



TEACHERS COLLEGE, COLUMBIA UNIVERSITY

**Strengthening Developmental Education Reforms:
Evidence on Implementation Efforts
From the Scaling Innovation Project**

Nikki Edgecombe
Maria Scott Cormier
Susan Bickerstaff
Melissa Barragan

June 2013

CCRC Working Paper No. 61

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
Email: edgecombe@tc.edu

Funding for this research was provided by the William and Flora Hewlett Foundation. We are grateful to Peter Adams and Donna McKusick from the Community College of Baltimore County, Katie Hern and Myra Snell from the California Acceleration Project, and Barbara Lontz from Montgomery County Community College for their unwavering commitment to Scaling Innovation. The data and insights included in this paper would have been impossible without them and the dedicated faculty working with them nationwide to improve developmental education. Lastly, we would like to thank Amy Mazzariello for her editorial assistance.

Abstract

In this paper, the authors draw on empirical data from the Community College Research Center's Scaling Innovation project to examine trends in developmental education instructional reform and outline a framework for reform adoption and adaptation. The paper's findings are based on two qualitative data sources: a scan of developmental education reforms that involved changes to curricula, course structure, and/or pedagogy; and fieldwork conducted at 11 colleges working to replicate high-potential instructional innovations developed at other colleges. The data suggest that colleges tend to enact developmental education reforms in ways that may unintentionally undermine their potential benefits. The authors present a framework for engaging practitioners in activities that will increase the impact of their developmental education reforms while strengthening institutional capacity.

Table of Contents

1. Introduction	1
2. Perspectives From the Literature	3
3. Instructional Reform Scan	6
4. Reform Activities	10
4.1 What Drives Colleges to Engage in Reform?	10
4.2 What Occurs When Reforms Are First Launched?.....	14
4.3 What Does It Take to Scale and Sustain Reform?	17
5. Adoption and Adaptation Framework	20
5.1 Adoption.....	21
5.2 Adaptation	26
6. Conclusions and Implications	30
References	33
Appendix A: Scaling Innovation Partner Programs	37
A.1 Accelerated Learning Program.....	37
A.2 California Acceleration Project.....	38
A.3 Concepts of Numbers for Arithmetic and Prealgebra	40
Appendix B: Methods	42
B.1 Instructional Scan	42
B.2 Fieldwork at Partner Colleges	43

1. Introduction

The structure and outcomes of various approaches to developmental education reform are well described in the research literature (Boatman, 2012; Cho, Kopko, Jenkins, & Jaggars, 2012; Edgecombe, 2011; Edgecombe, Jaggars, Baker, & Bailey, 2013; Hern, 2010; Visher, Weiss, Weissman, Rudd, & Wathington, 2012; Rutschow & Schneider, 2011). Evidence from several of these studies suggests that most developmental education reform models generate relatively small effects that tend to be short lived. For instance, Visher et al. (2012) found that learning communities that included a developmental education course had modest positive effects on full-time registration, credits attempted and earned in English or math, and total credits attempted and earned during the first (or treatment) semester. However, after the third semester, those effects persisted for only one outcome: credits attempted and earned in English or math. Other analyses of developmental education reforms also have documented positive short-term effects that faded over time (Cho et al., 2012; Edgecombe et al., 2013). Although it is possible that longer analysis timeframes (i.e., of several years) could reveal stronger distal outcomes, the available evidence does not suggest that such impacts are likely.

To better understand why the impacts of developmental education reforms tend to be small and short-term, researchers from the Community College Research Center (CCRC) examined reform development and implementation processes at a sample of community colleges across the country. We identified three potential reasons why developmental education reforms often do not generate substantial impacts. First, colleges often enact developmental education reforms in ways that may undermine their potential benefits. Frequently, colleges make concessions from the outset that weaken implementation. Caused by resource constraints and longstanding institutional norms, these concessions can impair reform activities and outcomes. The impact of these concessions is magnified because most reform efforts lack mechanisms to identify and counteract implementation weaknesses. Reforms to developmental education may need to be more targeted and effectively implemented to dramatically improve student outcomes.

Second, we found that the predominant orientation toward reform typically leads to the adoption of minimally disruptive, small-scale approaches. The most popular developmental education reforms rarely require faculty to profoundly alter what they do

in the classroom, which may be necessary to prepare students for the rigor of college coursework. Moreover, most reforms are implemented as small-scale pilots. Typically, pilots do not reach enough students to improve institutional outcomes, such as persistence, credential completion, or transfer rates. We hypothesize that the small scale and few changes to teaching and learning of most developmental education reforms limit their impact.

