individual instruction. Similarly, another non-traditional male student was grateful for his math instructor's responsiveness and dependability. "I trust my professor because he never failed me. He never failed me," the student said. "He was always there for me when I needed a question answered." An older female student recounted a comparable intimacy with two instructors co-teaching the developmental English/public speaking learning community. She noted, "I'm closer to those two teachers than I am to any of my other teachers. I can go to them with anything. I feel more comfortable with them." One of the Latinas reflected on her strong performance in a FastStart English course compared to her poor performance in a regular math course. She attributed the variation in her performance to the instructor: "I feel like the professor is a very big difference." As discussed previously, some FastStart faculty believe the program attracts a certain type of instructor, who is dedicated, flexible, and collaborative in terms of his or her orientation toward teaching. These student perspectives affirm and even extend the characteristics of an effective FastStart faculty member to include one who is responsive, dependable, and open to close interactions with students.

A few focus group participants believed that their FastStart classmates were equally, if not more, influential to their success than their instructors. These students tended to highlight productive interactions with peers, such as teaching one another during group activities. They also described their FastStart classmates as more serious and engaged in class. According to one non-traditional student, "I'd have to say it's the students that made the difference in the class. The reason I say the students is that the students are more serious. I've got other classes … this 090 class, there are so many distractions in the class because people are on their cell phones…. In this classroom setting, the students are serious. In others, you have distractions left and right." The guiding principles of FastStart promote caring, respect, and support for one another, and the program attempts to facilitate experiences for students and faculty that reinforce those principles. Nevertheless, it is possible that FastStart attracts more motivated and committed students, particularly given the rigor of intake and time commitment.

There were some notable structural elements that students flagged as contributing to positive interactions in FastStart classes. Among them was the physical layout of certain classrooms, which were furnished with round tables. A student in a FastStart math course suggested this configuration facilitated increased discussion among students. Another structural feature that students said helped interaction was the extended instructional time. A learning community participant described her FastStart paired courses as her longest class and suggested she was able to get to know the students and instructors more than she was able to in other courses. She said, "I feel like this is like our homeroom class. I know all of the students that are there. I know the teacher better. It's really going really good."

4.3 Perceptions of Impact on Learning and Preparedness

Students reported that FastStart contributed to their academic and non-academic development in a variety of ways, some of which translated into academic proficiency and behavior modifications that extended beyond their FastStart participation. In particular, students described classroom environments where challenging subject matter was made approachable and where faculty demonstrated in tangible ways that they were invested in students' success. Students also highlighted certain elements of the support services embedded in FastStart that they thought were more or less beneficial.

Students were cognizant of the time-saving feature of FastStart's compressed course structure; however, they generally did not identify that structural factor as impacting their success. Nor did they highlight the effects of specific instructional activities on their learning. Instead, the students in the focus group spoke at length about the importance of their instructors' behavior and dispositions. For example, a student referred to FastStart from the college's TRIO program attributed her success in developmental English and reading to her instructor's "hands on" approach and "caring" attitude. She reported, "I really felt like I learned more in these classes than my other classes." Similarly, a non-traditional male student spoke about the level of preparedness he felt he had gained from his FastStart math class. He said of his instructor, "She sends you out with all the tools. She's not going to send you out on a job without everything." It was evident from the focus group that students were aware that faculty had to attend to

the full spectrum of their academic and non-academic needs to help them build the proficiency and confidence necessary for long-term success in college.

Students also ascribed value to the formal and informal support they received from FastStart case managers. Several focus group participants noted that the one-on-one advice from the case manager before enrolling clarified critical performance expectations. Others described how the case manager and other program personnel were readily available and willing to assist FastStart students at any point in time. "There's so much support," claimed an older female student. "You walk into the office and there is always somebody there." Such comfort and closeness led some FastStart students to informally utilize the services of FastStart case managers beyond their participation in the one-semester program.

Relative to the consistently positive sentiments expressed about FastStart case managers, students reported mixed feelings about the program's student success course. The success course activities related to assessing one's learning style and career planning were viewed favorably by many. Students recounted using this information to manage how they approached their work in other courses and for academic planning purposes. However, non-traditional students who entered CCD aware of their career goals did not find the career exploration activities nearly as useful. Other indirect supports, such as the required 25 lab hours, which were mandatory for all developmental math students, were seen as superfluous by a number of the students. Only one student felt strongly about the benefits of the lab requirement.

5. Student Outcomes

FastStart gives students the opportunity to progress more rapidly through their developmental education course requirements. It also provides enhanced student support services. In recent years, the program leadership has worked with FastStart faculty to improve their teaching and enhance their interactions with students through structured, sustained, and collaborative professional learning opportunities. Does this set of program features succeed in overcoming the problems with developmental education that the

program was designed to address? Does participation in FastStart improve student outcomes?

In order to assess the effect of FastStart participation on a variety of academic outcomes, we collected transcript data for first-time students who entered the Community College of Denver during or prior to the spring 2008 semester and tracked their academic outcomes for three years. For most of the analyses we conducted, we divided students into a "program" group (of students who participated in FastStart) or a "comparison" group (of students who did not participate in FastStart) in order to compare outcomes between students in these two groups. The quantitative data presented here focus on the Math 030/060 and Math 060/090 pairings, which (as Table 1 illustrates) were the most popular pairings prior to and during spring 2008. Enrollment in the English pairings was too low to generate an adequate sample for evaluation.

In this report we have emphasized that throughout the life of FastStart, organizers have worked to strengthen the professional development and non-academic support components of the program. Since our quantitative analysis is limited to early cohorts, through 2008, some of these changes had not been made when the students we tracked were enrolled. Neither does our analysis include students in the version of FastStart that pairs an upper-level developmental course with an introductory college-level course, due to these pairings' recent introduction and small scale.

To define the program group, we included students who took a FastStart pairing of Math 030/060 (Fundamentals of Mathematics: Arithmetic and Pre-algebra) or Math 060/090 (Pre-algebra and Introductory Algebra) for the first time between spring 2006 and spring 2008. Each student's FastStart pairing was determined according to the *first FastStart course* taken.[11] For example, if a student took a regular section of Math 030 in

[11]The CCD transcript database does not contain enrollments in FastStart pairings such as Math 030/060. Rather, it indicates whether a student took (for example) Math 030 in a given semester and, if so, whether the section was a regular or FastStart section. We could identify students taking a particular pairing only because they enrolled in the two relevant FastStart sections in the same semester. However, students who performed poorly in the first half of a FastStart semester (e.g., in Math 030) were allowed to drop their enrollment in the FastStart section that constituted the second half of the semester (e.g., Math 060) and instead enroll in a regular section of the course at some later date. In this example, the dropped FastStart section of Math 060 would not appear on the student's transcript. Accordingly, student transcripts reflecting a single FastStart section in a given semester were assumed to represent a student who embarked on the relevant pairing but dropped the second half of the pairing due to poor performance.

one semester and then took a FastStart section of Math 060 in the next semester, the student was categorized as attempting the FastStart pairing Math 060/090. If a student attempted the same FastStart course multiple times or took two different FastStart pairings, only the first FastStart attempt was considered. A student who did not complete a FastStart pairing (e.g., attempted FastStart Math 030 but did not attempt FastStart Math 060) was considered a member of the pairing he or she attempted (i.e., the student was classified as participating in the FastStart Math 030/060 pairing).

To define the comparison group, we included all students who took a non-FastStart section of either Math 030 or Math 060 for the first time during the same time period.[12] The semester in which each program or comparison student took the designated course was termed their "FastStart semester." We tracked each student for three academic years subsequent to his or her FastStart semester (i.e., six long semesters and the three intervening summer semesters). For example, if a student took Math 060 for the first time in fall 2007, that student's outcomes would be tracked from spring 2008 until fall 2010.

The sample was limited to students who were not dual-enrolled high school students, were not enrolled at any other college prior to or during their FastStart semester, were enrolled primarily at the main Community College of Denver campus rather than a satellite campus or online, and had a valid placement test score referring them to developmental math. These exclusions resulted in 80 students who attempted at least the first course in the Math 030/060 pairing and 728 comparison students who attempted a regular section of Math 030, and 53 students who attempted at least the first course in the Math 060/090 pairing and 494 comparison students who attempted a regular section of Math 060.

[12]Comparison students were allowed to serve as comparisons for multiple FastStart students. For example, if a comparison student first took Math 030 in spring 2006 and first took Math 060 in fall 2007, that student could serve as a comparison for both a FastStart 030/060 student and a FastStart 060/090 student. This strategy ensured that Math 060 comparison students were similar to FastStart Math 060/090 students, in that some began their math sequence with Math 030 and others began the sequence with Math 060. In practice, only 16 percent of comparison students served as a comparison record more than once. In those cases, each comparison student's "FastStart semester" differed between the two records, resulting in a different tracking period, and therefore different time-varying covariates and outcomes. Therefore, the degree of clustering of outcomes within students was negligible.

