



Accelerating the Academic Achievement of Students Referred to Developmental Education

Nikki Edgecombe

February 2011

CCRC Working Paper No. 30

A WORKING PAPER IN THE CCRC ASSESSMENT OF EVIDENCE SERIES

Across the first year of a major grant from the Bill & Melinda Gates Foundation, with supplemental funding from Lumina Foundation for Education, CCRC has gathered and synthesized a large body of research evidence regarding strategies that may improve the success of students who attend community college. Working papers in the *Assessment of Evidence Series* use the research literature to draw conclusions and provide evidence-based recommendations in eight major topic areas: developmental assessment, developmental acceleration, developmental mathematics pedagogy, contextualization of basic skills instruction, online learning, non-academic support, institutional and program structure, and organizational improvement. All the papers in the series are made available on CCRC's website (<http://ccrc.tc.columbia.edu>) as they are released.

Address correspondence to:

Nikki Edgecombe
Senior Research Associate, Community College Research Center
Teachers College, Columbia University
525 West 120th Street, Box 174
New York, NY 10027
212-678-3091
Email: edgecombe@tc.edu

This research was funded by the Bill & Melinda Gates Foundation. The author gratefully acknowledges Katie Conn and Mina Dadgar for their assistance with the research for this project.

Abstract

Acceleration, which involves the reorganization of instruction and curricula in ways that facilitate the completion of academic requirements in an expedited manner, is an increasingly popular strategy at community colleges for improving the outcomes of developmental education students. This paper reviews the literature on acceleration and considers the quality of evidence available on the effects of acceleration on student outcomes. After examining various definitions of acceleration to better understand what it is and how it works, the paper describes and categorizes the different acceleration models in use. Then, the recent empirical literature on acceleration is reviewed to assess the effectiveness of these approaches. While the empirical basis for acceleration is not as strong as is desirable, existing evidence suggests that there are a variety of models of course redesign and mainstreaming that community colleges can employ to enhance student outcomes. The paper closes with a discussion of the challenges involved in implementing acceleration strategies and recommendations for policy, practice, and research.

Table of Contents

1. Introduction.....	1
2. Acceleration: What It Is and How Can It Help Underprepared Students.....	4
2.1 A Definition and Discussion of Its Presentation in the Higher Education Literature.....	4
2.2 Acceleration and Developmental Education.....	6
3. Models of Acceleration	7
3.1 Course Restructuring.....	8
3.2 Mainstreaming with Supplemental Support or Through Contextualization	11
4. The Effects of Acceleration on Student Outcomes.....	14
4.1 Literature Review.....	14
4.2 Course Restructuring Outcomes	14
4.3 Mainstreaming Outcomes	20
4.4 Contrary Evidence.....	24
5. What Does the Promise of Acceleration Mean for Instructional Reform?	25
6. Challenges and Recommendations for Policy, Practice, and Research	27
6.1 Assessment and Placement	28
6.2 Course Development and Curricular Alignment.....	29
6.3 Student Recruitment.....	30
6.4 Faculty Resistance.....	31
6.5 Financial Sustainability.....	32
6.6 Administrative Logistics	33
6.7 Actionable Research.....	34
7. Conclusion	35
References.....	37

1. Introduction

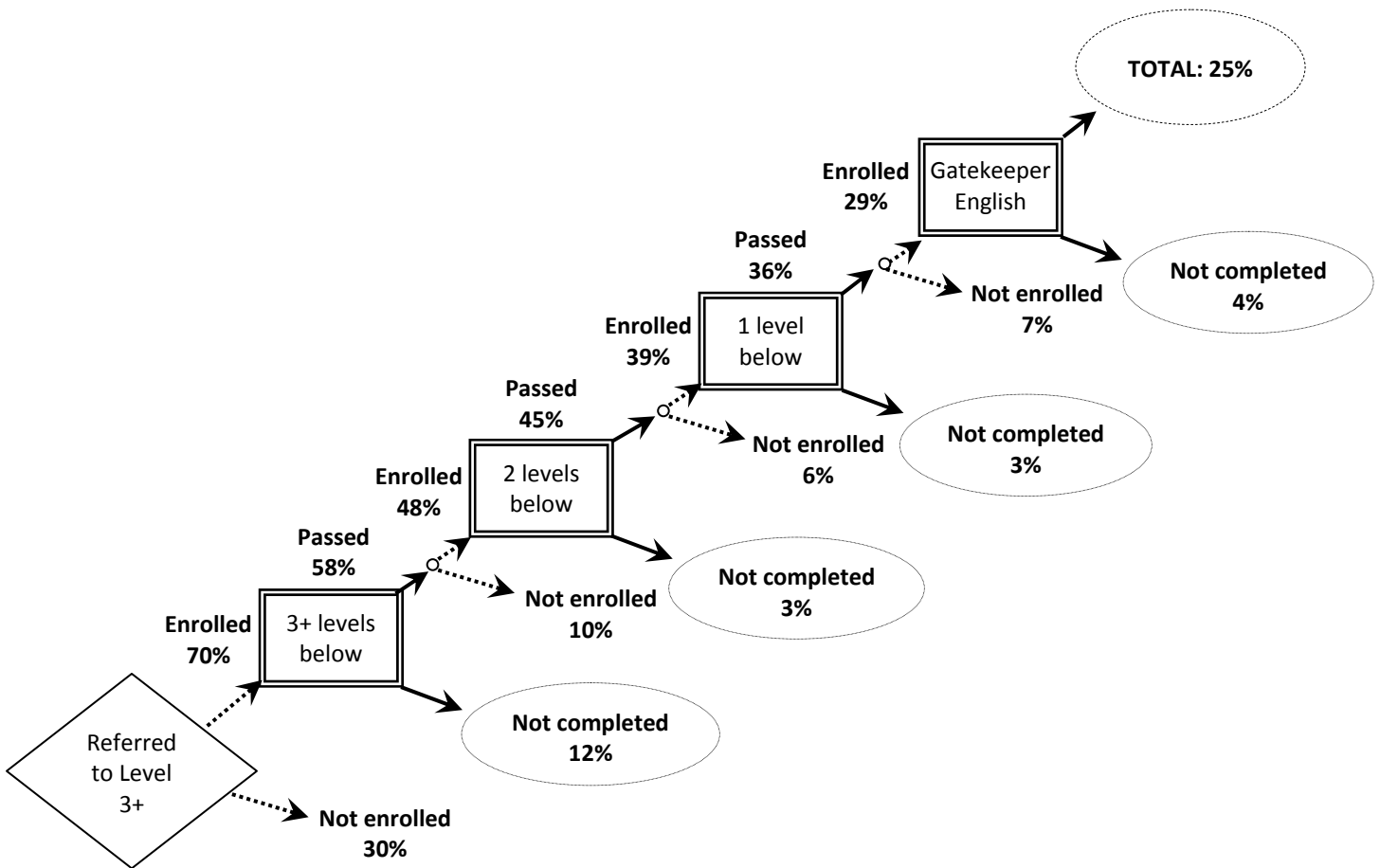
There is mounting evidence that following the traditional sequence of developmental education courses is hindering community college students from progressing to college-level coursework and ultimately earning a credential. The Community College Research Center conducted an analysis of Achieving the Dream data and found that only 31% of students referred to developmental math and 44% of students referred to developmental reading completed the recommended sequence of courses within three years (Bailey, Jeong, & Cho, 2008). Students referred to the lowest levels of the developmental sequence fared significantly worse—only 16% of math students and 22% of reading students completed remediation when they began by enrolling in courses that were three or more levels below the college level.

Obscured in the aggregate non-completion figures is important information about why students do not persist to college coursework. Many students never enroll in the courses to which they are initially referred, while others drop out between courses in the sequence. Bailey et al. (2008) found that among students referred to the lowest levels of developmental math and reading, 42% and 60%, respectively, failed to enroll in the next recommended course at some point in the sequence. Unfortunately, the non-enrollment issue is not limited to the developmental sequence. Eleven percent of math and 12% of reading students who completed all developmental education requirements did not enroll in the introductory college-level math or English course required for degree completion or transfer to a four-year college. This analysis illuminates a major structural deficiency in the traditional sequence—a multitude of exit points available to and taken by students—that seriously undermines academic achievement.

Practitioner research affirms that the structural obstacles within the traditional developmental education sequence inhibit student progress. Hern (2010) describes a conceptual framework developed by Myra Snell of Los Medanos College called the “multiplication principle,” which describes how students are shed at each level of the sequence, diminishing the pool of students that ultimately persists to the college level. According to this principle, the multiple levels of developmental courses are “harmful” to students because they dramatically decrease students’ likelihood of completing transfer-level courses.

The cumulative consequences of non-enrollment are illustrated in Figure 1 (Bailey & Cho, 2010).

Figure 1
Developmental Reading Exit Points Analysis: 2001–2005 Cohorts



It is unclear precisely why students choose not to enroll in their first or subsequent developmental education courses. Multiple factors, including competing work and family interests, discouragement, and differing self-assessments of ability, may play a role. The devastating impact of non-enrollment, however, is obvious, and it has led an increasing number of practitioners to experiment with restructuring the developmental sequence to capture and retain as many students as possible while accelerating their pathway to college coursework. While researchers have not found a silver bullet, a small but growing

body of evidence highlights the need for an array of multisystem solutions designed to reduce impediments to sustained enrollment, streamline the delivery of developmental education content, and provide targeted academic and non-academic support.

Advocates of acceleration believe that the rate at which academically underprepared students complete remedial instruction and succeed in college-level courses can be increased by helping students proceed through requirements more quickly or by encouraging them to enroll in higher-level courses while providing effective academic support. Implicit in this belief is the notion that something is broken within the traditional developmental education sequence—that students would benefit from alternatives that minimize the number of exit points and allow them to complete requirements more quickly or skip the sequence altogether. Skeptics argue that underprepared students need more time—in and out of class—to master competencies required for college-level coursework, and they contend acceleration may not be an effective alternative to the traditional sequence for some students. More generally, the notion of providing developmental coursework to underprepared students in an accelerated fashion (i.e., in less time) seems counterintuitive to many.