Third, the short-term effects of most developmental education reforms suggest the need for community colleges to build their capacity to deploy and sustain an array of high-impact supports and instructional approaches that span students' academic careers. Yet, as is consistent with previous research (Karp et al., 2012), we found that colleges struggle to do so. Developmental education reforms only impact the beginning of students' college experience and may not provide the intensity or duration of supports necessary to affect long-term outcomes. Because the types of support required to enhance college success vary across students and across time, developmental education reform may function best as a first step in a broader institution-wide improvement strategy. However, many developmental education reforms occur in isolation, limiting the likelihood that knowledge or practices developed and refined during their implementation can be used to support other institutional change processes. Our analysis indicates that thoughtful implementation of developmental education reforms provides opportunities for community colleges to increase their organizational capacity and build on the benefits of reforms.

The evidence presented in this paper is drawn from Scaling Innovation, a research and implementation project created by CCRC and funded through the William and Flora Hewlett Foundation's Deeper Learning program.¹ With Scaling Innovation, CCRC seeks to assess the instructional reform landscape in developmental education and to develop research-based resources to evaluate and refine instructional models designed to enhance teaching and learning in developmental education. Instructional reforms or innovations² include any changes to the structure, curricula, or pedagogy of developmental education that are intended to directly or indirectly improve teaching and learning. CCRC researchers conducted a scan of existing instructional innovations in developmental

¹ The Deeper Learning program emphasizes stronger content knowledge, cognitive strategies, and learning behaviors associated with long-term success in college and the workforce.

² We use the terms *reform* and *innovation* interchangeably.

education and reviewed the evidence on their effectiveness. Following the instructional reform scan, we conducted fieldwork at several community colleges across the country to deepen our understanding of how various developmental education innovations work and how they were implemented and scaled.³ On the basis of the scan and our fieldwork, we developed a practical framework for understanding the process of advancing instructional reforms. The framework has the added benefit of modeling practices that support broader institutional improvement.

In this paper, we draw on empirical data from Scaling Innovation to illustrate the dominant trends in developmental education reform, and we propose a set of processes that colleges should attend to in order to develop reforms with a deep and lasting impact. We begin with a review of the relevant literature on education reform and establish the basis for the challenges colleges experience in their efforts to improve developmental education. Notably, these challenges are fairly typical of all education reform. We then present descriptive findings from our scan of instructional reforms. Next, we analyze the reform activities in which practitioners are engaged, from when the reforms are first conceived through the time when they are institutionalized. We conclude by presenting a practical framework to guide practitioners in a thoughtful and strategic approach to reform.

2. Perspectives From the Literature

Research on instructional reform in higher education is limited, but decades of scholarship on local and national policy reforms in K-12 and higher education have uncovered lackluster and fleeting impacts on student outcomes (Bowen, Chingos, & McPherson, 2009; Hill & Celio, 1998; Tyack & Cuban, 1995; Kazis, Vargas, & Hoffman, 2004). Progress made on important fronts, such as the racial achievement gap, has been undermined by other trends, such as the growing achievement disparity between students of high and low socioeconomic status (Reardon, 2012). Further, the results of thirty years of federal, state, local, and philanthropic investment in reform have

³ See Appendix A for descriptions of Scaling Innovation reform partners.

demonstrated as much about the difficulty of improving educational outcomes as they have about the most powerful levers for improvement.

Elmore (2008) described the reasons for reform failure as “extraordinarily persistent and robust” and attributed this phenomenon to an inability “to connect what we know about good practice to what schools actually do” (p. 3). As a result, policy prescriptions can be flawed from the start, lacking mechanisms to bridge the chasm between the goals of reform and schools’ existing practices. Espousing a similar theory, Payne (2010) suggested that reformers generally lack an in-depth understanding of the underlying causes of school failure. Without this understanding, it is virtually impossible to implement reforms well, particularly in school contexts prone to dysfunction:

At the school level, the district level, and the national level, even where we see some progress, we continue to see attempts to implement reform in ways that are manifestly unlikely to work. Some of this is just political expediency or earnest incompetence, but some of it is that people in leadership positions do not have a systemic understanding of the causes of failure, in part because the same dysfunctional social arrangements that do so much to cause failure also do a great deal to obscure its origins. (p. 5)