5.1 Descriptive Statistics

Demographic characteristics of FastStart and non-FastStart participants are shown in Table 3. Overall, FastStart students were more likely to be female and Hispanic and less likely to be Black. Both groups of students had high rates of referral to reading and English developmental education, but program students were less likely to have been referred to the lowest levels of developmental reading (Reading 030) and writing (English 030). As a result, when combined with their developmental math placements, program students were referred to slightly fewer remedial courses than comparison students. Program students were also more likely to be attending school full-time during the FastStart semester, and they seem to have had slightly higher incomes (although this difference was statistically significant only for Math 030/060 students). Students who took the Math 060/090 pairing were also more likely than comparison students to be independent from their parents, 25 years of age or older, and taking evening courses during their FastStart semester.

In Table 3, differences between program and comparison students in terms of case management and student success course enrollment reflect the additional supports provided to FastStart participants. Nearly half of FastStart students took a student success course, with most of these taking AAA 101, the FastStart one-credit companion course adapted from CCD's First Year Experience course that focuses on education and career goals. The few comparison students who took a student success course tended to opt for AAA 090, a three-credit course that covers goal-setting, time management, critical thinking, and other general student success skills. In terms of case management, all FastStart students were provided with light-touch case management as part of the program, but a few also received more intensive case management through an additional program at the college. Approximately 10 percent of comparison students received light-touch or intensive case management through other programs.

Table 3
Student Characteristics by Program Participation

Characteristic	Math 030/060			Math 060/090			Combined		
	FS (*N* = 80)	Reg (*N* = 728)	*p*	FS (*N* = 53)	Reg (*N* = 494)	*p*	FS (*N* = 133)	Reg (*N* = 1,222)	*p*
Basic demographics									
Female	70%	53%	**	60%	54%		66%	54%	**
White	27%	29%		31%	35%		28%	32%	
Hispanic	51%	41%		46%	37%		49%	40%	*
Black	13%	23%	*	15%	21%		14%	22%	*
Asian	5%	4%		6%	4%		6%	4%	
Native American	4%	2%		2%	3%		3%	2%	
Socioeconomic background									
Pell grant recipient	44%	51%		58%	54%		50%	53%	
Dependent on parents[a]	55%	53%		39%	52%	†	48%	53%	
Median family income[a]	$25,868	$15,436	**	$22,464	$18,620		$24,405	$16,913	
Median family size[a]	2.50	3.00		3.00	3.00		3.00	3.00	
CCD entry information									
Entered during spring semester	34%	42%		25%	31%		30%	38%	†
Entered 2004-2005 or earlier	3%	1%		0%	4%		2%	3%	
Entered in 2005-2006	10%	16%		17%	29%	†	13%	21%	*
Entered in 2006-2007	40%	44%		49%	38%		44%	41%	
Entered in 2007-2008	48%	39%		34%	30%		42%	35%	
Placed in Math 030	100%	97%		64%	56%		86%	80%	
Placed in Math 060	0%	3%		32%	40%		13%	18%	
Placed in Math 090	0%	0%		2%	3%		1%	1%	
Placed in Reading 030[b]	5%	12%	†	2%	8%		4%	10%	*
Placed in Reading 060[b]	22%	29%		20%	20%		21%	26%	
Placed in Reading 090[b]	34%	28%		24%	29%		30%	28%	
Placed in English 030[c]	3%	17%	**	6%	11%		4%	15%	**

Table 3, Continued

Characteristic	Math 030/060			Math 060/090			Combined		
	FS (*N* = 80)	Reg (*N* = 728)	*p*	FS (*N* = 53)	Reg (*N* = 494)	*p*	FS (*N* = 133)	Reg (*N* = 1,222)	*p*
Placed in English 060[c]	26%	26%		24%	19%		25%	23%	
Placed in English 090[c]	51%	44%		50%	45%		51%	45%	
Placed in English 121[c]	20%	13%	†	20%	25%		20%	17%	
Total remedial courses referred[d]	5.00	5.66	**	4.40	4.64		4.76	5.25	**
FastStart semester information									
Age 25 or older	24%	26%		49%	30%	**	34%	28%	
Median terms since entry (1=first)	1.00	1.00		2.00	2.00		1.00	1.00	
Prior credits earned	1.29	1.16		6.97	7.20		3.55	3.60	
Taken success course	53%	19%	***	45%	20%	***	49%	20%	***
AAA090	1%	13%	**	9%	14%		5%	14%	**
AAA101	51%	8%	***	42%	9%	***	47%	8%	***
Full-time student	48%	33%	**	57%	45%	†	51%	38%	**
Taking evening courses	38%	40%		51%	32%	**	43%	37%	
Received case management	100%	8%	***	100%	14%	***	100%	10%	***
Light-touch case management	100%	5%	***	100%	8%	***	100%	6%	***
Intensive case management	4%	2%		2%	6%		3%	4%	

†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

[a] Information available only among those who filed for financial aid, *N* = 993.
[b] Among those with valid reading placements or who were referred directly to English 121, *N* = 1,307.
[c] Among those with valid English placements, *N* = 1,288.
[d] Among those with valid math, reading, and English placements, *N* = 1,269.

5.2 Regression Analysis

We conducted regression analyses to examine the relationship between FastStart participation and various measures of persistence and course taking. For all students, persistence outcomes included:

- Short-term persistence: In the fall or spring term immediately following their FastStart semester, the student persisted at CCD or transferred to another two- or four-year college.
- Longer term positive educational outcome: At the three-year follow up, the student continued to persist at CCD or another community college, had earned a credential, or had transferred to a four-year school. Each type of long-term outcome is not mutually exclusive. In the descriptive results, we show each type of long-term outcome as well as the combined long-term outcome. In the regression, we consider the combined long-term outcome only.

We also tracked course-taking and -passing behavior at CCD, beginning in the FastStart semester and continuing across the three-year follow-up period. We used course transcript data to calculate the following outcomes:

- Credits earned with a grade of C or higher (developmental or college-level)[13]
- College-level credits earned with a grade of C or higher[14]
- Passed Math 090 (the highest level of developmental math) with a grade of C or higher
- Enrolled in any gatekeeper math course[15]

[13]In addition to A, B, and C, developmental grades S, S/A, S/B, and S/C were considered as C or higher.
[14]During the period under study (spring 2006 to spring 2008), the math course Math 106 was counted as college-level credit. In 2009 (during the three-year follow-up period for later cohorts of students), the course was renumbered as Math 099 and began to be awarded with developmental credit. To be consistent with students' actual credits on the transcript, in this study Math 106 counts as college-level credit while Math 099 does not. Accordingly, students in later cohorts had a lesser opportunity to earn college-level credit through completion of Math 099/106 across the three-year tracking period. This cohort difference is controlled in the regression analysis through the "cohort of entry" fixed effects.
[15]We typically define a math gatekeeper course as any college-level course that students are required to take to fulfill their program's math requirement. During the period under study, most non-STEM students took Math 106 to fulfill their math requirement. Although the course was renumbered during the follow-up period, the content of the course remained the same, and it continued to fulfill the terminal math

- Passed gatekeeper math with a grade of C or higher (those who did not enroll in gatekeeper math were considered to have not passed the course)

Approximately 22 percent of program students and 23 percent of comparison students co-enrolled at other community colleges or four-year colleges at some point during the three-year follow-up period. Transcript information was unavailable for non-CCD colleges, and thus course-taking and -passing outcomes may be underestimated for students who co-enrolled during the follow-up period. Accordingly, in the regression models discussed below, models predicting course-taking and -passing outcomes include a control for enrollment at a non-CCD school.

To enhance the power of our regression models, we combined the Math 030/060 and Math 060/090 pairings together in the analysis and included the type of pairing as a control. Overall, both program and comparison students who took Math 060 had noticeably better two-year outcomes than those who took Math 030; therefore, including the type of pairing in the analysis allowed us to control for this difference. This strategy resulted in 133 FastStart and 1,222 comparison records for analysis.

5.3 Results

Table 4 shows descriptive outcomes for Math 030/060, Math 060/090, and the two groups combined together. Figures 1-8 show the trajectory of descriptive outcomes across time. Overall, in comparison to students who enrolled in regular Math 030 or Math 060 sections, the FastStart groups appear to have slightly higher short-term persistence rates and credit accrual, and substantially higher Math 090 completion, gatekeeper math enrollment, and gatekeeper math passing rates. Additional regressions were performed to determine whether these differences were driven by differences in the measurable characteristics of FastStart and non-FastStart students—that is, if the differences persisted after controlling for student characteristics, including exposure to student success courses and case management. Below we discuss each of the regression models that appear in Table 5 and their results.

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requirement for a variety of programs that are not heavily math- and science-oriented. Accordingly, in this analysis we treat both Math 099 and Math 106 as gatekeeper courses.