Recent research suggests that the faster students progress toward a credential, the more likely they are to complete college (Bowen, Chingos, & McPherson, 2009). The same dynamic applies to discrete portions of the college experience, such as the developmental education sequence or program degree requirements (Bailey et al., 2008; Hern, 2010). Policymakers and the philanthropic community have seized upon this time-to-degree evidence and established ambitious credential completion goals in an effort to encourage postsecondary institutions, particularly community colleges, to focus on interim and final academic outcomes. A separate but related issue is the economic rationale for acceleration (i.e., reducing the cost of college, limiting lost wages), which is frequently discussed in the trade press (see, e.g., Moltz, 2010).

Given the increasing focus on improving student outcomes by reducing time-to-degree, this paper explores the evidence on the effects of acceleration. After examining various definitions of acceleration to better understand what it is and how it works, the paper describes and categorizes the different acceleration models that are being used with developmental education students. Then, the recent empirical literature on acceleration is

reviewed to assess the effectiveness of these approaches. The paper closes with a discussion of the challenges involved in implementing acceleration strategies and recommendations for policy, practice, and research.

2. Acceleration: What It Is and How Can It Help Underprepared Students

2.1 A Definition and Discussion of Its Presentation in the Higher Education

Literature

Within this paper, acceleration is defined as the reorganization of instruction and curricula in ways that facilitate the completion of educational requirements in an expedited manner. Importantly, this definition does not necessarily imply that students spend less total time in class. Many accelerated course formats require the same number of instructional contact hours as traditional classes. The difference is that those hours occur within a truncated timeframe, which can result in the quicker completion of coursework or credentials. Wlodkowski (2003) asserts that “accelerated learning programs are structured for students to take less time than conventional (often referred to as traditional) programs to attain university credits, certificates, or degrees” (p. 6). The intentionality of this structure is arguably its strength in that it explicitly frames an expedited academic pathway as means to credit accumulation and credential completion.

Although the focus of this review is on the application of this concept to developmental education, forms of acceleration are ubiquitous in higher education, and there is an expansive literature describing its various manifestations, including summer school and other courses with non-traditional term lengths. Accelerated courses—also referred to in the literature as *intensive*, *compressed*, *condensed*, and *time-shortened*, among other terms—are commonplace and designed to meet students’ demands for more flexible course scheduling (Scott & Conrad, 1992). Martin and Culver’s (2007) defense of summer sessions highlights empirical evidence suggesting the academic rigor of intensive courses and the outcomes of students who take them are equal to those of full-term courses. The authors conclude that the research demonstrates that intensive courses are not “inferior” to traditional courses and that, in certain cases, they might be

“superior.” Interestingly, however, Martin and Culver note higher failure rates in intensive courses with heavy reading requirements, illuminating the negative consequences of having less out-of-class time to complete reading and other assignments. Daniel (2000) emphasizes the potential scheduling benefits of “time-shortened” course formats for nontraditional-age college students in her review of the research on intensive courses. She also addresses questions of academic rigor by examining student learning and finds consensus in the literature that time-shortened courses generate comparable and, in some cases, better learning outcomes than traditional course formats. However, Daniel notes that the reliability of evidence is questionable given the methodological weaknesses of most of the studies.

Seamon (2004) conducted a matched-pair analysis comparing student outcomes in intensive and semester-length educational psychology courses and concluded that intensive courses are the superior instructional format if instructional time is equal. He cautions, however, that there is no comparative benefit in terms of student retention of course material. In contrast, Austin and Gustafson (2006) examined the relationship between course length and student learning and found that students in accelerated courses not only earn higher grades but also retain more learning. The authors compared learning outcomes in various summer course configurations and concluded that the optimal length for an intensive course is roughly four weeks.

Gallo and Odu (2009) investigated the impact of the frequency of lectures (i.e., multiple short lectures or one longer lecture per week) on student achievement at a community college. The authors found that the frequency of lectures has a significant effect on college algebra achievement. Students who took college algebra via a one-day-per-week schedule (i.e., Saturday morning) scored significantly lower on their final examination than students who took college algebra either two or three times a week. Gallo and Odu attribute the achievement differences to spacing effect theory, which suggests there is an optimal amount of time that should pass between the presentation of new concepts to enable more effective memory storage and retrieval processes. Other researchers of instructional spacing have suggested that breaking up content and distributing it across multiple learning sessions influences performance as much as the notion of an optimal time gap (Rohrer & Pashler, 2010).

While few authors elaborate on precisely why or how courses offered in shortened formats frequently generate comparable, if not superior, outcomes for students, there is a general sense that compressed courses give students “less time to forget” content. This may be a reflection of both the shortened timeframe and more in-depth learning that could occur during instructional blocks that are generally longer. For example, a three-credit course that meets three times per week for 50 minutes in a traditional 16-week semester might meet twice per week for two and a half hours in an 8-week format. The aggregate instructional contact hours may be the same in the 16- and 8-week formats, but the instructional activities and relationship building that are possible during longer instructional blocks could positively affect learning. Questions remain regarding the impact of compressed courses on retention, however. An alternative explanation of student success in compressed courses is that they provide a smaller window of time for other issues—such as work and family—to interfere with academic progress. Frequently, students who are capable of successfully completing coursework stop attending class during the course of the semester due to a variety of issues unrelated to their academic abilities (Edgecombe, 2011).

2.2 Acceleration and Developmental Education

For students referred to developmental education, reorganizing instruction and curricula to facilitate the rapid completion of educational requirements involves a departure from the multi-course sequence in favor of a streamlined structure that will ultimately better support students’ college-level degree program learning objectives. This approach to developmental education takes care not to simply repeat a primary or secondary school version of math, reading, or English. It is grounded in the view that developmental education should prepare students for success in subsequent coursework through exposure to rigorous performance standards and practice in skills and habits associated with consistently high academic achievement. The accelerated structure complements this reframing of developmental education teaching and content and acknowledges the complicated lives of many students by purposefully reducing the time required to complete these academic requirements.

These guiding principles draw on a decades-old push to radically rethink our approach to educating underprepared or otherwise disadvantaged students. The Accelerated Schools Project, developed by Henry Levin and his Stanford University colleagues in the 1980s to serve low-performing elementary school students, employed pedagogical strategies typically reserved for the gifted and talented within a comprehensive school improvement model (Levin, 1991, 2005). Levin argued that the existing educational process subjected at-risk students to compensatory instruction designed to decrease the pace of student learning and the rigor of the curriculum under the assumption that these children, in particular, needed more time to master less demanding content. Over time, compensatory education reproduced inequity by putting disadvantaged students further and further behind (Levin, 1991, 1993). Equally deleterious were the affective consequences. Compensatory education dampened the performance expectations of both students and teachers, creating a dangerous, self-reinforcing cycle that persisted across grade levels (Levin, 1993; Levin & Hopfenberg, 1991). The cumulative consequences of the remediation problem allowed researchers to extend Levin's analysis beyond K-12 schools and begin to assess the feasibility of acceleration, in lieu of remediation, within the higher education sector (Koski & Levin, 1998).

3. Models of Acceleration

A scan of the empirical literature on approaches designed to accelerate students' progress through developmental education sequences yielded a variety of strategies in use, categorized and described below. The acceleration approaches are grouped into two broad categories and several subcategories, based on their dominant design characteristics. It is important to note that individual programs may integrate multiple design elements. Excluded from this presentation of acceleration models are short-term intensive remediation programs, such as test prep boot camps or intersession tutorials, designed to generate a higher developmental education placement or result in students testing out of remediation altogether. A comprehensive scan and analysis of these models is available elsewhere (Sherer & Grunow, 2010).

3.1 Course Restructuring

Among the most popular acceleration models are those that restructure courses, either by reorganizing instructional time or modifying curriculum, in order to reduce the time necessary to fulfill developmental education requirements. Examples of course restructuring include compressed courses, paired courses, the elimination of courses, and new or modified courses that incorporate significant curriculum redesigns and replace one or more classes at the developmental or college level. These strategies accelerate achievement by helping to reduce leakage points in the developmental education sequence through the elimination of course requirements and the incorporation of content with stronger linkages to the college curriculum.

Compressed courses. Compressed configurations combine multiple developmental courses and allow students to complete sequential courses in one semester instead of two or more. Typically, the content of a single course is compressed into a seven- or eight-week segment, which is followed immediately by the next course in the sequence, also taught in a compressed format. Notably, students register for at least two sequential courses at the start of the semester, reducing the likelihood that they will never enroll in a subsequent course. Although the length of the course is shortened, the instructional contact hours are the same as in a traditional 16-week course. Therefore, depending on scheduling, class periods tend to be longer and generally require instructors to modify lesson plans. Students receive grades for each compressed course. If students do not pass the first course, they are not permitted to move on to the second.

Advocates of compressed courses believe that longer instructional blocks provide opportunities for teachers to diversify classroom activities and to encourage the development of stronger student–instructor relationships—both of which are assumed to benefit student learning. Additionally, the compressed format facilitates the rationalization of redundant content by reducing the amount of time dedicated to review, leaving more time to engage challenging material in greater depth (Bragg & Barnett, 2008). The FastStart program at the Community College of Denver fully leverages the efficiencies enabled by content overlap, offering a compressed four-course, 12-credit developmental reading and English combination in a single 16-week semester.