Education, specifically the culture of schooling, is frequently characterized as resistant to change and innovation (Christensen & Eyring, 2011; Marcus, 2011; Shugart, 2012; Tyack & Cuban, 1995). A number of studies converge on the notion that there are significant institutional barriers to reform. However, broadly categorizing the culture of schooling as resistant to change may be overly deterministic, concealing specific features of schools that enable or constrain improvement. For example, Bryk and Schneider (2002) presented evidence that relational trust in school communities is essential to school improvement. They argued that “the nature of these social exchanges, and the local cultural features that shape them, condition a school’s capacity to improve” (p. 5). More recent analyses have identified additional features necessary for school improvement, including leadership as a driver of change, the professional capacity of faculty and staff, a student-centered learning climate, parent and community ties, and instructional guidance (Bryk, Sebring, Allensworth, Luppescu, & Easton, 2010).

Coburn (2003) provided less direct but equally compelling insights into the vulnerabilities of current approaches to education reform. She argued that deep and

enduring educational improvement requires attention to “the nature of change in classroom instruction; issues of sustainability; spread of norms, principles, and beliefs; and a shift in ownership such that a reform can become self-generative” (p. 3). Failing to recognize the importance of these dimensions of reform increases the likelihood that new approaches will be implemented in a diffuse, surface-level way, with limited effects.

Despite the fact that to date substantial efforts and investment in education reforms have not dramatically increased student outcomes, policymakers and practitioners in higher education continue to seek ways to address systemic educational underachievement—particularly in the area of developmental education. Nearly 60 percent of incoming community college students are referred to developmental education, but only about one third complete their remedial course requirements within six years (Bailey, Jeong, & Cho, 2010). These high referral and low completion rates have implications for longer term student outcomes.⁴ Only 21 percent of full-time, first-time students in two-year public institutions graduate within three years. Completion rates are even lower for African American and Latino students. Over half of African American and Latino undergraduates are enrolled in community colleges (Katsinas & Tollefson, 2009); yet the three-year graduation rates for African American and Latino students are 14.5 and 17 percent, respectively, compared with 24.7 percent for White students (Knapp, Kelly-Reid, & Ginder, 2012). It is reasonable to infer from these statistics that a failure to effectively reform developmental education (as well as other facets of community college education) may exacerbate racial and socioeconomic disparities in education and employment, seriously hampering economic mobility.

Improving developmental education is just one of the herculean tasks confronting community colleges. Many students enter developmental education with long and painful histories of educational failure and with fragile ties to the educational enterprise (Rose, 2005, 2012; Grubb, 2012). Even if colleges dramatically improved outcomes in

⁴ Researchers have advanced many reasons for the high referral and low completion rates in developmental education. Studies on the effect of developmental education on outcomes such as student persistence and credit attainment have suggested that the traditional system of developmental education does little to enhance student success (e.g., Boatman & Long, 2010; Martorell & McFarlin, 2011; Scott-Clayton & Rodríguez, 2012). Others have noted that conventional assessment policies and practices may result in high levels of student misplacement (Scott-Clayton, 2012; Belfield & Crosta, 2012). Grubb (2012) argued that requiring students to enroll in remedial courses that replicate courses and instructional approaches that did not serve them well in high school is not likely to generate substantially better outcomes.

developmental education, the majority of students enrolled in community colleges would still face significant obstacles to completing subsequent coursework and earning a credential or transferring to a four-year institution (Jenkins, Jaggars, & Roksa, 2009; Zeidenberg, Jenkins, & Scott, 2012). In addition, colleges are tasked with imparting to students the knowledge, skills, and behaviors needed to succeed in an increasingly competitive workforce (Partnership for 21st Century Skills, 2010; Pellegrino & Hilton, 2012). Thus, it is imperative that community colleges, which enroll over 40 percent of all undergraduates, find ways to better serve students *throughout* their college careers. Lessons from developmental education reform may help colleges to reform other aspects of students' college experience in order to serve all students more effectively (see, e.g., Grubb, 2012; Hinds, 2011; Perin, 2012).

Researchers and practitioners know significantly more about developmental education outcomes and somewhat more about approaches to reform today than they did just five years ago. Nonetheless, the effects of developmental education reforms remain modest and short-term. Research on developmental education reform suggests that certain models may be promising, but it has also raised new questions related to reform implementation and improvement (Bryk, Gomez, & Grunow, 2010; Quint et al., 2011; Visher, Schneider, Wathington, & Collado, 2010). The obstacles to reform improvement need to be better understood and addressed. We hypothesize that vulnerabilities in the reform selection and implementation processes can undermine the potential impacts of developmental education reforms. In the remainder of this paper, we seek to provide some insight into the nature of these vulnerabilities and potential solutions.