Table 4
Descriptive Outcomes

Outcome	Math 030/060			Math 060/090			Combined		
	FS (*N* = 80)	Reg (*N* = 728)	*p*	FS (*N* = 53)	Reg (*N* = 494)	*p*	FS (*N* = 133)	Reg (*N* = 1,222)	*p*
Short-term persistence (next term)	66%	57%	†	74%	69%		69%	62%	†
Long-term positive outcome (3 years)	40%	34%		36%	42%		38%	37%	
Still enrolled at a CC	26%	25%		30%	27%		28%	26%	
Transferred bachelor's institution	15%	12%		13%	17%		14%	14%	
Earned certificate or degree	8%	2%	**	0%	4%		5%	3%	
Credits earned with C or higher	24.74	19.11	*	27.30	24.03		25.76	21.10	*
College credits earned with C or higher	15.14	11.66		19.43	17.65		16.85	14.08	
Passed Math 090 with C or higher	39%	21%	***	66%	41%	***	49%	29%	***
Enrolled in gatekeeper math	31%	17%	**	57%	33%	***	41%	23%	***
Passed gatekeeper math with C or higher	26%	13%	**	43%	25%	**	33%	18%	***

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

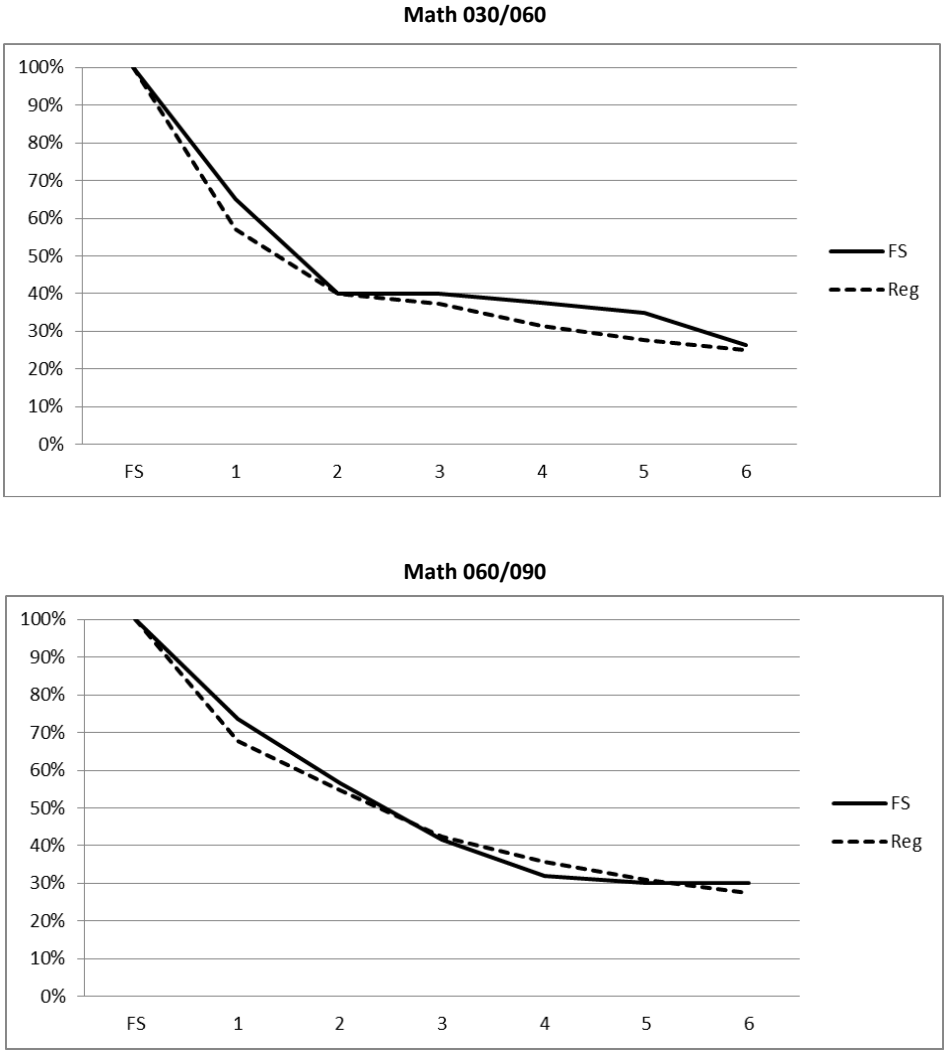
Table 5
Regression Estimates for FastStart Math Attempters Compared With Regular Developmental Attempters

Outcome	Model 1 (*N* = 1,355)	Model 2 (*N* = 1,352)	Model 3 (*N* = 1,352)	Model 4 (*N* = 1,348)
Short-term persistence	0.317	0.111	0.037	0.528
	(0.198)	(0.210)	(0.215)	(0.324)
Long-term positive outcome	0.004	-0.063	-0.078	1.330
	(0.189)	(0.198)	(0.202)	(0.323)
Credits earned with C or higher	4.757*	2.807	2.483	5.093
	(2.114)	(2.087)	(2.135)	(3.325)
College credits earned with C or higher	2.871	0.951	0.758	2.447
	(1.711)	(1.689)	(1.728)	(2.692)
Passed Math 090 with C or higher	0.940***	0.836***	0.772***	1.525***
	(0.191)	(0.201)	(0.206)	(0.380)
Enrolled in gatekeeper math	0.891***	0.878***	0.797***	1.314***
	(0.194)	(0.205)	(0.210)	(0.388)
Passed gatekeeper math with C or higher	0.868***	0.827***	0.813***	1.521***
	(0.203)	(0.216)	(0.223)	(0.445)

Note. Table displays logit coefficients with standard errors in parentheses. Sample is CCD students enrolled in developmental math between spring 2006 and spring 2008. Students excluded who: were dual-enrolled high school students, were enrolled at any other college prior to or during their FastStart semester, were primarily enrolled at a satellite campus, or had no valid math placement test score.

$^{\dagger}p < .10$. $*p < .05$. $**p < .01$. $***p < .001$.

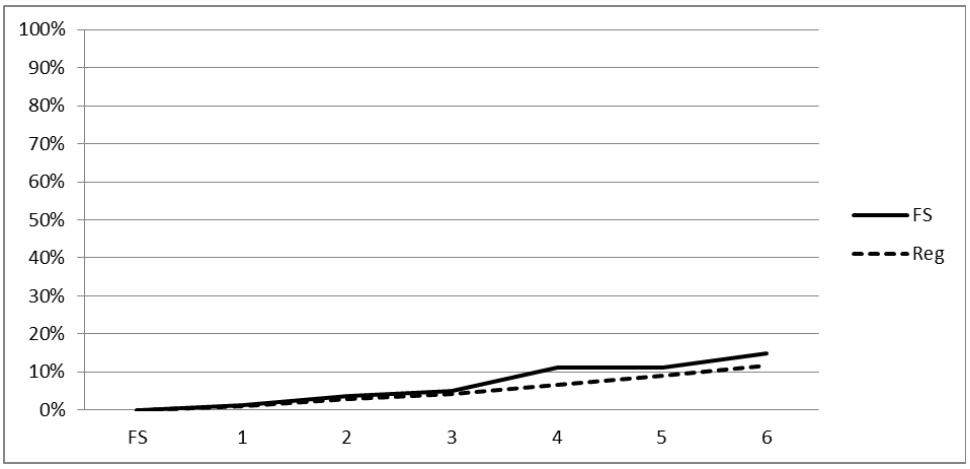
Figure 1
Enrolled in a Community College During the Current Term



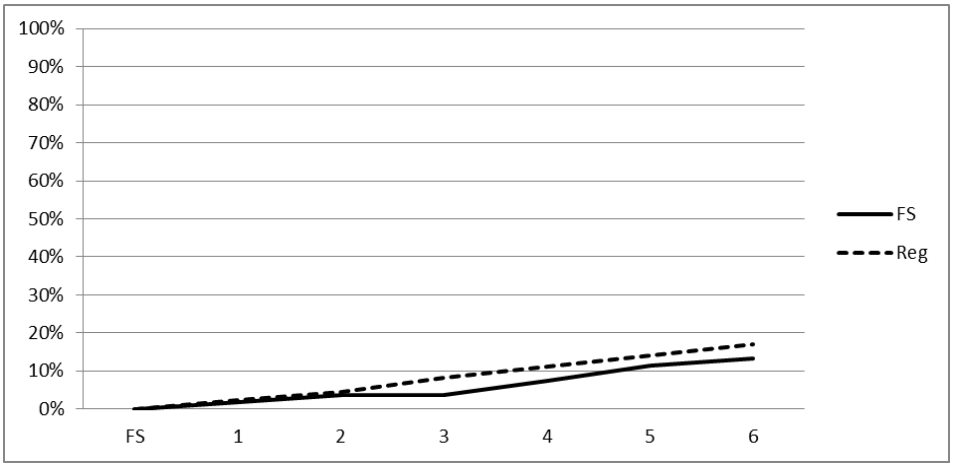
Note. "FS" indicates the FastStart term and "1" indicates the first long semester subsequent to the FastStart semester. Credit accrual figures also display prior CCD credits, aggregating any terms previous to the FastStart term into a "pre-FS" category.