Paired courses. Paired courses generally link developmental and college-level courses with complementary subject matter. For example, an upper-level developmental writing course may be paired with a college literature class. The purpose of such a combination would be to provide students the opportunity to develop their writing skills using literature as content; simultaneously, students' ability to analyze the literature would be enhanced by the writing exercises. This interaction would be bolstered through co-teaching by two instructors and a syllabus that fully integrates the content of both courses. Paired courses are offered as a unit, which means the same students are in each class. This cohort structure has the potential to generate a level of connectedness and support among students that is absent from typical course configurations, as discussed in more detail in Karp's (2011) paper in this series. Cohorts also are associated with stronger social relationships and improved retention in the learning communities literature (Engstrom & Tinto, 2008; Scrivener et al., 2008; Tinto, 1997; Weiss, Visher, & Wathington, 2010).

The acceleration mechanism for paired courses allows students to simultaneously pursue developmental and college coursework and thus begin to accrue college credit earlier than they would if they were required to complete all developmental education courses first. The paired structure not only eliminates exit points between developmental and college classes that would otherwise be taken in different semesters but also makes basic skills instruction more relevant to students through immediate linkages with the college curriculum. There is a likely psychological benefit as well, as students feel more like "real" college students tackling higher-level coursework instead of simply rehashing middle or high school content. Paired courses also have the potential to bypass prerequisite requirements that may prohibit developmental students from taking college-level courses. The rationale for waiving prerequisites for pairings that include introductory college courses is that the curricular integration across courses allows for more "just-in-time" remediation tailored to the needs of students. Even at colleges where developmental and college-level courses are co-requisites, students who take the courses separately do not benefit from the interaction of content or the cohort effect, which may diminish their likelihood of successful completion.

Curricular redesign. While curricular redesign can take many forms, its acceleration mechanism is fairly consistent—the time to complete developmental education requirements is reduced by decreasing the number of courses students have to take. These course reductions are not done indiscriminately; redundant content is eliminated and the remaining curriculum is generally modified to meet the learning objectives of a particular intervention or academic pathway. For example, the curricula of multiple developmental education courses can be consolidated into a single-semester course. New courses typically cover more content (even with curriculum rationalization) and require more instructional contact hours, and they therefore are offered for more credit than their legacy components. A more radical but increasingly popular curricular redesign strategy discards the multi-course sequence altogether and creates a single developmental bridge course closely aligned to the college curriculum or a specific program of study.

Curricular redesign can also occur through the elimination of developmental courses and the modification of college courses. For example, in order to comply with new state policy prohibiting the offering of developmental education at four-year institutions, Middle Tennessee State University (MTSU) launched a pilot program in which they eliminated two developmental math courses (elementary and intermediate algebra), developed a new general education college-level math course, and modified two general education math courses required for most major degree programs (Lucas & McCormick, 2007). MTSU's alternative path, comprised entirely of college-level courses, is designed to accelerate progress to gatekeeper math by eliminating one or two semesters of remedial coursework, depending on students' original placement. Equally importantly, however, is the affective dimension of this remedy, an implicit benefit of models that expose developmental students to college coursework immediately. Students are enrolled in courses in which they can earn college credit—in this case, elective credit for the new course and general education credit for the modified gatekeeper courses. Unlike traditional developmental courses, in which students only earn institutional credit, these courses count toward degree requirements, which may influence how much effort students put forward.

The conversion of developmental content into modules is another curricular redesign strategy gaining momentum. However, modular instruction may or may not accelerate student progress. Although modular instruction has been in use in various forms for decades (Goldschmid & Goldschmid, 1973), it has regained popularity in recent years as an explicit strategy to individualize instruction and, when combined effectively with technology, as a cost-effective way to provide developmental education (Twigg, 2005).

Modular approaches to acceleration operate under two different theories of action. The first suggests that students need to spend more time mastering certain competencies and less time on others. Thus, modules may accelerate student progress because they permit a more customized and efficient approach to learning. For students who simply need to “brush up” on certain skills, modules may be a quicker route to college-level coursework than a multi-stage developmental course sequence. Students who need more time to demonstrate competency can have sustained practice in troublesome areas. The second way modular instruction may accelerate progress for developmental students is through a rationalization of the curriculum. An ongoing debate persists regarding how much math instruction college students need, particularly those not pursuing credentials in the fields of science, technology, engineering, or mathematics (STEM). Modules allow practitioners to reduce the amount of material students must cover and focus only on the competencies necessary for success in specific academic pathways. With a smaller curriculum to cover, students pursuing general education degrees, for example, may be able to fulfill developmental requirements and move on to college-level coursework in less time. The challenge inherent in modularized instruction is pacing. How do practitioners keep students from stalling along the way? One strategy is to embed mandatory assessments or other structured check-ins at regular intervals to ensure that students are making adequate progress.

3.2 Mainstreaming with Supplemental Support or Through Contextualization

Mainstreaming strategies accelerate students’ progress by placing developmental students directly into college-level courses, thus bypassing the traditional remedial course sequence. Colleges may choose to recruit students with higher developmental placement

scores for mainstreaming programs, since they are similar to if not academically indistinguishable from many of their college-ready peers (Calcagno & Long, 2008). The stigma associated with developmental placement has the potential to dampen community college students' enthusiasm and motivation and negatively affect their academic performance (Bailey, 2008). Mainstreaming may reduce the negative implications surrounding the distinction between developmental and college-ready students and increase the academic achievement of all students (Levin & Hopfenberg, 1991). It is important not to underestimate the potential boost to motivation and purpose that students, particularly those placed into remediation, experience when given the opportunity to earn college credit.

Mainstreaming with supplemental support. Mainstreaming with supplemental support involves placing students with developmental education referrals directly into introductory college-level courses and providing additional instruction through mandatory companion classes, lab sessions, or other learning supports. Depending on the structure of the intervention, student progress can be accelerated through the simultaneous completion or elimination of developmental requirements. Moreover, with college-ready and developmental students enrolled in the same college-level course, there are more opportunities for underprepared students to be exposed to the classroom practices and work habits of higher-achieving students and to engage with a more challenging and potentially enriching curriculum. The supplemental support experiences are explicitly designed to increase the likelihood of success in the college course. During these sessions, students may review concepts presented in the college class in greater depth, address particular skills necessary to complete an assignment, preview upcoming lessons or assignments, or participate in a variety of other tailored activities. To maximize the potential of the model, it is important to have instructional continuity across the college course and supplemental sessions. The Accelerated Learning Program (ALP) at the Community College of Baltimore County (CCBC), for example, uses the same instructor for the introductory college composition and supplemental companion courses.

A community college's ability to mainstream students may be limited by its placement policy. Mandatory developmental education placement policies may require

colleges to incorporate into the mainstreaming model a component that allows students to fulfill their developmental requirements. CCBC addressed this limitation by creating a customized version of upper-level developmental English to serve as the companion course. With ALP, students receive grades for both the college and companion (i.e., developmental) courses and must pass both to move on to subsequent college English classes.

Basic skills integration. Integrating basic skills instruction into college-level courses is a form of contextualization and a means to accelerate student progress. Integration, which incorporates basic skills instruction into specific college-level courses, is designed to remediate students' academic deficiencies in instructional contexts that are more relevant than traditional developmental or adult basic skills classes (Perin, 2011). Students accelerate their progress by avoiding the developmental education sequence completely and instead enrolling in specially designed college courses, which are occasionally co-taught by disciplinary and developmental education faculty.

Advocates of contextualization emphasize its meaningfulness to students. Teaching is embedded in relevant disciplinary content or draws from real-life situations to which students relate. Some career and technical education divisions have implemented programs designed to leverage the enhanced transfer of skills purported by contextualized learning. A notable example is the Washington State community and technical college system, which developed the Integrated Basic Education and Skills Training Program (I-BEST) program explicitly to accelerate the completion of credentials in high-demand employment fields. I-BEST integrates basic skills instruction into college-level occupational courses jointly taught by career-technical faculty and basic skills instructors.

4. The Effects of Acceleration on Student Outcomes

4.1 Literature Review

Despite the increasing popularity of acceleration as a strategy to improve the academic outcomes of students referred to developmental education, there is a limited body of empirical literature that evaluates the effectiveness of these types of interventions. The review that follows draws from a variety of peer- and non-peer-reviewed sources.¹ In order to be included, the studies had to present student outcome data, such as course success rates, sequence completion rates, grade point averages, subsequent course performance, or credential completion. Twelve empirical studies met the appropriate criteria and were included in this review. The majority of these studies did not include control groups, which limits the inferences that can be made from the findings. This section concludes with a brief presentation of evidence on non-accelerated (i.e., extended or decelerated) instructional formats.

4.2 Course Restructuring Outcomes

Compressed courses. Many community colleges provide developmental education courses in compressed formats; however, there were few available articles or reports on student outcomes in compressed developmental education classes. Sheldon and Durdella (2010) conducted an analysis of historical enrollment records to examine the relationship between course length and student outcomes for developmental English, math, and reading courses at a large, suburban California community college. Using no statistical controls, the authors compared the success rates of students who took compressed (i.e., 5–9 week) and full-semester (i.e., 15–18 week) courses and found higher course completion rates (with a grade of C or higher) among students taking the

¹ The literature review methodology included a search of education, economics, and general social sciences databases including ERIC, JSTOR, Education Full Text (Wilson), ProQuest and Social Sciences Citation Index, among others, for relevant articles, books, and dissertations dating back to 1990. Database queries were supplemented with targeted internet searches for reports, evaluations, and conference papers posted to the websites of colleges, foundations, professional or advocacy organizations, and research centers. This broad search parameter was necessary because most of the available analyses of developmental education acceleration have been conducted by practitioners who have not published their work in academic journals. Lastly, limited citation crawling was conducted from some of the higher-quality sources. Although plentiful, conference presentations were excluded from this review because the majority lack sufficient information about the intervention, research design, and outcomes.

compressed format. English course success rates were 76% and 87% for the 5–6 week and 8–9 week formats, respectively, compared to 57% for the full-semester courses. Similarly, math course success rates were 58% and 65% for the 5–6 week and 8–9 week formats, respectively, compared to 51% for the full-semester courses. The authors report comparable outperformance in reading, although only 5–6 week and 15–18 week options were compared due to low enrollment in the 8–9 week format. Additional analyses by Sheldon and Durdella controlled for age, ethnicity, and GPA and found students in compressed courses were more likely to earn a grade of C or higher than students in traditional formats. Although this study presents results for a single institution and a single course—thus limiting external validity and not addressing the detrimental effects leakage within the sequence—the results suggest that students referred to developmental education may achieve superior academic performance in accelerated course structures.