3. Instructional Reform Scan

We conducted a scan of existing instructional reforms in order to identify the range of innovations with implications for teaching and learning in developmental education classrooms.⁵ We cataloged a total of 66 developmental education innovations, 41 of which were focused on math, 21 of which were focused on English and/or reading,

⁵ See Appendix B for a comprehensive description of our project methodology.

and four of which were focused on both math and English.⁶ The research team identified innovations through existing relationships with reform leaders, professional associations, conference proceedings, and online communities. Site visits and interviews with faculty and administrators were conducted to gain additional insights into the reforms' structure, outcomes, and implementation processes. Our sample is not representative and cannot be used to infer the distribution of the types of developmental education reforms nationally. However, we believe it provides generalizable information about how specific reforms work and about common trends in implementation. Over half of the reforms we cataloged used compression, linked courses, or modularization. Other types of reforms, such as boot camps and mainstreaming, were identified less frequently in our sample. (See Table 1 for a complete listing of reform types and the prevalence of each in the scan.)

Compression involves combining two or more courses in a developmental education sequence into a single semester in order to expedite students' completion of academic requirements. For example, colleges may offer beginning algebra during the first half of a semester and intermediate algebra during the second half. Generally, in compressed courses, the total number of instructional contact hours and the content covered are the same as in traditional, semester-length courses. At several colleges in the scan, the same instructor taught both compressed courses. Compression models aim to build stronger relationships among students by creating cohorts, to build stronger relationships between students and faculty, to decrease the amount of time spent reviewing previously learned material, and to allow students to spend a larger proportion of their time during the semester focused on a single subject (Bragg & Barnett, 2008; Edgecombe et al., 2013).

Linked courses, often referred to as learning communities, are designed to allow cohorts of students to co-enroll in two or more courses. Developmental education learning communities may link a developmental math or English course with a student success course or another credit-bearing course, or they may pair developmental math and English courses with one another. The courses can be bridged by a common theme reflected across integrated assignments and assessments. Advocates of learning

⁶ The presentation of the proportion of each type of developmental education reform is intended for readers to understand the composition of our sample. We do not recommend applying these proportions beyond this analysis.

communities suggest that they help students to build productive relationships with peers and to contextualize course content (Engstrom & Tinto, 2008). Some learning communities are augmented with additional support services (e.g., dedicated counselors) and at least initially may provide common planning time for instructors. Challenges to effective learning community implementation include managing the co-enrollment registration process and facilitating cross-course curricular integration among faculty (Visher et al., 2010).

Table 1
Types and Prevalence of Instructional Reforms Cataloged in Scan

Reform Type	Description	Number Cataloged^a
Boot camp	Prepares students to take or retake and pass the placement exam via a short-term course (usually 1–2 weeks).	7
Compression	Expedites requirement completion by combining multiple courses in a developmental education sequence into a single semester. Number of instructional contact hours and course content are typically unchanged.	17
Contextualization	Involves the teaching of developmental skills using discipline- or career-specific content.	7
Curricular redesign	Revises learning objectives and course content to align with college-level expectations and/or decrease curricular redundancy and the time needed to complete developmental requirements.	6
Learning community or linked courses	Creates cohorts of students that take two or more courses together. Course combinations are generally cross-disciplinary and united by a theme.	16
Mainstreaming	Places students referred to developmental education into an introductory college-level course with supplemental support (e.g., mandatory companion course, lab sessions). Typically targets students who scored near the cutoff for college-level course placement.	5
Modularization	Breaks curriculum into smaller components and tailors remediation to academic needs and major requirements. Models typically use instructional software for course delivery.	16
Skip and jump	Allows students to forego some developmental requirements if they have met the learning objectives for the course being skipped.	3

^aTallies of the different reform types are greater than the total number of innovations cataloged in the scan. Some initiatives combined multiple reform types. In those instances, we tallied the innovation as a singular reform but cataloged the separate features (i.e., type) to best capture the variability in reform efforts in the field.