Figure 2
Transferred to a 4-Year School This Term or Earlier

Math 030/060



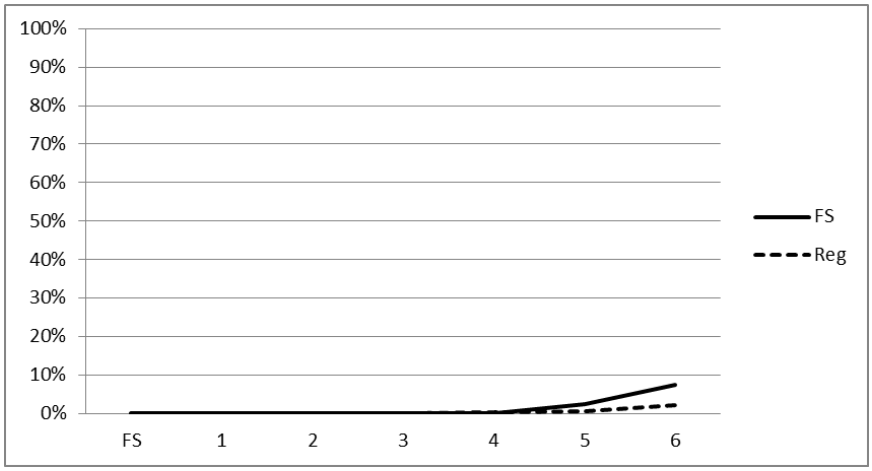
Math 060/090



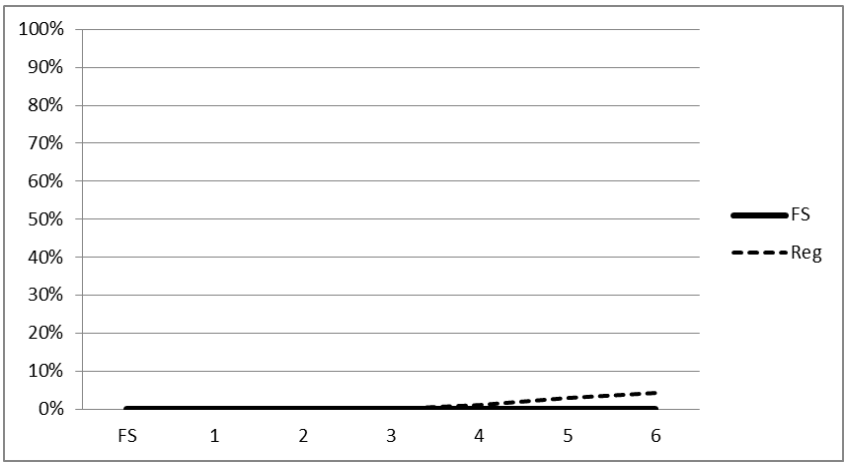
Note. "FS" indicates the FastStart term and "1" indicates the first long semester subsequent to the FastStart semester. Credit accrual figures also display prior CCD credits, aggregating any terms previous to the FastStart term into a "pre-FS" category.

Figure 3
Graduated This Term or Earlier

Math 030/060



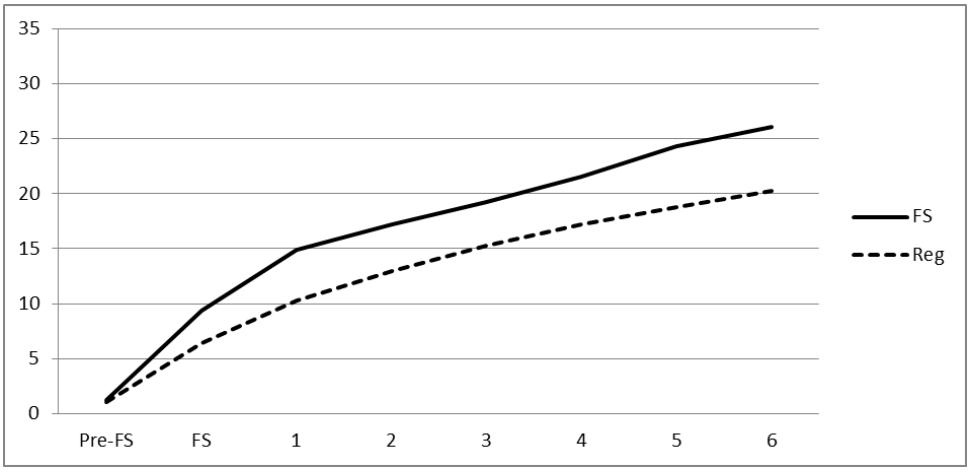
Math 060/090



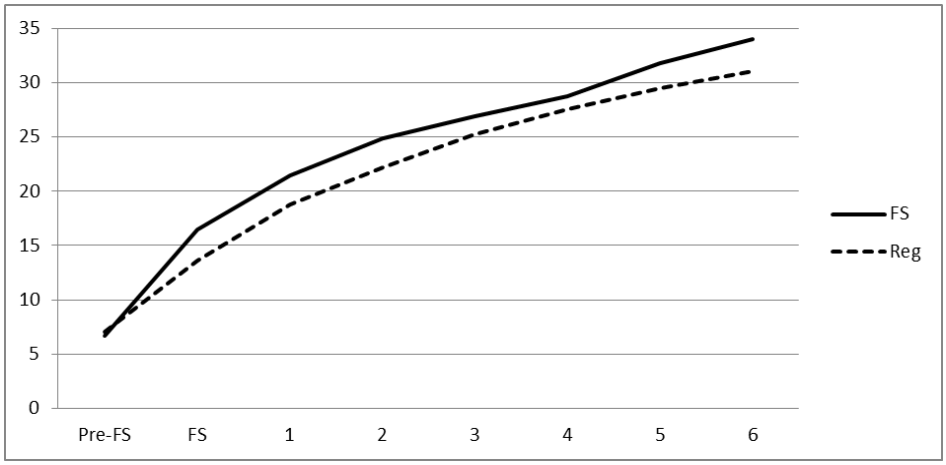
Note. "FS" indicates the FastStart term and "1" indicates the first long semester subsequent to the FastStart semester. Credit accrual figures also display prior CCD credits, aggregating any terms previous to the FastStart term into a "pre-FS" category.

Figure 4
Credits Earned With C or Above, Cumulative Across CCD Career

Math 030/060



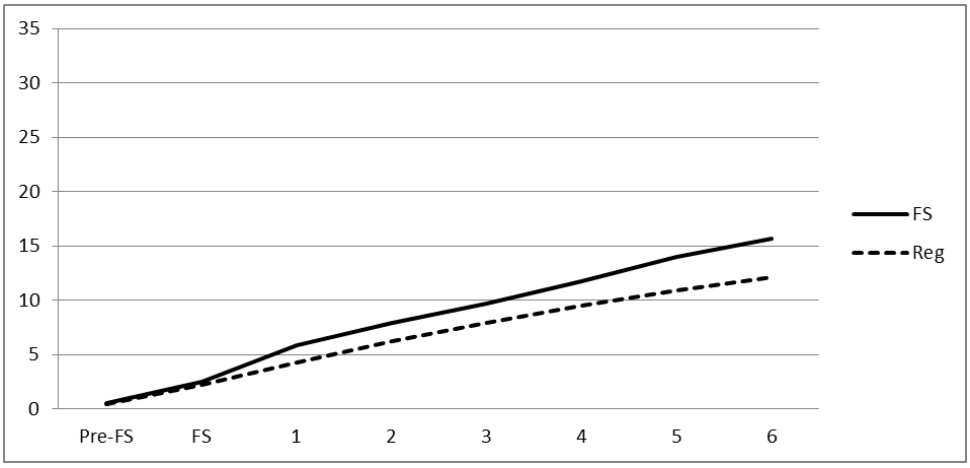
Math 060/090



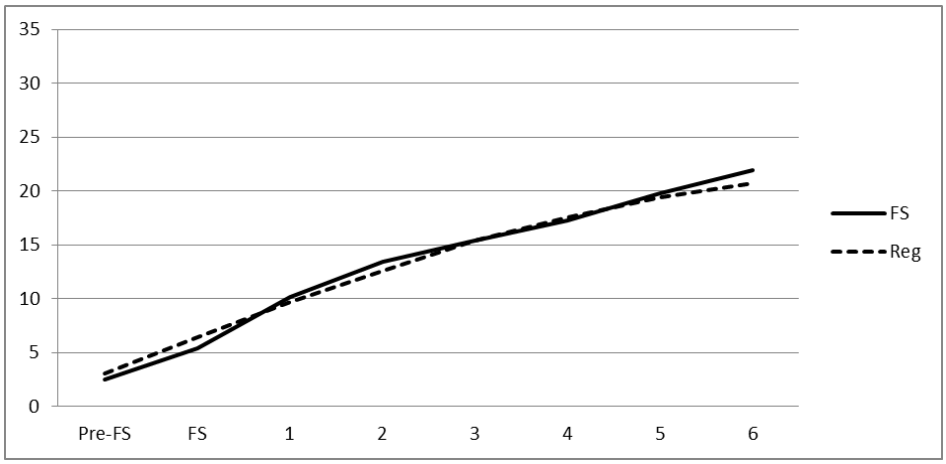
Note."FS" indicates the FastStart term and "1" indicates the first long semester subsequent to the FastStart semester. Credit accrual figures also display prior CCD credits, aggregating any terms previous to the FastStart term into a "pre-FS" category. Values for Term 6 are slightly higher than those seen in Table 1, as trajectories include pre-FS credits, while Table 1 excludes them.