Preliminary (Brancard, Baker, & Jensen, 2006) and subsequent (Bragg, 2009) analyses of Community College of Denver’s FastStart provide useful information about longer-term student outcomes. FastStart offers students a range of compressed and paired developmental education course options, combining two to four courses in a single semester. Depending on the number of credits, courses range from two and a half to four and a quarter hours per class session and generally meet two days per week. FastStart students are screened prior to participation in the program and provided intensive case management services. First-time college students enrolled in the program must take a specially designed student success course as a corequisite. Additionally, students are expected to complete 20 hours per semester of lab time through the tutoring center or study groups.

Brancard et al.’s (2006) preliminary descriptive analysis concluded that FastStart students have higher developmental course completion rates. Bragg’s (2009) more recent descriptive analysis found that FastStart students complete more developmental math courses, accumulate more developmental math credits, and are more likely to pass college-level math courses than non-FastStart students. FastStart faculty attribute higher student achievement to the longer instructional blocks, which allow for more effective pedagogy and relationship building with students. An evaluation of FastStart conducted for the Breaking Through initiative (Bragg & Barnett, 2008) supports the faculty

perspective. Bragg and Barnett (2008) note that while students in compressed and traditional courses may receive the same amount of instructional time, students in compressed courses may benefit because instructional blocks are longer and redundancies across the curricula can be reduced. These results must be interpreted cautiously since Brancard et al. and Bragg rely on descriptive statistics and do not statistically control for differences in student characteristics. Ongoing analyses of FastStart by the Community College Research Center seek to address these methodological weaknesses and provide a more rigorous assessment of students' short- and long-term academic outcomes.

An analysis of remediation pilots at Ivy Tech, Indiana's 23-college statewide community and technical college system, yielded similar positive results (Brown & Ternes, 2009). Several Ivy Tech institutions participated in a pilot program designed to test various models of accelerated remediation during the 2007–08 academic year. At the Evansville campus, compressed courses, which consisted of two eight-week sessions of sequential developmental coursework, were compared to the traditional sequence. A case manager recruited, screened, and advised pilot participants. Students in accelerated writing, reading, and math sections had higher success rates than students in the 16-week format. Specifically, 71% of students successfully completed the two-course sequence of the low and middle levels of developmental math offered in the 8-week format. Only 52% of students taking the same two courses in the 16-week format were successful. Similar statistically significant percentage differences were observed for the two-course developmental reading sequence, where 58% of students in the accelerated sections were successful compared to 25% in the traditional format. Percentage differences for the upper-level math courses and the English courses showed a similar pattern but were not statistically significant. Additionally, a higher proportion of accelerated students persisted into the spring semester. Results from the compressed course pilot at the Fort Wayne campus also were positive and statistically significant for the upper-level developmental math and reading pairings. Notably, the Fort Wayne analysis highlighted a 50% lower withdrawal rate in the accelerated format.

The Ivy Tech statistical evaluation was primarily descriptive and did not attempt to control for differences in observable student characteristics between groups. Furthermore, the screening of students likely exacerbated these differences, and the

sample sizes were quite small in certain comparisons, limiting what can be inferred from comparative analyses. Finally, the short period of time in which students were followed provides no information about the mid- or long-term implications of these course formats. Therefore, it is difficult to draw firm conclusions based on the Ivy Tech remediation pilot analysis.

Curricular redesign. The limited body of empirical evidence on curricular redesign as a strategy to accelerate the progress of students referred to developmental education is promising, but it warrants further examination. Hern (2010) presents positive results from redesign initiatives at two community colleges in California. In both cases, the multi-course sequence was modified to create a shorter pathway to college coursework. At Chabot College, students self-place into either an accelerated one-semester integrated developmental reading-and-writing course or a two-semester alternative. Notably, the accelerated course does not replicate or compress the two-semester curriculum; it builds backward from college English requirements to offer a more strategic alignment with the college curriculum. Hern's descriptive statistical analysis finds that students who take the accelerated one-semester course complete college-level English at twice the rate of students who take the two-semester developmental sequence. Specifically, 45% of students from the accelerated course complete college English compared to 23% from the traditional sequence. Additionally, a larger proportion of accelerated students who take the college-level course pass it, compared to students coming from the longer sequence. The open-access model, which allows students to self-place into either course format, is a unique feature of Chabot's acceleration efforts and raises questions about the accuracy and benefits of the formal developmental assessment and placement systems used at most colleges. For example, logistic regressions and other analyses conducted by an external evaluator suggested that ACCUPLACER test results provided little predictive value in determining which Chabot students should take the accelerated track and which should take the slower track. (For more on the predictive validity of developmental assessments, see Hughes and Scott-Clayton [2011].)

Hern (2010) also reports results from a preliminary analysis of Statpath, an experimental course in developmental statistics first offered in fall 2009 at Los Medanos

College. This curricular redesign resulted in a six-unit, one-semester developmental statistics course designed to teach students the concepts and processes needed to be successful in college-level statistics. The rationale for Statpath is that most Los Medanos students do not pursue academic programs that require advanced algebraic knowledge, which is the focus of the traditional developmental math sequence. A statistics pathway is a more relevant and practical approach to quantitative skill building. Statpath, like the initiative at Chabot, does not require students to have a minimum ACCUPLACER score to enroll in the course. Early results of Statpath are promising. Of the 29 students who enrolled in the accelerated statistics course, 28 completed the course and 22 earned a grade of C or higher. Twenty of the 22 successful students enrolled in the college-level statistics class in the spring semester, and 17 passed the course with a grade of C or higher. Overall, 59% of the original Statpath cohort completed the transfer statistics course in the same academic year.

The open-access structure of Statpath also allows for a closer examination of outcomes for students who place into the lowest level of developmental math (i.e., arithmetic/pre-algebra). A third of the original Statpath cohort was comprised of students who placed into the lowest level of developmental math, and their completion rates were not as high as those of other Statpath students. Their completion rates, however, were dramatically higher than those of lowest-placement students who enrolled in the traditional developmental math sequence. Specifically, 38% of Statpath students who placed into arithmetic/pre-algebra completed college statistics, compared to only 5% in the traditional algebra sequence.

Although these results are promising, the analyses of the Chabot and Los Medanos accelerated courses have methodological limitations. First, both analyses of course outcomes are descriptive and do not control for observable student characteristics. The Los Medanos results in particular are very preliminary, and attempts to rigorously assess the effectiveness of Statpath are hampered by the small sample size and lack of statistical controls.

Both the interventions at Chabot and Los Medanos Colleges focused on redesigns within developmental education, but similar curriculum modifications targeting students referred to developmental education have also occurred at the introductory college level.

As noted earlier in this paper, Middle Tennessee State University (MTSU) eliminated its developmental math courses and created a new college credit-bearing pathway to gatekeeper math courses for students with low assessment scores (Lucas & McCormick, 2007). Three new college courses were developed—an introductory course focused on the content and learning strategies students need for success in college math as well as modified versions of two gatekeeper math courses that incorporate additional foundational algebra content. To address potential skill deficits, the new and modified courses include three hours of classroom instruction and an additional two hours of lab time each week. Students are placed into one of the three course options based on ACT, SAT, or COMPASS scores. Unlike typical developmental education, all courses are offered for elective or general education credit.

Lucas and McCormick conducted a series of analyses examining outcomes across course offerings at MTSU. However, it does not appear that they controlled for observable student characteristics. The authors compared percentage differences in course success rates (i.e., the percentage of students who received a grade of C or higher) and found no statistically significant differences for underprepared students who took the modified gatekeeper courses compared to students in the regular sections. It is important to note that modified sections required more instructional contact hours than regular sections, which may have bolstered student performance. Moreover, there was a statistically significant difference in success rates between students in the modified courses and students in the regular sections who had previously taken developmental math at MTSU or another institution. Students in the modified sections outperformed their peers by 9 to 14 percentage points. MTSU's pilot has shown results suggesting that underprepared students may be able to successfully navigate redesigned college-level content, effectively bypassing the traditional developmental education sequence.

South Texas College (STC) piloted a number of interventions across developmental math, English, and reading to help eliminate barriers to course completion for students at different levels within the sequence (South Texas College, Office of Institutional Effectiveness and Assessment, 2010a, 2010b, 2010c). The analyses available for these interventions are primarily descriptive and do not include statistical controls to offset the potential effect of self-selection. One study on self-paced modules pilots found

strong results, but these results may not be reliable, given the small sample sizes of the cohorts (South Texas College, Office of Institutional Effectiveness and Assessment, 2010c). STC students attempting to repeat the mid-level developmental math course for at least the third time were given the option to enroll in a self-paced modularized format. The analysis indicates that 82% of students enrolled in the modules pilot successfully completed the course, compared to 45% of students enrolled in the traditional mid-level math course in fall 2008. Strong performance persisted in the summer 2009 session, in which 88% of students taking the self-paced modules passed, compared to 71% of students taking the traditional math course. STC also offered an online self-paced version of the highest developmental English course in spring 2009. The course pass rate was 90%, higher than the 75% in the traditional face-to-face classroom. Notably, 30% of students completed the online self-paced English course early—highlighting the potential of modules to accelerate academic progress, though only for a minority of students in this pilot. These online course results are noteworthy and warrant further examination, given lingering questions regarding the appropriateness of online formats for developmental students. (For additional information on online courses, see the paper by Jaggars [2011] in this series.)