Modularized reforms reorganize curriculum into smaller, discrete units. At some colleges, module completion requirements vary across majors, potentially allowing students to enroll in fewer developmental education credit hours than they would if they took traditional, full-semester sequential courses. The majority of the modularized innovations we chronicled were in developmental math and used software as the primary means of instructional delivery. In these cases, students independently accessed instructional software, such as ALEKS or MyMathLab, in computer-equipped classrooms or labs and worked at their own pace through a series of modules. Software packages typically introduced students to new content through electronic textbooks and/or instructional videos and provided students with problem sets and assessments. Proponents of computer-mediated modularization argue that this type of reform requires students to take increased responsibility for their learning and spend more time on task. They also report that modularization is a cost-saving strategy for colleges because contact hours with instructors are often decreased and tutors can be deployed to support students in computer-mediated classrooms or labs (Twigg, 2005).

In addition to identifying reforms in the scan that used compression, linked courses, and modularization, we documented other, less prevalent reform approaches, such as boot camps, contextualization, curricular redesign, mainstreaming, and skip-and-jump models. Boot camps are short-term interventions designed to provide students with intensive instruction before they retake the placement test. With contextualization, instructors teach developmental skills and knowledge using discipline- or career-specific curricula. Colleges that undertake curricular redesigns typically revise the instructional materials, assignments, and assessments used in developmental courses to more closely resemble those used in college-level courses, in many cases eliminating basic skills content that does not align with college course requirements. In mainstreaming approaches, students enroll directly in introductory college courses as well as in mandatory companion courses, where they receive additional support. Finally, we noted the emergence of skip-and-jump models, in which students may be recommended to skip the subsequent developmental course in a sequence based on their performance in the previous course. Curricular redesign, mainstreaming, and jump-and-skip models, along with compressed courses, are frequently cited as acceleration strategies explicitly

designed to reduce the time it takes for students to complete developmental education requirements (Edgecombe, 2011).

Each reform type we identified in the scan is designed to address particular obstacles that students confront in traditional approaches to developmental education in a different way. The variation in reform types suggests that reformers can target interventions to address particular obstacles and thus increase their impact. However, our analysis indicates that selecting and implementing targeted reforms is often challenging. In the next section, we build on the scan findings and examine the rationale that reform leaders used to select reforms and the factors that affected reform implementation.

4. Reform Activities

The scan and subsequent fieldwork provided important insights into the underlying mechanisms of developmental education reform as well as information on the activities that practitioners engaged in to select, launch, refine, and institutionalize instructional innovations. Drawing on our data, we illustrate how these activities are typically enacted, highlighting pitfalls that appear to undermine the potential benefits of reforms. We also highlight examples of alternative approaches that may be associated with more effective reform implementation and potentially with stronger student outcomes.

4.1 What Drives Colleges to Engage in Reform?

For most colleges in our sample, developmental education reform was sparked by external catalysts, such as fiscal constraints, policy mandates, and funding opportunities, coupled with the personal motivation of a few reform-minded practitioners. These external factors and personal motivations interacted with context-specific pragmatic considerations to influence choices regarding which reforms to pursue and the timing of implementation. In some cases, the reform activities that resulted were not closely tied to the main issues impeding student success, and in many cases, colleges were not able to evaluate their reform choices thoroughly due to limited analytic capacity. However, when faculty and administrators were able to systematically diagnose obstacles to students'

academic performance and persistence and align reform approaches to a set of prioritized needs, we saw the potential for reforms to generate long-term positive outcomes.

Financial pressures, manifesting through shrinking budgets and exacerbated by growing enrollments, were the most commonly reported impetus for reform. In response to declining government support, colleges have reduced course offerings, increased class sizes, and eliminated student support services and staff positions. In addition, colleges are increasingly delivering instruction through acceleration models, boot camps, and computer-mediated courses, which are perceived to enhance efficiency. For example, in response to fears that a state budget shortfall would result in job losses and fewer course sections for students, faculty at one college moved quickly to restructure their developmental sequences in English and reading into an accelerated pathway, which reduced costs by decreasing faculty contact hours and substituting tutors for instructors in support workshops. Although a renewed focus on efficiency is a constructive response to the fiscal outlook for public higher education, reformers worry that it may reduce instructional quality, undermining the potential of reforms that are resource intensive.