Figure 5
College-Level Credits Passed With C or Above, Cumulative Across CCD Career

Math 030/060



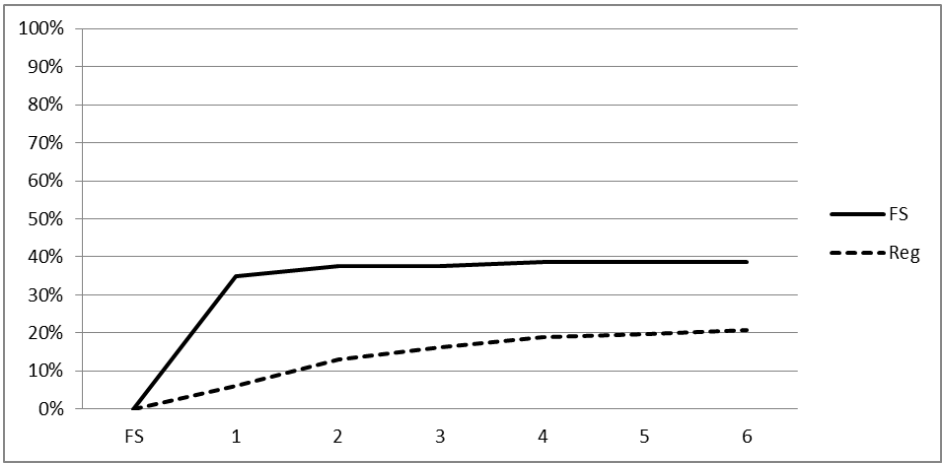
Math 060/090



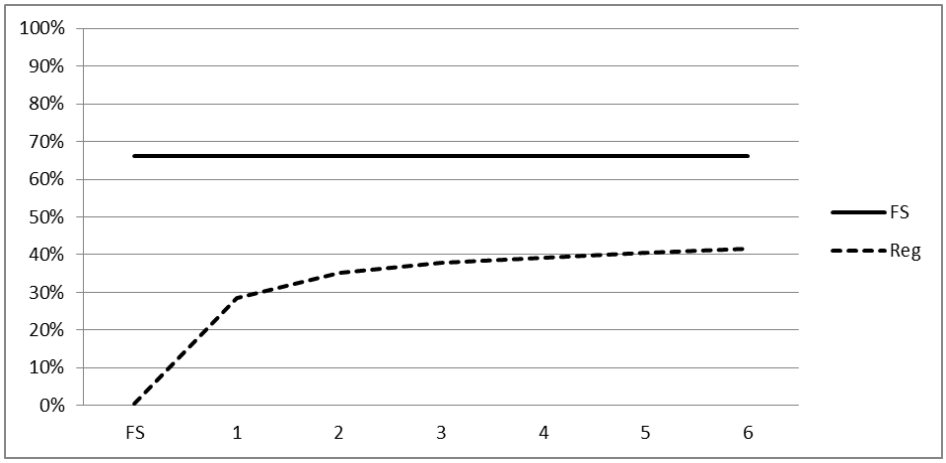
Note. "FS" indicates the FastStart term and "1" indicates the first long semester subsequent to the FastStart semester. Credit accrual figures also display prior CCD credits, aggregating any terms previous to the FastStart term into a "pre-FS" category. Values for Term 6 are slightly higher than those seen in Table 1, as trajectories include pre-FS credits while Table 1 excludes them.

Figure 6
Passed Math 090 With C or Above This Term or Earlier

Math 030/060

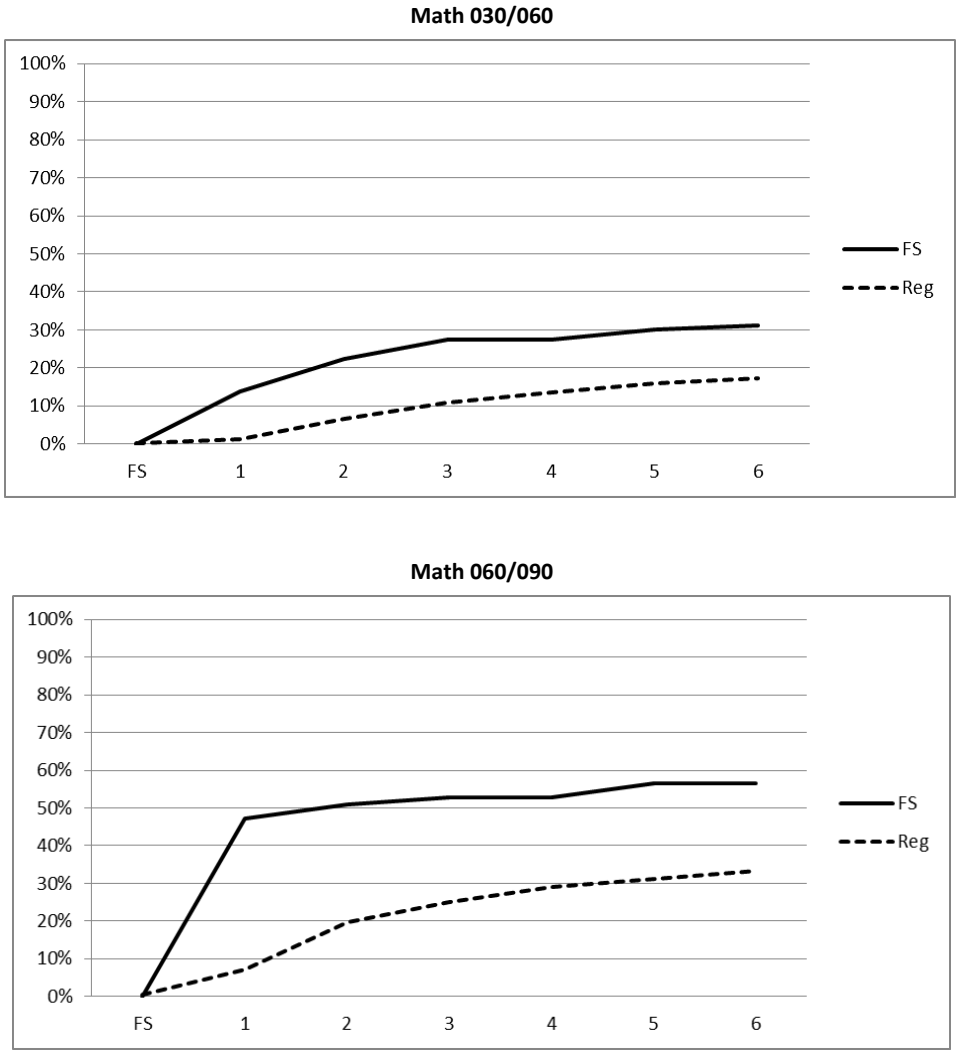


Math 060/090



Note. "FS" indicates the FastStart term and "1" indicates the first long semester subsequent to the FastStart semester. Credit accrual figures also display prior CCD credits, aggregating any terms previous to the FastStart term into a "pre-FS" category.

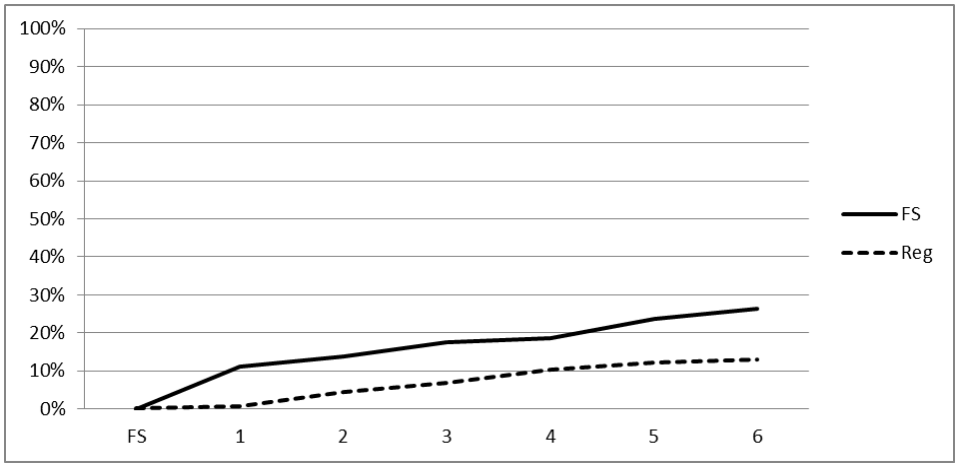
Figure 7
Enrolled in Math Gatekeeper Course This Term or Earlier



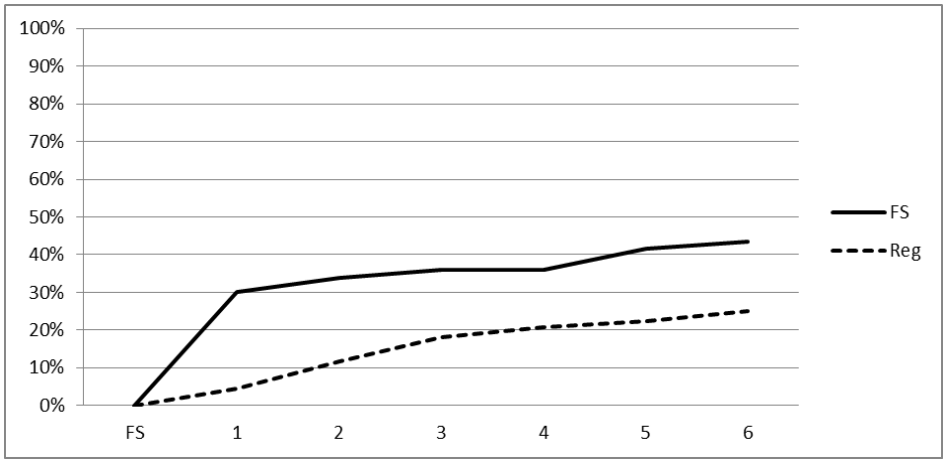
Note. "FS" indicates the FastStart term and "1" indicates the first long semester subsequent to the FastStart semester. Credit accrual figures also display prior CCD credits, aggregating any terms previous to the FastStart term into a "pre-FS" category.