4.3 Mainstreaming Outcomes

Mainstreaming with supplemental support. Growing evidence suggests that instructional approaches that mainstream underprepared students may be effective in improving their short- and long-term academic outcomes. Adams, Gerhart, Miller and Roberts (2009) report results from the Accelerated Learning Program (ALP) at the Community College of Baltimore County. The program was designed to address “leakage” in the developmental English sequence that is thought to be a consequence of the multi-course structure and the stigma associated with being labeled a weak writer. ALP places eight students who tested into the highest level of developmental English into a 20-person introductory college composition course with students who qualified for the class through placement testing or the completion of prerequisite coursework. The eight ALP students also attend a companion course, which meets immediately after the college class and is taught by the same instructor. The content, instructional activities, and

performance standards of the college composition course are identical to other non-ALP sections of the class. In contrast, the content and instruction of the companion course are explicitly tailored to help ALP students to meet the performance requirements of the college English course. Preliminary evaluations indicate 63% of ALP students passed the introductory college-level composition course within two academic years, compared to 39% of non-ALP developmental English students. A follow-up analysis using rigorous statistical controls affirms Adams et al.'s findings of superior outcomes for ALP students. Jenkins, Speroni, Belfield, Jaggars, and Edgecombe (2010) found that compared to non-ALP students, ALP students complete the introductory college-level course at a higher rate, enroll and complete the subsequent college English requirement at a higher rate, and attempt more college courses.

Concerns about the effect of mainstreaming on at-level or high-performing students persist and have affected how mainstream-based acceleration strategies have been developed and implemented. For example, the Community College of Baltimore County purposefully limits the number of developmental students in the ALP sections of the college English course to discourage faculty from altering the content or pace of instruction. Burriss, Heubert, and Levin (2006) examine this issue in their longitudinal study of universal acceleration at the middle and high school levels in a New York school district. The introduction of universal acceleration reflected a district policy to eliminate instruction by ability grouping in favor of an accelerated mathematics curriculum for all. This reform was considered acceleration because it taught the typical middle school math curricula in two instead of three years and relocated the algebra course usually taught in ninth grade to eighth grade. By institutionalizing acceleration, policymakers and practitioners hoped to address the low participation rates of historically lower-achieving students of color in the accelerated track. The new accelerated math curriculum was implemented at the middle school level and included an alternate-day supplemental math workshop for students seeking additional instructional time. Burriss et al. compared three cohorts of students from before the reform to three cohorts after the reform was implemented and found that enrollment and performance in higher-level math courses had significantly increased. Importantly, they concluded that heterogeneous groupings of students under universal acceleration had no adverse effect on high achievers.

It is worth noting that there has been an increased use of the Supplemental Instruction model, or adaptations thereof, to improve academic achievement among underprepared students. Originally developed to enhance students' success in high-enrollment, high-risk gatekeeper courses, Supplemental Instruction (or SI) provides voluntary, small-group study sessions facilitated by an experienced student (the SI leader) who has previously demonstrated mastery of the concepts of the course. Several studies discuss the use of Supplemental Instruction within the developmental sequence to provide students with additional time to learn and practice concepts (Martin, Arendale & Blanc, 1997; Phelps & Evans, 2006; Wright, Wright, & Lamb, 2002). This research, however, does not utilize Supplemental Instruction to explicitly accelerate student progression through developmental education.

Contextualization.² Jenkins, Zeidenberg, and Kienzl (2009) conducted a multivariate analysis of academic outcomes for students participating in the Integrated Basic Education and Skills Training Program (I-BEST) in Washington State. Unlike ALP, which provides supplemental support in the form of a companion course, I-BEST fully integrates basic skills instruction into college-level occupational courses that are jointly taught by college-level career-technical faculty and basic skills instructors. The I-BEST model seeks to embed basic skills education into a highly relevant context, workforce training, in order to make the learning more meaningful and expedite progress on college-level coursework. Moreover, the state board required that credits earned in I-BEST programs, which generally last only one quarter, can be applied to more advanced certificate and degree programs—thus structuring an educational pathway toward higher-level workforce credentials. Using regression and propensity score matching analyses, Jenkins et al. tracked I-BEST and non-I-BEST students enrolled in 24 colleges in the Washington State community and technical college system over a two-year period. Their findings suggest that participation in I-BEST is associated with an increased number of college credits earned, persistence to the subsequent academic year, attainment of a credential, and achievement of point gains on basic skills tests. Over two years, I-BEST students earned 18 more quarter-term college credits, on average, than the matched comparison group. Additionally, the probability of earning an occupational

² For additional information on contextualization, see Perin (2011) in this series.

certificate was 55% for the I-BEST cohort and only 15% for the comparison group. Precisely which aspects of I-BEST contribute most to student success is unclear, although the short duration of the programs may be as influential as the integration of basic skills instruction.

An assessment of the effectiveness of contextualization through an examination of outcomes for students enrolled in basic math skills courses at 34 community colleges in California led Wiseley (2009) to contend that the contextualization of pre-algebra could accelerate students' entry into college-level coursework. Although contextualized courses were not plentiful, Wiseley analyzed pass rates for basic skills courses and enrollment and pass rates for degree- and transfer-eligible courses for students taking remedial math contextualized in a vocational field versus those taking traditional basic math skills classes. Logistic regressions were used to test differences between students in the contextual and traditional courses, controlling for demographics including ethnicity, gender, socio-economic status, and program of study. Wiseley found that, overall, basic math skills and pass rates for subsequent degree- or transfer-eligible courses were higher for students who enrolled in contextualized math in their initial semester. Specifically, 89% of students taking the contextualized basic math skill courses passed, while only 59% of students in non-contextualized courses passed. Course pass rates in the concurrent and following term were also higher for students enrolled in contextualized math; however, enrollment in degree- and transfer-eligible courses was lower. This lower enrollment may be attributable to the content of occupational certificate programs, in which fewer courses are transferable to four-year colleges in general. Further, Wiseley's analyses suggest that contextualized courses appear to benefit ethnic minorities more than White students—an important finding, given the disproportionate number of Black and Hispanic students referred to developmental education at community colleges. Although Wiseley's results are promising, little information was given about what contextualization looked like in practice in the specific classes under investigation. Additionally, while the analysis is rigorous, an interpretation of the results must be tempered by the size of the sample (only 16 contextualized basic skills math classes were identified) and the limited duration (i.e., two semesters) of the study.

4.4 Contrary Evidence

Healthy debates continue regarding the appropriate instructional pace and course content for underprepared students (Finnan & Swanson, 2000; Means, Chelemer, & Knapp, 1991). It is reasonable to assume that students with academic deficiencies may require additional time or support to master certain competencies, and certain schools have attempted to accommodate the needs of these students by offering extended developmental education courses. Arizona State University (ASU) is among those institutions experimenting with remediation. ASU's Stretch English course sequence provides basic writers two semesters to complete the introductory college-level composition course (Glau, 2007). The content is the same as that of the traditional college English course, but the writing assignments are stretched over two semesters instead of one. Participating students receive three hours of elective credit and three hours of English credit. A descriptive statistics analysis suggests that course completion rates are higher for students in the Stretch program compared to students taking the one-semester course. Guilford Technical College in North Carolina took a similar approach as part of its Achieving the Dream activities, piloting a developmental mathematics course in introductory algebra that was spread over two semesters (Zachry & Orr, 2009). The course was designed to serve students who would benefit from slower-paced instruction. Early results for this initiative were promising; however, it was discontinued after a brief period at the request of state officials who determined the course did not adhere to the state policy on course format.

These findings suggest there may be circumstances in which students can benefit from deceleration. If instruction is extended over time, students may have opportunities to engage with developmental education content in more depth and to practice skills for more time. This approach could very well generate positive learning outcomes. However, there are drawbacks that should be weighed relative to the potential benefits. For example, the longer course structure provides ample opportunity for issues associated with work, family, or health to emerge and disrupt college enrollment. Additionally, these courses may cost students more money relative to traditional or accelerated options and may adversely affect students' long-term financial aid eligibility.

5. What Does the Promise of Acceleration Mean for Instructional Reform?

The analyses highlighted in this paper suggest that failure to complete the developmental education sequence can be attributed in part to the significant structural obstacles presented by multi-course sequences riddled with potential exit points. Limiting opportunities for exit—through their outright elimination, the compression of instructional time, and the use of more relevant and engaging content—is the strategy employed in many of the models of acceleration discussed in this paper. The evidence presented here suggests that exclusively structural acceleration interventions are associated with improved student outcomes, even when teaching practice remains unchanged. While this is encouraging, focusing primarily on structural reforms diverts attention from pedagogy, a dimension of the educational experience that is critical to student success. It also limits recognition of the potential for interaction between structure and pedagogy. This section discusses pedagogy and considers how attention to this area could provide opportunities to accelerate more students more effectively. The discussion that follows relies heavily on recently collected data and ongoing analyses stemming from fieldwork conducted in accelerated and non-accelerated developmental education classrooms (Edgecombe, 2011), since there is not a significant body of literature describing pedagogy in these settings.

Pedagogical innovations tend to be harder to enact than structural changes. They are also more difficult to study—which has contributed to a significant gap in knowledge about the nature of teaching and learning in accelerated classrooms. Most acceleration evaluations track milestones of academic progression—such as course completion, sequence completion, gatekeeper course completion, and persistence to subsequent terms—but while these indicators are important, they reveal very little about what students have learned and how that knowledge is relevant to and may transfer to other academic or occupational settings. There is a need for a more explicit discussion about and analysis of developmental education pedagogy. This would include cataloging variation in instructional practices across traditional and accelerated developmental education classrooms and assessing specific learning outcomes. Where feasible, instructional practices should be mapped to learning outcomes in order to facilitate a more robust discussion of what constitutes high-quality instruction. What is taught and

how it is taught should receive as much attention as the structure in which that pedagogy occurs.