State or district policy mandates also are strong catalysts for reform. Sometimes the policy decisions that drive reform initiatives emerge from fiscal concerns, gaining momentum with increasing public awareness of poor developmental education outcomes and low community college graduation rates. As a result, state boards of higher education and community college systems have advocated policy options to reduce the number of students placed into developmental education and the amount of time they must spend completing remedial requirements. Colleges must comply with state mandates, which vary in substance and prescriptiveness. For instance, community college systems in Tennessee, Virginia, and North Carolina have enacted policies modularizing their developmental math curriculum in an attempt to reduce the number of developmental credits and the amount of content students are required to complete. Such policy mandates ensure compliance, but they may generate resentment among faculty who feel the reforms infringe on academic freedom, which may negatively impact implementation.

A large number of developmental education reforms are stimulated through grants funded by foundations or the government. Grants provide seed money that may underwrite a range of start-up costs, including staffing, training, materials, and

equipment. Importantly, grant makers' funding priorities not only catalyze reforms but also shape their focus and structure. A foundation may prioritize work with a specific student population (e.g., English language learners) over a limited amount of time (e.g., two years). Colleges we studied were likely to pursue such opportunities for supplemental funding, even if the parameters did not align with previously identified priorities or the full scope of their reform endeavors.

Financial pressures, policy mandates, and grants were essential to initiating reform efforts at the colleges we observed, but they often resulted in the adoption of reforms that may not directly address students' most salient academic and nonacademic challenges. This is, in part, because reforms that emanate from external catalysts may not be tailored to the most pressing needs of students in a particular college context. Policymakers and funders working with aggregate data, if any data at all, may settle on a single approach that is more effective for some students than others. Moreover, across-the-board budget cuts have contributed to constrained analytic capacity at many community colleges. When data are available at the institutional level, practitioners rarely have the time or expertise to systematically investigate the causes of poor outcomes for students enrolled in developmental education. When we inquired about the issues affecting student performance in developmental education, reform leaders generally mentioned academic preparedness and student motivation but lacked specific metrics to measure these broad constructs. Others relied on relatively gross measures of success and failure, such as overall course pass rates or graduation rates. In our fieldwork, we found practitioners changing course structures, curricula, or pedagogical approaches without an empirical basis for their decisions—risking the implementation of reforms that may not address the underlying obstacles to student success.

In many cases, external forces and weak empirical evidence operated in conjunction with internal pragmatic considerations to affect the selection of reforms. Interview data suggest that many colleges intentionally selected reforms that resembled their current approaches or required minimal changes to institutional or pedagogical practices. For instance, many colleges selected compression models not only because they expected the reforms would accelerate students' progress through developmental education but also because they could be launched without dramatic changes to staffing,

curriculum, or pedagogy. For the most part, compressed courses fit into colleges' existing course schedules and had little impact on prerequisites. The results of our scan suggest that colleges were less likely to select reforms with an explicit focus on classroom practice because they required the most significant individual-level change. Less than one fifth of the innovations we cataloged included pedagogical change as a primary focus.

When reformers deliberately assessed students' needs, they were able to leverage—rather than merely react to—external forces in order to enhance their reform efforts. A few colleges in our sample were able to select reforms that addressed essential pragmatic considerations and aligned with student needs. For example, at one college, the reform process was catalyzed by a grant that provided funding to explore new developmental education options. To understand why the outcomes for arithmetic students were persistently low, a math faculty member was given released time from teaching to review institutional performance data, course outlines, and course textbooks. She also spoke with students about their math experiences and looked at how other colleges were approaching arithmetic. Notably, this reform leader was not satisfied with a simple review of course-level outcomes. She believed that the course restructuring process should be informed by a thorough analysis of content, pedagogy, and student perceptions.

In another case, a college required by the state to modularize its developmental math curriculum convened a faculty-led committee, which used insights from national professional teaching organizations in mathematics and the empirical literature to inform its approach. The committee found little evidence that skill repetition and lecture-style teaching effectively facilitated mathematics learning at the developmental level. Instead, the research literature suggested that problem solving and application were promising approaches for enhancing students' conceptual understanding. In response, the faculty members designed an approach that combined collaborative learning with individual computerized modular practice. Working within the parameters of the state policy, they developed a hybrid instructional model, with both computer-assisted and face-to-face components, that addressed students' conceptual understanding within the classroom and with instructional software.

These particular approaches to developmental math reform selection may have been atypical, but the empirical basis on which they were built gave them immediate credibility within their institutions and paved the way for more effective implementation. The reform processes also modeled analytical strategies that could be used to solve problems related to a range of organizational issues.