Figure 8
Passed Math Gatekeeper With C or Above This Term or Earlier

Math 030/060



Math 060/090



Note. "FS" indicates the FastStart term and "1" indicates the first long semester subsequent to the FastStart semester. Credit accrual figures also display prior CCD credits, aggregating any terms previous to the FastStart term into a "pre-FS" category.

In Table 5, regression Model 1 estimates the raw or unadjusted effect of FastStart using the full sample (N = 1,355). The analysis included controls for the type of pairing (i.e., Math 030/060 versus Math 060/090) and for co-enrollment at another college during the follow-up period. Results of this model indicate that FastStart students earned significantly more credits (nearly five more) than comparison students; however, most of these additional credits were likely remedial credits as FastStart students did not earn significantly more college-level credits. FastStart students were also significantly more likely to successfully complete the top level of developmental math (Math 090) as well as to enroll in and pass gatekeeper math. However, FastStart students were no more likely to persist in college.

Model 2 expands Model 1 by controlling for student demographics, including gender; ethnicity; whether the student was 25 years or older at entry into college; initial math, reading, and writing placement recommendations; Pell recipient status; and other financial aid information.[16] The model also takes into account whether the student initially entered CCD in a fall or spring semester as well as the year of entry. Additionally, the model includes student characteristics during the FastStart semester, such as the number of terms since college entry, prior credits earned, whether the student took evening courses that semester, and whether the student was enrolled full-time. To preserve statistical power, ethnic categories were collapsed into a single dummy variable indicating whether the student was a member of an ethnic group that is traditionally underserved (i.e., White and Asian students were compared with Black, Hispanic, Native American, and other ethnicities).[17] Across all the outcomes, the coefficient for FastStart tended to decrease when these variables were added, and the coefficient for credit accrual became non-significant. However, FastStart students were still significantly more likely to successfully complete Math 090 as well as to enroll in and pass gatekeeper math.

[16]Other financial aid information includes whether the student was a dependent, log of family income, and log of family size.

[17] Three students were missing gender information, thus the sample for this analysis is slightly smaller. For covariates with more substantial amounts of missing data, dummy variables were included in the model to indicate where the relevant data elements (including reading placement, writing placement, and FAFSA-based financial aid information) were missing. Robustness checks indicated that the slope of the treatment variable was similar for students with complete data and those with missing data.

Model 3 expands Model 2 by controlling for student success course taking. Results remained fairly consistent with Models 1 and 2. Thus, while FastStart students were more likely to take student success courses than were comparison students, the apparent effects of the FastStart program seem fairly independent of student success course enrollment.

Model 4 expands Model 3 by controlling for case management. All FastStart students received case management. Accordingly, case management could not be included as a separate control variable. Instead, we compared FastStart students to: (a) comparison students who did not receive case management, (b) comparison students who received light-touch case management similar to that provided through FastStart, and (c) comparison students who received case management more intensive than that provided through FastStart. A handful of FastStart students who also received more intensive case management through another program ($N = 3$) were dropped from the model.

The results for Model 4 displayed in Table 5 compare FastStart students who received only light-touch case management ($N = 129$) to students who also received light-touch case management ($N = 78$). FastStart students continued to perform better in terms of passing Math 090, enrolling in gatekeeper math, and passing gatekeeper math. To show the broader set of comparisons included in the model, Figure 9 displays the predicted probabilities[18] of passing Math 090 for each of the four groups; Figures 10 and 11 show parallel results for enrolling in and passing gatekeeper math.

Figures 9–11 show that among comparison students, light-touch case-managed students ($N = 78$) had the lowest predicted probabilities. Indeed when compared to students who received no case management ($N = 1{,}097$), light-touch students had significantly lower rates of passing Math 090 ($p < .05$) and marginally lower rates of passing gatekeeper math ($p < .10$). All of CCD's case management programs target at-risk students. Given the low probabilities for the light-touch group, it seems likely that these at-risk factors are not completely accounted for through the covariates we included in our model. For example, we did not have information regarding whether the student was the first in their family to attend college, and outside of FastStart, the primary light-

[18] Model-based predicted probabilities were calculated using each covariate's overall sample mean.

touch case management program at CCD is targeted particularly at first-generation students. The FastStart program is also heavily oriented toward first-generation students; a conservative estimate is that three-quarters of FastStart participants are first-generation college goers.

Figure 9
Proportion of Students Passing Math 090 in Each Treatment Category

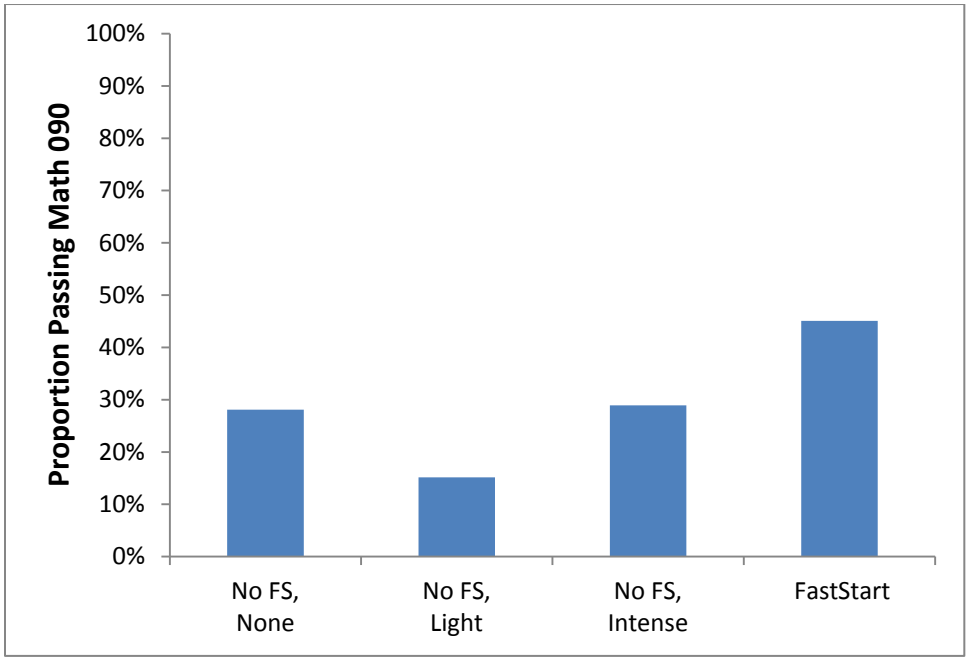


Figure 10
Proportion of Students Enrolling in Gatekeeper Math in Each Treatment Category

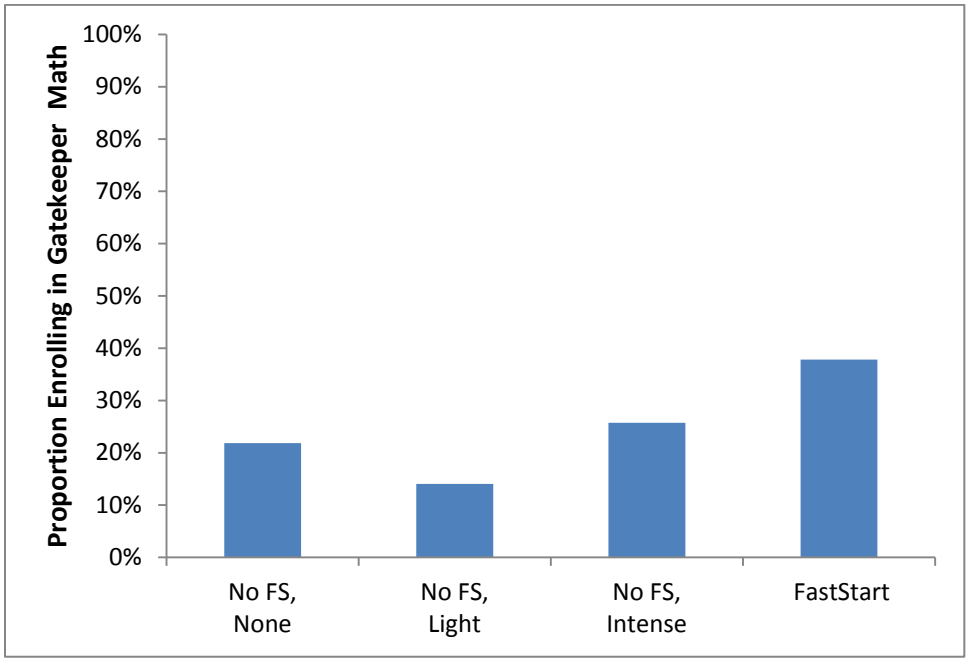
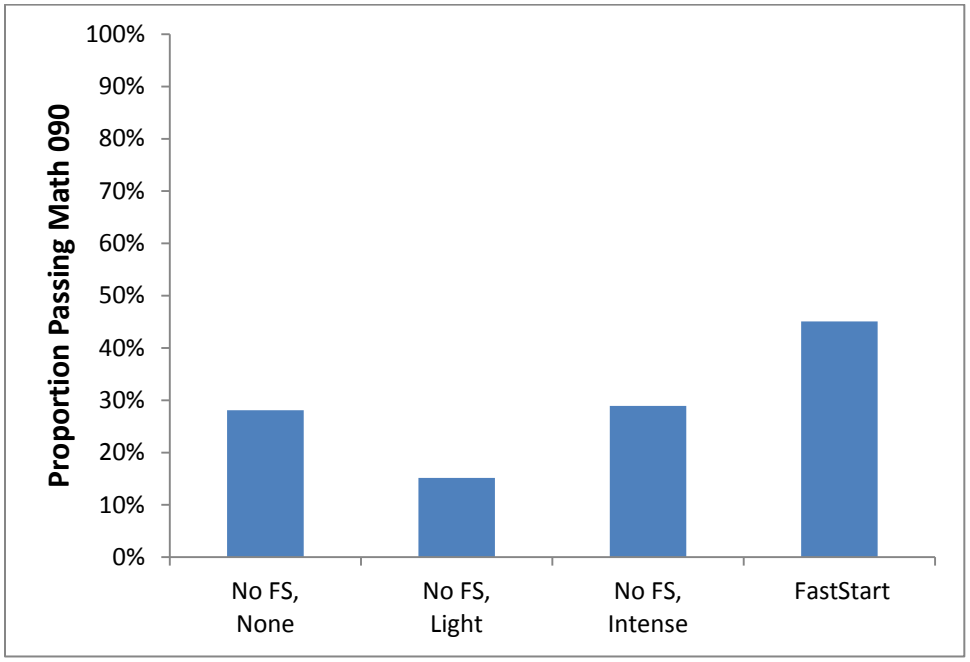