Recent forays into accelerated and non-accelerated developmental education classrooms by the Community College Research Center and others (Edgecombe, 2011; Grubb, 2010) have prompted both concern and hope regarding the effects of instruction on student performance and retention. Preliminary analyses of data collected through interviews and observations in traditional developmental classrooms characterize the vast majority of pedagogy as teacher-centered and lacking clear messages about the relevance or application of specific lessons (Grubb, 2010). These reports suggest a low level of student engagement in or excitement about the content or instructional activities.

Unfortunately, it is not possible to rigorously assess the quality of pedagogy based on these empirical analyses because student learning is generally not measured.

Furthermore, given that most developmental education classes include material students have previously covered—oftentimes successfully—but now must revisit, a lack of enthusiasm, if not outright resentment, would not be unexpected. In reflecting on student outcomes, particularly students' propensity to exit at various stages in the developmental education sequence (Bailey et al., 2008), it is not unreasonable to speculate that the dominance of pedagogy that does not effectively engage students could contribute to an ambivalence toward specific coursework if not a wholesale detachment from college.

In contrast, preliminary analysis of accelerated classrooms suggests the frequent use of diversified instructional approaches that include more student-centered activities, such as peer-led small-group work and interactive student presentations (Edgecombe, 2011). Faculty teaching accelerated courses tend to change instructional activities more frequently and give students extended time and multiple opportunities to reflect on and refine their thinking. The longer instructional blocks discussed previously may facilitate this pedagogical diversity as well as the development of stronger social relationships between faculty and students and among students (Bragg & Barnett, 2008). These approaches and contextual conditions may have the potential to create more meaningful and engaging learning environments for students.

Differences revealed by the literature between pedagogy in traditional and accelerated developmental classrooms can be attributed to two major factors. First, it is

likely that accelerated interventions tend to attract uniquely talented and ambitious faculty who view the accelerated structure as an opportunity for pedagogical experimentation. For these faculty, the structure likely enables them to integrate a wider array of instructional approaches from their existing pedagogical toolkits. Second, the extended instructional time may provide these arguably high-quality faculty more time to engage students in a variety of learning activities that would have been difficult, though not impossible, to enact during a typical 50-minute (or even one-hour-and-50-minute) class. Although most accelerated models purposefully reduce opportunities for students to exit the developmental education sequence, the more student-centered pedagogy may contribute to the lower attrition and higher course completion rates documented in several program evaluations (Bragg, 2009; Hern, 2010; Jenkins et al., 2010).

6. Challenges and Recommendations for Policy, Practice, and Research

The trend toward accelerating the academic progress of students referred to developmental education continues to gain momentum based on a limited but promising empirical evidence base. The increased focus on student success, as opposed to just access, during the last decade in particular has ramped up the pressure on community colleges to demonstrate superior outcomes, particularly for the large proportion of students who are referred to developmental education. Policymakers and practitioners have responded to this challenge by simultaneously implementing broad institutional improvement efforts and expanding the use of more targeted instructional innovations such as acceleration. This dual focus on both the big and small pictures is critical to the improvement process, but it can introduce conflicts that make the implementation of effective acceleration models at scale very difficult. Biswas (2007) highlights similar tensions in her analysis of accelerated developmental math models that have been hindered by policies and procedures designed to support more traditional instructional delivery. What follows explores these challenges in more depth and presents recommendations intended to facilitate the availability of more, higher-quality acceleration models; to create the contextual conditions most likely to support successful

adoption, implementation, and scaling; and to generate rigorous and actionable data on the efficacy of various acceleration approaches.

6.1 Assessment and Placement

The sorting function of the assessment and placement process reinforces the sequential structure of developmental education, which appears to hamper student progress. Unlike the open-access models described earlier at Chabot and Los Medanos Colleges, most acceleration models do not permit students to self-place and instead rely on tests like ACCUPLACER and COMPASS to place students at the appropriate levels of reading, English, and math within the developmental sequence—despite well-documented evidence of the limitations of these instruments (Bailey, 2008; Collins, 2008; Hughes & Scott-Clayton, 2011). Moreover, mandatory placement policies that require students to complete the developmental education course to which they have been referred before pursuing advanced courses have the potential to undermine participation in accelerated pathways, particularly those mainstreaming models that attempt to place higher-scoring developmental students directly into college courses.

Assessment and placement instruments and policies should be reconceived in ways that emphasize the importance of diagnosis and the more precise matching of academic interventions to students' needs. As more thoroughly discussed by Hughes and Scott-Clayton (2011) in this working paper series, the most commonly used assessments do not provide advisors or students with actionable information and thus may contribute to the misplacement of students in accelerated or traditional pathways. Test makers have responded to this concern by creating diagnostic tests, but these assessments remain infrequently used, most likely due to the additional time and costs required to administer them. Similar obstacles hinder the use of supplemental measures for course placement, such as high school transcripts or student interviews. State policymakers, in particular, may benefit from keeping these weaknesses in mind as they evaluate the effectiveness of existing assessment instruments and set policy accordingly. Further, stakeholders may wish to examine the feasibility of customized assessments, like that in use in Florida and those in development in Texas and Virginia.

6.2 Course Development and Curricular Alignment

Strict system or college guidelines regarding course content and sequencing can undermine attempts to implement acceleration models, particularly those models that rationalize curricula or do not adhere to the traditional developmental education sequence. To be offered beyond the pilot phase, courses must typically be approved by faculty senates and potentially be approved at the state level, which may require curricular revisions and take significant time. Courses designed to more closely align with degree program pathways or the college curriculum more generally could include content that varies significantly from the traditional developmental curriculum. While better alignment may improve outcomes (Jenkins, 2011), variability in comparable-level courses among the developmental education offerings may generate confusion regarding the best course-taking options for students.

Although they may potentially be constrained by policy, academic administrators, faculty senates, and other course-monitoring bodies within colleges should reevaluate what students in developmental education are asked to learn and why. In instances where there is no clear connection between required content or desired skill development and the college-level curriculum, practitioners should consider rationalizing content and potentially accelerating student progress. This process could yield a more competency-based approach to developmental education, which has its own pitfalls, including the possible overemphasis of subskills. It also might result in better alignment between developmental education and college coursework and a more relevant academic experience for underprepared students. Additionally, states that utilize common course descriptions and numbering may wish to consider mechanisms through which experimental courses that meet specified discipline-specific learning objectives can be more easily introduced through a reasonable but rigorous approval process. Regular audits of courses and degree program requirements are recommended to ensure that students are not being asked to master out-of-date concepts or demonstrate irrelevant skills.

6.3 Student Recruitment

It can be challenging to recruit students to participate in accelerated developmental education models, particularly when these interventions are new and rather insular. During peak registration times, students rush to enroll in courses that fit their work schedules, (hopefully) adhere to degree program requirements, and possibly pique their interests. The extent to which students are aware of accelerated developmental education options depends in large part on the information they receive from active resources, such as counselors, academic advisors, and program staff, and passive resources, such as the course catalog and course announcement fliers or emails. The active information resources play a crucial role in helping students sort through their alternatives and in suggesting appropriate courses based on students' life circumstances and academic needs. Unfortunately, developmental education assessment results are frequently the first and typically the only data point used to determine the appropriateness of an accelerated or non-accelerated pathway. This approach is less than ideal, since the most commonly used assessments do not generate actionable information on what would be the most appropriate academic or non-academic services to provide to students (Hughes & Scott-Clayton, 2011).

Course capacity issues may also impede the recruitment of students into accelerated models. When accelerated courses are first introduced or require complicated registration processes, such as dual-course enrollment for compressed or paired courses, colleges will occasionally have difficulty filling the minimum number of seats to constitute a viable section. In contrast, high-demand compressed course combinations or mainstreaming models that limit the number of students with developmental education referrals may be oversubscribed.

The effective marketing of accelerated developmental education alternatives—both to individuals who help students decide which courses to take and to the students themselves—is under-emphasized, in part due to the time and energy that advocates of acceleration dedicate to developing and teaching their courses. Pre-term information sessions with counselors could help to steer more students to the appropriate courses by reiterating the structure, purpose, and availability of accelerated models and by sharing student outcomes data. Communications to students through email, text message, and

announcement boards could highlight developmental education alternatives and direct students to counselors and program staff for further information. Importantly, subsequent conversations between students and staff can clarify expectations for potential acceleration model participants. For example, the FastStart case worker at Community College of Denver explains to prospective program participants the time commitment—in and out of class—necessary to successfully complete the course requirements and helps students assess whether their current situation could accommodate such an obligation. Although students make the final determination regarding FastStart enrollment, these conversations provide information that is instrumental in preparing students for the rigors of an accelerated course format. The use of more actionable assessments can also provide advisors and students with additional feedback, which may enable them to make better-informed placement decisions.

6.4 Faculty Resistance

Faculty resistance to changes in the developmental education course structure can affect their willingness to participate in accelerated instructional reform and may hinder a college's full-scale implementation of acceleration. Some of this resistance stems from the fact that the notion of accelerating the coursework of students referred to developmental education seems counterintuitive. Many faculty believe that all students referred to developmental education need slower-paced instruction stretched out over extended periods of time. Skepticism also persists among faculty who believe that academic standards are inevitably lowered in intensive or compressed courses. The dearth of rigorous research on student outcomes, including measures of learning, gives acceleration advocates little ammunition to quell this skepticism. Faculty may also resist acceleration due to concerns about the increased workload associated with teaching new material in a redesigned course.