Figure 11
Proportion of Students Passing Gatekeeper Math in Each Treatment Category



In terms of the Math 090 and gatekeeper math outcomes, FastStart students (N = 129) consistently outperformed comparison students who received no case management (N = 1,097; $p < .001$ for all three outcomes) but less consistently outperformed comparison students with intensive case management (N = 47; passing Math 090, $p < .10$; enrolling in gatekeeper, *n.s.*; passing gatekeeper math, $p < .05$). Non-FastStart students who received intensive case management (N = 47) were similar in each of the three outcomes compared to those who received no case management (N = 1,097). Intensive case management students also performed similarly to light-touch students (N = 78), with the exception of marginally outperforming them in terms of passing Math 090 ($p < .10$).

Given the small numbers of comparison students involved in the light-touch and intensive case management models, as well as the lack of controls for factors such as being a first-generation college student, we caution against drawing conclusions regarding the effectiveness of traditional case management. Taking Model 4 together with the other models, however, the overall results suggest that FastStart helped students successfully complete the developmental math sequence, enter gatekeeper math, and successfully complete gatekeeper math. After controlling for both the student success course and the light-touch case management components, this preliminary evidence suggests that there may be an independent effect of the accelerated paired-course structure that helps students to fulfill their developmental requirements.

5.4 Conditional Pass Rates in Gatekeeper Math

Programs meant to support student progression often run into resistance from faculty who worry that such programs may water down academic standards (Jaggars & Hodara, 2011). For example, faculty may worry that students who complete an accelerated version of developmental education are not sufficiently prepared for college-level coursework, which in turn may result in lower pass rates in the relevant college-level courses. While the results in Table 4 indicate that accelerated students are more likely to ultimately pass gatekeeper math, it is possible that this effect is driven entirely by increased enrollments in college-level math. Thus, it is unclear whether accelerated students who enroll in college-level math are more or less successful in the course in comparison to their peers who participated in regular developmental education. To investigate this possibility, we restricted the sample to only students who enrolled in a

gatekeeper math course and used Model 3 to predict the likelihood of earning a grade of C or better in the course. Among those who ever enrolled in gatekeeper math, there was no significant difference between accelerated and non-accelerated students in terms of whether they were likely to earn a C or better in the course (logit coefficient = 0.20, *SE* = 0.42, *n.s.*; predicted probabilities are that 80 percent of regular developmental students and 83 percent of FastStart students would earn a grade of C or better in the course). Thus, to the extent that we can rely on students' grades in the subsequent course as a proxy for preparedness, FastStart students, despite progressing more rapidly, seemed to emerge from developmental education with a level of preparedness similar to those who took the traditional sequence.

5.5 Discussion and Summary

Overall, our analyses indicate that students who participated in FastStart were more likely than otherwise similar students to pass the highest developmental math course as well as to enroll in and pass gatekeeper math courses. Although we accounted for measured student characteristics in our analyses, it is still possible that unmeasured characteristics contributed to this result. Students are screened in FastStart, and one in ten students declines to enroll after being informed of the demands of the program. It is also possible that FastStart attracts higher-quality teachers, which could in part account for their students' superior outcomes. On the other hand, the timing and nature of student gains suggest that such progress would be difficult, if not impossible, in the absence of compression. For example, Figure 6 shows that approximately 35 percent of Math 030/060 enrollees were able to successfully complete the highest developmental math course (Math 090) in their next semester. In the absence of FastStart, Math 090 completion within such a short timeframe would be structurally infeasible for students referred to Math 030. Moreover, these students received at least comparable preparation as their peers in traditional developmental math courses; their acceleration was not gained at the expense of substantive learning, as measured by grades in gatekeeper math courses.

We attempted to isolate the effects of certain program features in our analyses; by doing so it appears that the course compression structure may be the catalyst driving superior course performance outcomes. That is, after we controlled for participation in student success courses and case management, the apparent effect of the course structure

remains. This persistent pattern suggests that the longer term gains associated with the program are not primarily due to case management, although given the sample size and absence of some important variables, this can only be considered a suggestive conclusion.

In addition to accelerating their completion of math requirements, FastStart students also completed more overall credits than comparison students. Although they completed no more college-level credits than comparison students, the greater number of overall credits accumulated by FastStart students can be interpreted as a positive outcome, suggesting that the program students completed more remedial courses while finishing just as many college-level courses as the comparison students.

On the other hand, FastStart participation had no relationship with student retention, transfer, or completion. While it is possible that our three-year tracking period was too short to capture definitive outcomes for transfer or completion, it is also plausible that compressing developmental math courses does not generate the depth or breadth of change necessary to produce positive long-term outcomes. Subsequent FastStart cohorts have benefitted from recent program improvements, including learning communities that reach further into the college experience by combining a developmental and college-level course. Additional analyses of these cohorts may reveal longer term benefits.

6. Conclusion and Implications

When launched in 2005, FastStart exclusively used a compressed course model to accelerate the completion of the remedial sequence for students testing into multiple levels of developmental education. Its theory of action was simple—rather than taking a three-hour course in one semester followed by a second course in a subsequent semester, FastStart would combine the two courses into a six hour-per-week format taught in a single semester. The configuration provides students fewer opportunities to exit the developmental education sequence and has the potential to leverage expanded class time to diversify instructional activities and build more productive relationships among students and faculty. Our analysis suggests that FastStart makes it possible for students to complete the developmental math sequence and required gatekeeper math course more

quickly than would otherwise be possible, without harming other long-term academic outcomes.

FastStart also provides students an array of non-academic supports. Dedicated case managers coordinate various services, including intake, academic advising, and referrals to external resources. They also work closely with FastStart faculty to identify and assist struggling students. Students co-enroll in a customized student success course, and faculty build on the success course content by contextualizing career exploration and academic planning into the curriculum. FastStart faculty also receive support through a range of professional learning opportunities that are structured and incentivized. Indeed, FastStart provides a lens into the potential for developmental education reform to create opportunities to reshape the approach to faculty engagement and learning and to encourage the development of instructional approaches, relationships, and other practices that contribute to students' academic success. FastStart was the proving ground where these dimensions of teaching and learning were introduced and refined at CCD, but they need not be exclusive to developmental education. They are pieces of a larger puzzle of community college improvement that, to date, have received little attention. Harder to enact and evaluate than structural changes to courses, these pedagogical improvements represent new norms and expectations for both faculty and students with relevance across the entirety of a community college education.

Today, FastStart can be viewed as uniting two complementary models: one that harkens back to its origins and that accelerates the progress of students referred to multiple levels of developmental education through compression, and another that assists remedial students closer to the college-level cutoff through learning communities. The compression approach was studied in our quantitative evaluation, and it is the basis for the outcomes that we have reported. However, the learning communities model accounts for most of the growth of FastStart in recent years. While the number of compressed courses grew at a relatively steady rate between fall 2005 and spring 2012 (growing from three to 14 sections), the number of learning community courses jumped substantially between 2009 and 2012 (growing from one to eight sections, see Table 2). The overall growth of FastStart is evidence of the broad acceptance of the model among CCD faculty and administrators.

FastStart's current incarnation represents a significant achievement, but more needs to be done. A growing body of research suggests that single-semester interventions focused on developmental education, even mainstreaming models and learning communities that span into college coursework, are not strong enough on their own to influence longer term outcomes such as transfer and completion (Barnett et al., 2012; Cho, Kopko, Jenkins, & Jaggars, 2012; Rutschow et al., 2011; Visher, Weiss, Weissman, Rudd, & Wathington, 2012). Acceleration may need to be combined with other structures and practices, such as the integration of remediation into college-level coursework in particular streams of study or the delivery of an accelerated curriculum within the context of long-term academic and non-academic supports. For example, Washington State's well-regarded I-BEST program integrates basic skills instruction into college-level career-technical education courses, which has resulted in a perceptible increase in these programs' graduation outcomes (Zeidenberg, Cho, & Jenkins, 2010). However, I-BEST was designed for short-term (i.e., one year) credentials, and the results of the analysis may not be generalizable to community college students seeking longer term associate degrees or to transfer. Ongoing research on the City University of New York's Accelerated Study in Associate Programs (ASAP), which has generated positive early results, will shed light on whether a multifaceted and multi-year intervention can sustain improved student progress over three years (Scrivener, Weiss, & Sommo, 2012). Concerns about the cost of ASAP suggest it will be important to understand which program features may be most impactful on long-term outcomes.

The Colorado Community College System (CCCS), with the support of the Colorado Department of Higher Education, is moving in the direction of reassessing and redesigning developmental education, with the goals of reducing time spent in remediation and increasing student enrollment and success in college-level programs. The redesign foregrounds acceleration and provides colleges the opportunity to choose among various approaches based on their needs and preferences, including compression, learning communities, mainstreaming, modularization, and co-requisite models that link developmental education with specific curricular strands. The evidence presented here and elsewhere serves as a reminder that these models, while promising, should be implemented in concert with other longer term strategies to help sustain

academic progress throughout students' community college careers. To that end, the system's redesign of developmental education will provide new opportunities for CCD to extend features of FastStart more deeply into its college-level programs. Perhaps more important, from a systemic perspective, the redesign will help CCD to share what it has learned from FastStart about effective strategies in course organization, integrated student supports, pedagogic innovation, and professional development with other colleges that have only recently ventured into developmental education redesign.

References

Bailey, T. (2009). Challenge and opportunity: Rethinking the role and function of developmental education in community college. *New Directions for Community Colleges, 145*, 11–30.

Bailey, T., Jeong, D. W., & Cho, S. W. (2010). Referral, enrollment, and completion of developmental education sequences in community colleges. *Economics of Education Review, 29*(2), 255–270.

Barnett, E. A., Bork, R. H., Mayer, A. K., Pretlow, J., Wathington, H. D., & Weiss, M. J. (with Weissman, E., Teres, J., & Zeidenberg, M.). (2012). *Bridging the gap: An impact study of eight developmental summer bridge programs in Texas*. New York, NY: National Center for Postsecondary Research.

Bettinger, E. P., & Long, B. T. (2005). Remediation at the community college: Student participation and outcomes. *New Directions for Community Colleges,129*, 17–26.

Bettinger, E. P., & Long, B. T. (2009). Addressing the needs of underprepared students in higher education: Does college remediation work? *Journal of Human Resources*, *44*(3), 736–771.

Bickerstaff, S., Barragan, M., & Rucks-Ahidiana, Z. (2012). *"I came in unsure of everything": Community college students' shifts in confidence* (CCRC Working Paper No. 48). New York, NY: Columbia University, Teachers College, Community College Research Center.

Bickerstaff, S., & Edgecombe, N. (2012). Pathways to faculty learning and pedagogical improvement. *Inside Out*, *1*(3). Retrieved from http://www.scalinginnovation.org/pathways-to-faculty-learning-and-pedagogical-improvement/

Bragg, D. D. (2009). *Community College of Denver Breaking Through outcomes report*. Unpublished manuscript.

Bragg, D. D. (2010). *Ready for College in Colorado: Evaluation of the Colorado SUN and the College Connection program*. Champaign, IL: University of Illinois, Office of Community College Research and Leadership.

Bragg, D. D., Baker, E. D., & Puryear, M. (2010). *2010 follow-up of Community College of Denver FastStart program*. Champaign, IL: University of Illinois, Office of Community College Research and Leadership.

Bragg, D. D., & Barnett, E. A. (2008). *Final report of the Charles Stewart Mott Breaking Through initiative.* Unpublished manuscript.

Brancard, R., Baker, E. D., & Jensen, L. (2006). *Accelerated developmental education project: Research report*. Denver, CO: Community College of Denver.

Bryk, A. S. (2009). Support a science of performance improvement. *Phi Delta Kappan, 90*(8), 597–600.

Calcagno, J. C., & Long, B. T. (2008). *The impact of postsecondary remediation using a regression discontinuity approach: Addressing endogenous sorting and noncompliance* (NBER Working Paper No. 14194). Cambridge, MA: National Bureau of Economic Research.

Cho, S. W., Kopko, E., Jenkins, D., & Jaggars, S. S. (2012). *New evidence of success for community college remedial English students: Tracking the outcomes of students in the Accelerated Learning Program (ALP)* (CCRC Working Paper No. 53). New York, NY: Columbia University, Teachers College, Community College Research Center.

Corash, K., & Baker, E.D. (2009). *Calculating the productivity of innovation: Using a simplified cost-benefit analysis to promote effective practice*. Denver, CO: Colorado Community College System. Retrieved from http://cccs.edu/Research/costeffect.html.

Dadgar, M. (2012). *Essays on the economics of community college students' academic and labor market success* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses Database. (Accession Order No.3506175.)

Edgecombe, N. (2011). *Accelerating the academic achievement of students referred to developmental education* (CCRC Working Paper No. 30). New York, NY: Columbia University, Teachers College, Community College Research Center.

Fernandez, C. (2002). Learning from Japanese approaches to professional development: The case of lesson study. *Journal of Teacher Education, 53*(5), 393–405.

Hodara, M. (2012). *Language minority students at community college: How do developmental education and English as a second language affect their educational outcomes?* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses Database. (Accession Order No.3505981.)

Jaggars, S. S., & Hodara, M. (2011). *The opposing forces that shape developmental education: Assessment, placement, and progression at CUNY community colleges* (CCRC Working Paper No. 36). New York, NY: Columbia University, Teachers College, Community College Research Center.

Karp, M. M. (2013). *Entering a program: Helping students make academic and career decisions*. Manuscript in preparation.

Lewis, C., & Tsuchida, I. (1998). A lesson is like a swiftly flowing river: How research lessons improve Japanese education. *American Educator*, *2*(4), 12, 14–17, 50–52.

Lindstrom, P., & Rippetoe, C. (2012).Structure of success. In *FastStart: A faculty community of learners, a collection of practitioner reflections in accelerated developmental education learning community courses.* Unpublished manuscript. Denver, CO: Community College of Denver.

Martorell, P., & McFarlin, I., Jr. (2011). Help or hindrance? The effects of college remediation on academic and labor market outcomes. *Review of Economics and Statistics*, *93*(2), 436–454.

Quint, J. C., Jaggars, S. S., Byndloss, D. C., & Magazinnik, A. (2013). *Bringing developmental education to scale: Lessons from the Developmental Education Initiative*. New York, NY: MDRC.

Rosenbaum, J. E., Deil-Amen, R., & Person, A. E. (2009). *After admission: From college access to college success*. New York, NY: Russell Sage Foundation.

Rutschow, E. Z., Richburg-Hayes, L., Brock, T., Orr, G., Cerna, O., Cullinan, D., Kerrigan, M. R., Jenkins, D., Gooden, S., & Martin, K. (2011). *Turning the tide: Five years of Achieving the Dream in community colleges*. New York, NY: MDRC.

Scott-Clayton, J., & Rodriguez, O. (2012). *Development, discouragement, or diversion? New evidence on the effects of college remediation* (NBER Working Paper No. 18328). Cambridge, MA: National Bureau of Economic Research.

Scrivener, S., Weiss, M. J., & Sommo, C. (2012). *What can a multifaceted program do for community college students? Early results from an evaluation of Accelerated Study in Associate Programs (ASAP) for developmental education students*. New York, NY: MDRC.

Stigler, J. W., & Hiebert, J. (1999). *The teaching gap: Best ideas from the world's teachers for improving education in the classroom*. New York, NY: The Free Press.

Visher, M. G., Weiss, M. J., Weissman, E., Rudd, T., &Wathington, H. D. (2012). *The effects of learning communities for students in developmental education: A synthesis of findings from six community colleges.* New York, NY: National Center for Postsecondary Research.

Wehlage, G. G., Newmann, F. M., &Secada, W. A. (1996). Standards for authentic achievement and pedagogy. In F. M. Newmann& Associates (Eds.), *Authentic achievement: Restructuring schools for intellectual quality* (pp. 21–48). San Francisco, CA: Jossey-Bass.

Yoshida, M. (1999). *Lesson study: A case study of a Japanese approach to improving instruction through school-based teacher development* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses Database. (Accession Order No.9951855.)

Zeidenberg, M., Cho, S. W., & Jenkins, D. (2010). *Washington State's Integrated Basic Education and Skills Training Program (I-BEST): New evidence of effectiveness* (CCRC Working Paper No. 20). New York, NY: Columbia University, Teachers College, Community College Research Center.