In response to this resistance, faculty who develop accelerated courses tend to bypass the critics within their departments and recruit groups of like-minded instructional innovators who are willing to pilot and refine acceleration models. Converts from the faculty and administrator ranks may join the acceleration advocates in time as incremental data validating the effectiveness of the pilots is presented publicly. Although

these analyses tend to be simple descriptive statistics, the success they often depict for a student population that many stakeholders assumed was essentially lost can breed enough curiosity and enthusiasm to recruit additional faculty for program expansion.

Faculty resistance also may be offset if faculty feel that they have a role in leading instructional reforms. Institutions can encourage the broad participation of faculty in acceleration efforts by developing, within or across disciplines, faculty inquiry groups tasked with identifying, experimenting with, and evaluating structural and pedagogical remedies for persistent academic underperformance in developmental education. Ideally, these faculty-led improvement activities would cycle through a continuous refinement process and engage administrators, students, and others in ongoing discussions about findings, resource allocation, and areas of further inquiry. Results of this iterative process would ideally be shared with external stakeholders, including policymakers, researchers, and colleagues at other community colleges.

6.5 Financial Sustainability

The imperative for improved student outcomes is coming at a time when community colleges are facing a serious funding crisis. In theory, this crisis should prompt community colleges to consider how they deploy resources and reallocate funding based on high-impact strategies that match students' most salient needs. However, colleges rarely have the information or capacity to pursue such a stringent budgeting process. For instructional innovations, in particular, the current funding scheme tends to reward the receipt of soft money from governments or foundations that support the testing of new programs rather than systemic change. As a result, community colleges may embrace numerous acceleration strategies at the same time, simultaneously growing multiple programs from small pilots to larger, permanent alternative pathways if funding is available. Less effective models may be abandoned along the way, while new initiatives are launched. This dynamic process reflects most colleges' piecemeal approach to innovation and can complicate resource allocation. Notably, the transition from soft money to base budget funds may require compromises that can adversely affect the quality of acceleration models, including the elimination of case workers and other crucial support services.

Although instructional experimentation may be beneficial for colleges, colleges should consider rigorously assessing innovations in order to identify those associated with meaningfully superior student outcomes and sustain and expand funding for those interventions. Policymakers and practitioners may find cost-effectiveness analyses particularly useful when making resource allocation decisions. Jenkins et al. (2010) found that the Accelerated Learning Program (ALP) at Community College of Baltimore County provides a substantially more cost-effective route through the required college English course sequence than the traditional developmental English pathway. On a per-successful-student basis, ALP costs the college \$2,680 versus \$3,122 for the traditional sequence, a 14% savings. The availability of rigorous analysis of the cost per successful student can provide the budget justification that, in conjunction with student outcome data, can be used to determine if it is appropriate to scale up or discontinue acceleration models. Optimally, institutions will not consider cost effectiveness a one-time assessment but rather use ongoing analyses to monitor performance over time.

Initiatives such as Achieving the Dream highlight the importance of using data to inform decision-making; however, only a fraction of the nation's community colleges are participating in Achieving the Dream, and preliminary evidence on how well colleges are using data to generate policies and practices that improve student outcomes appears mixed (Rutschow et al., 2011). Colleges would benefit from a renewed focus not just on generating data but also on ensuring that high-quality data are in the hands of instructional leaders, most notably faculty, who are best positioned to act. Such data might be used by faculty to determine which students would benefit most from acceleration, to supplement traditional assessment instruments, to identify the points of vulnerability in the developmental education sequence, or to assess instructional quality. Further, analyses generated by offices of institutional research could be examined in conjunction with findings from faculty inquiry to initiate more cross-functional discussions within the college (Jenkins, 2011).

6.6 Administrative Logistics

Certain acceleration models present unique logistical challenges by virtue of their programmatic features. For example, compressed courses, which may have class periods

lasting as long as four or five hours, could face significant course and room scheduling issues. Models that mainstream a small number of students into a college course may struggle to find space to conduct the companion course. Administrators may be hesitant to allocate a normal-sized classroom to a group of only eight students, particularly as ballooning enrollments make instructional space a valuable commodity at most colleges. The use of non-traditional instructional space, such as small-group study rooms at libraries and administrator conference rooms, is emerging as a potential solution to the space constraint issue.

The lack of flexibility of student information systems emerged as an early challenge to implementing certain acceleration models (Biswas, 2007). Self-paced modules, for example, can be problematic from a record-keeping perspective if not explicitly apportioned by credit and if students do not complete all of the modules in a 16-week semester. While grades of “Incomplete” or “Re-enroll” can serve as placeholders in the system, they do not allow administrators or faculty to accurately assess students’ progress. Although customization of student information systems remains a challenge, vendors are increasingly willing to work with state systems and colleges to ensure their product meets the dynamic needs of the end-user.³

6.7 Actionable Research

A significant portion of the postsecondary education field has already embraced, if not enacted, the concept of acceleration for developmental education, and the philanthropic community is actively funding acceleration programs. Nevertheless, the empirical basis for acceleration remains thin and is likely not representative of the diversity of acceleration programs in operation. Currently, the most common outcome measures in use focus on academic progression milestones or status indicators, such as course and sequence completion, credits accumulated, grade point average, and credential completion. While useful barometers of progress, these outcomes reveal little about what students have learned. Furthermore, the existing data provides few insights into the institutional contexts in which acceleration strategies are introduced and grow (or are stymied).

³ For more on this trend, see Parry (2009).

A strong evidence base is critical to the legitimacy of acceleration, and it should reflect a mix of relevant research questions and rigorous research methodologies, providing information about the effectiveness of acceleration as well as issues that institutions encounter during the implementation process. In order to more firmly establish the empirical evidence base for acceleration and clearly indicate whether or not such strategies negatively impact academic standards, it is recommended that institutions develop department-wide learning outcomes for specific courses measured by common assessments (see Jenkins, 2011). The rigorous evaluation of those learning outcomes across course formats can more effectively address questions about student outcomes and academic rigor. Additionally, structural reforms like those discussed in this paper will improve student outcomes only so much. A simultaneous focus on pedagogical improvement is necessary to understand and affect the confluence of factors that influence student performance. Research, spanning from faculty inquiry to third-party analyses, needs to rely more heavily on classroom-based fieldwork that catalogs, analyzes, and evaluates instructional practice. A better understanding of the instructional landscape across accelerated and traditional classrooms also may prove helpful in the development of professional learning opportunities for faculty.

Finally, the academic and policy research communities must partner with innovating colleges and systems to conduct more rigorous and independent assessments of acceleration strategies. In combination with internally generated analyses, results from these collaborative research endeavors can help institutions to make more informed decisions about the most effective academic alternatives for students referred to developmental education and to allocate resources appropriately.

7. Conclusion

Available evidence on the effectiveness of accelerating students through developmental education is promising, though not plentiful, and it suggests that there are a variety of models of course redesign and mainstreaming that community colleges can employ to enhance student outcomes. Research also indicates that acceleration may not be the optimal approach for all students referred to developmental education. Although

multiple pathways are available, practitioners have limited resources and imprecise information from assessment tests to direct students to courses or other interventions that will effectively address their academic and non-academic needs. Unfortunately, this system provides rather blunt remedies to a complex array of academic underpreparedness.

A close examination of the accelerated pathway engenders hope but also surfaces significant obstacles to implementation. Rigid assessment and placement policies, curricular misalignment, recruitment challenges, faculty resistance, unsustainable funding, and logistic impediments are among the issues practitioners must navigate if they are to effectively implement acceleration models. After initial implementation, challenges persist in moving from the pilot stage, in which a small number of students participate, to full-scale implementation, in which all the students who can benefit from this approach are served. Such scaling has financial and human resource implications and can require substantial changes to policy regarding placement, course content, or course sequencing as well as shifts in expectations for students and faculty.

Despite these challenges, the evidence presented in this report should encourage practitioners, policymakers, and researchers to think boldly about how to improve the current course delivery system in community colleges. This paper highlights challenges in the developmental sequence through the lens of acceleration, but in reality, academic outcomes are poor across the college-level as well. To reach the ambitious credential completion goals espoused by the Obama administration and the philanthropic community, institutions will need to radically rethink current policy and practice, challenge dysfunctional institutional norms, and be willing to reallocate resources to unconventional interventions proven to enhance academic achievement.

References

- Adams, P., Gerhart, S., Miller, R., & Roberts, A. (2009). The accelerated learning program: Throwing open the gates. *Journal of Basic Writing*, 28(2), 50–69.
- Austin, A. M., & Gustafson, L. (2006). Impact of course length on student learning. *Journal of Economics and Finance Education*, 5(1), 26–37.
- Bailey, T. (2008). *Challenge and opportunity: Rethinking the role and function of developmental education in community college* (CCRC Working Paper No. 14). New York, NY: Columbia University, Teachers College, Community College Research Center.
- Bailey, T., & Cho, S.-W. (2010). [Achieving the Dream data]. Unpublished diagram.
- Bailey, T., Jeong, D. W., & Cho, S.-W. (2008). *Referral, enrollment, and completion in developmental education sequences in community colleges* (CCRC Working Paper No. 15). New York, NY: Columbia University, Teachers College, Community College Research Center.
- Biswas, R. R. (2007). *Accelerating remedial math education: How institutional innovation and state policy interact* (Achieving the Dream Policy Brief). Boston, MA: Jobs for the Future.
- Bowen, W. G., Chingos, M. M., & McPherson, M. S. (2009). *Crossing the finish line: Completing college at America's public universities*. Princeton, NJ: Princeton University Press.
- Bragg, D. D. (2009). *Community College of Denver: Breaking Through outcomes report*. Denver, CO: Community College of Denver.
- 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. Retrieved from <http://www.communitycollegcentral.org/Resources/research/Materials/CCDLuminaAcceleratedResearchReport62106.pdf>
- Brown, R. & Ternes, R. (2009). *Final report to the Lilly Endowment Grant: Grant for targeted and accelerated remediation*. Indianapolis, IN: Ivy Tech Community College.
- Burris, C. C., Heubert, J. P., & Levin, H. M. (2006). Accelerating mathematics achievement using heterogeneous grouping. *American Educational Research Journal*, 43(1), 105–136.

- Calcagno, J. C., & Long, B. T. (2008). *The impact of postsecondary remediation using a regression discontinuity approach: Addressing endogenous sorting and noncompliance* (NCPR Working Paper). New York, NY: National Center for Postsecondary Research.
- Collins, M. L. (2008). *It's not about the cut score: Redesigning placement assessment policy to improve student success* (Achieving the Dream Policy Brief). Boston, MA: Jobs for the Future.
- Daniel, E. L. (2000). A review of time-shortened courses across disciplines. *College Student Journal*, 34(2), 298–308.
- Edgecombe, N. (2011). *Pedagogy in the community college: An examination of developmental and college-level classrooms*. Unpublished manuscript.
- Engstrom, C. M., & Tinto, V. (2008). Learning better together: The impact of learning communities on the persistence of low-income students. *Opportunity Matters*, 1, 5–21.
- Finnan, C., & Swanson, J. D. (2000). *Accelerating the learning of all students: Cultivating culture change in schools, classrooms, and individuals*. Boulder, CO: Westview Press.
- Gallo, M. A., & Odu, M. (2009). Examining the relationship between class scheduling and student achievement in college algebra. *Community College Review*, 36(4), 299–325.
- Glau, G. R. (2007). Stretch at 10: A progress report on Arizona State University's stretch program. *Journal of Basic Writing*, 26(2), 30–48.
- Goldschmid, B. & Goldschmid, M. L. (1973). Modular instruction in higher education: A review. *Higher Education*, 2, 15–32.
- Grubb, W. N. (2010, September). *The quandaries of basic skills: Views from the classroom*. Paper presented at the National Center for Postsecondary Research conference, New York, NY.
- Hern, K. (with Snell, M.) (2010). *Exponential attrition and the promise of acceleration in developmental English and math*. Hayward, CA: Chabot College.
- Hughes, K. L., & Scott-Clayton, J. (2011). *Assessing developmental assessment in community colleges* (CCRC Working Paper No. 19, Assessment of Evidence Series). New York, NY: Community College Research Center, Teachers College, Columbia University.

- Jaggars, S. S. (2011). *Online learning: Does it help low-income and underprepared students?* (CCRC Working Paper No. 26, Assessment of Evidence Series). New York, NY: Community College Research Center, Teachers College, Columbia University.
- Jenkins, D. (2011). *Redesigning community colleges for completion: Lessons from research on high-performance organizations* (CCRC Working Paper No. 24, Assessment of Evidence Series). New York, NY: Community College Research Center, Teachers College, Columbia University.
- Jenkins, D., Speroni, C., Belfield, C., Jaggars, S. S., & Edgecombe, N. (2010). *A model for accelerating academic success of community college remedial English students: Is the Accelerated Learning Program (ALP) effective and affordable?* (CCRC Working Paper No. 21). New York, NY: Columbia University, Teachers College, Community College Research Center.
- Jenkins, D., Zeidenberg, M., & Kienzl, G. S. (2009). *Educational outcomes of I-BEST, Washington State Community and Technical College System's Integrated Basic Education and Skills Training program: Findings from a multivariate analysis* (CCRC Working Paper No. 16). New York, NY: Columbia University, Teachers College, Community College Research Center.
- Karp, M. M. (2011). *Toward a new understanding of non-academic student support: Four mechanisms encouraging positive student outcomes in the community college* (CCRC Working Paper No. 28, Assessment of Evidence Series). New York, NY: Community College Research Center, Teachers College, Columbia University.
- Koski, W. S., & Levin, H. M. (1998). *Replacing remediation with acceleration in higher education: Preliminary report on literature review and initial interviews*. Stanford, CA: Stanford University, National Center for Postsecondary Improvement.
- Levin, H. M. (1991). *Accelerating the progress of all students* (Special Report No. 31). New York, NY: State University of New York, Nelson A. Rockefeller Institute of Government.
- Levin, H. M. (1993). Beyond remediation: Toward acceleration for all schools. In C. L. Fagnano & K. N. Hughes (Eds.), *Making schools work: A view from the firing lines* (pp. 31–37). Boulder, CO: Westview Press.
- Levin, H. M. (2005). Accelerated schools: A decade of evolution. In M. Fullan (Ed.), *Fundamental change: International handbook of educational change* (pp. 137–160). New York, NY: Springer.

- Levin, H. M., & Hopfenberg, W. S. (1991). Don't remediate: Accelerate! *Principal Magazine*, 70(3), 11–13.
- Lucas, M. S., & McCormick, N. J. (2007). Redesigning mathematics curriculum for underprepared college students. *Journal of Effective Teaching*, 7(2), 36–50.
- Martin, D. C., Arendale, D. R., & Blanc, R. (1997). *Mainstreaming of developmental education: Supplemental Instruction and Video-based Supplemental Instruction*. Kansas City, MO: University of Missouri-Kansas City, National Center for Supplemental Instruction. Retrieved from <http://a.web.umkc.edu/arendaled/mainstreamDE97.pdf>
- Martin, H., & Culver, K. B. (2007). Concentrate, intensify, or shorten? Short intensive courses in summer sessions. *Continuing Higher Education Review*, 71, 90–100.
- Means, B., Chelemer, C., & Knapp, M. S. (1991). *Teaching advanced skills to at-risk students*. San Francisco, CA: Jossey-Bass.
- Moltz, D. (2010, July 6). Picking up the pace. *Inside Higher Ed*. Retrieved from <http://www.insidehighered.com>
- Parry, M. (2009, November 29). Software giants try boutique approach to tempt colleges. *The Chronicle of Higher Education*. Retrieved from <http://www.chronicle.com>
- Perin, D. (2011). *Facilitating student learning through contextualization* (CCRC Working Paper No. 29, Assessment of Evidence Series). New York, NY: Community College Research Center, Teachers College, Columbia University.
- Phelps, J. M., & Evans, R. (2006). Supplemental instruction in developmental mathematics. *Community College Enterprise*, 12(1), 21–37.
- Rohrer, D., & Pashler, H. (2010). Recent research on human learning challenges conventional instructional strategies. *Educational Researcher*, 39(5), 406–412.
- 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 and Community College Research Center, Teachers College, Columbia University.
- Scott, P. A., & Conrad, C. F. (1992). A critique of intensive courses and an agenda for research. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research*. New York, NY: Agathon Press.
- Scrivener, S., Bloom, D., LeBlanc, A., Paxson, C., Rouse, C. E., & Sommo, C. (with Au, J., Teres, J. J., & Yeh, S.) (2008). *A good start: Two-year effects of a freshmen*

- learning community program at Kingsborough Community College*. New York, NY: MDRC.
- Seamon, M. (2004). Short- and long-term differences in instructional effectiveness between intensive and semester-length courses. *Teachers College Record*, 106(4), 852–874.
- Sheldon, C. Q., & Durdella, N. R. (2010). Success rates for students taking compressed and regular length developmental courses in the community college. *Community College Journal of Research and Practice*, 34(1–2), 39–54.
- Sherer, J. Z. & Grunow, A. (2010). *90-day cycle: Exploration of math intensives as a strategy to move more community college students out of developmental math courses*. Stanford, CA: Carnegie Foundation for the Advancement of Teaching.
- South Texas College, Office of Institutional Effectiveness and Assessment. (2010a). *Accelerating developmental English* (Intervention Assessment Brief, Vol. 1, Issue 1). Retrieved from http://isp.southtexascollege.edu/iea/assessment_briefs/Volume%201/Dev%20English%20Intervention%20Assessment%20Brief%20Press.pdf
- South Texas College, Office of Institutional Effectiveness and Assessment. (2010b). *Accelerating developmental reading* (Intervention Assessment Brief, Vol. 1, Issue 2). Retrieved from http://isp.southtexascollege.edu/iea/assessment_briefs/Volume%201/Dev%20Reading%20Intervention%20Assessment%20Brief.pdf
- South Texas College, Office of Institutional Effectiveness and Assessment. (2010c). *Accelerating developmental math* (Intervention Assessment Brief, Vol. 1, Issue 3). Retrieved from http://isp.southtexascollege.edu/iea/assessment_briefs/Volume%201/Dev%20Math%20Intervention%20Assessment%20Brief.pdf
- Tinto, V. (1997). Classrooms as communities: Exploring the educational character of student persistence. *Journal of Higher Education*, 68(6), 599–623.
- Twigg, C. A. (2005). *Increasing success for underserved students: Redesigning introductory courses*. Sarasota Springs, NY: National Center for Academic Transformation.
- Weiss, M. J., Visser, M. G., & Wathington, H. (2010). *Learning communities for students in developmental reading: An impact study at Hillsborough Community College*. New York, NY: National Center for Postsecondary Research.

- Wiseley, W. C. (2009). *Effectiveness of contextual approaches to developmental math in California community colleges* (Doctoral dissertation). University of the Pacific, Stockton, CA.
- Wright, G. L., Wright, R. R., & Lamb, C. E. (2002). Developmental mathematics education and Supplemental Instruction: Pondering the potential. *Journal of Developmental Education*, 26(1), 30–35.
- Wlodkowski, R. J. (2003). Accelerated learning in colleges and universities. *New Directions for Adult and Continuing Education*, 97, 5–15.
- Zachry, E. M., & Orr, G. (2009). *Building student success from the ground up: A case study of an Achieving the Dream college*. New York, NY: MDRC.