4.2 What Occurs When Reforms Are First Launched?

Once an intervention has been selected and launched, colleges enter an early implementation stage that presents opportunities for reflection, refinement, and growth. Our inquiries about the period after reform launch yielded information about “start-up” priorities that reform participants must manage. Typically, the energy expended on start-up activities precluded any substantive assessment of the reform or improvement efforts. However, when colleges were able to reflect on early implementation, analyze initial outcomes, and immediately involve stakeholders in refinement activities, reforms were able to grow and develop. Additionally, reformers who focused on refinement soon after implementation saw other benefits, such as broadened engagement and a sense of ownership among faculty.

As colleges prepared to launch their reforms, faculty and administrators focused their attention on logistical considerations, such as adjusting course schedules, securing classroom space, and recruiting students. Once reforms were operational, their focus shifted toward delivering new content and/or delivering traditional content in new course structures. Supporting student success in the newly reformed courses was time-consuming for many of the faculty members we interviewed, limiting their ability to perform other activities related to reform implementation, such as analyzing outcomes, pursuing professional development, and promoting the reform to students and colleagues. For example, pre-statistics faculty members who previously taught in the algebra sequence reported that in addition to performing their regular class preparation and assignment grading responsibilities, they were spending significant time each week relearning or familiarizing themselves with statistics content. To respond to student needs, faculty teaching in many types of reforms devoted significant time throughout the semester to creating and revising assignments, assessments, and grading rubrics, leaving little time for substantive reflection and long-term planning. Our data suggest that faculty

leadership during implementation is critical to building the momentum and credibility necessary for reforms to become firmly established.

With few exceptions, the developmental education reforms we studied were launched at a relatively small scale (i.e., with two to four sections) by an individual or a small group of dedicated faculty members. Typically, these faculty members were intensely involved in early implementation, reflecting the high level of commitment necessary to manage the unexpected challenges that arise when teaching a new course. Their intensity of involvement, however, had unintended consequences on reform ownership. Our analyses suggest that intense work by a small cadre of faculty can breed an insularity that relegates other faculty members to the sidelines. Those most engaged in reform efforts at the outset feel considerable pressure for the reform to succeed and frequently close ranks, sharing limited information on early implementation with colleagues for fear of criticism. When reform work occurs in isolation and information is not readily shared, fewer faculty members have the opportunity to learn about reform efforts or to assess their merits, which may negatively affect the willingness of other faculty to engage in the reform process.

Together, the focus on logistical and teaching-related concerns that dominated early implementation and the relatively small and isolated nature of many nascent reforms left the reforms we observed vulnerable to skepticism. The views of reform skeptics can gain traction when early implementation and outcomes are not transparent. For example, a seasoned math faculty member, convinced that a new pre-statistics pathway was less rigorous than the algebra sequence, expressed concerns that positive early outcomes were inflated by the group of exceptionally talented instructors recruited to teach during the pilot. Although reform leaders at this college disputed notions of instructor exceptionalism, they acknowledged that they chose instructors with similar teaching philosophies. Reform skeptics often expressed concerns that the enthusiasm of early adopters would lead to unintentional grade inflation and decreased standards, particularly in reforms with alternative assessment strategies (i.e., more collaborative student work).

One way to counteract early implementation pitfalls requires reformers to repurpose mechanisms for engagement and refinement that were developed during reform

planning, such as curriculum committees or faculty inquiry groups. Doing so eliminates the need for reform leaders to create a support infrastructure from scratch during the hectic time after launch. For example, one group of faculty members leading the redesign of a developmental English course met weekly to plan lessons, identify common curricular materials, and develop instructional strategies prior to the launch of the reform. After the reform was launched, they continued meeting to troubleshoot curricular issues and to discuss and refine classroom practices. Their meetings were sites of substantive, collaborative work and were perceived as valuable to the participants. Faculty members we interviewed stated unequivocally that their continued participation in these professional learning and support gatherings was meaningful and beneficial and helped to allay some of their concerns about teaching a redesigned course for the first time.

At another college, a reform steering committee comprised of faculty members and administrators not only made classroom-based improvements during early implementation but also pursued faculty recruitment and training and ongoing analysis of student outcomes. Although the committee was established after the reform was launched with the support of grant money, it used its diverse representation and collective strength to address multiple reform implementation priorities at once. For instance, committee members administered surveys to faculty members and students in order to better understand their experiences and interpret course pass rates and college course enrollment and completion patterns. Members of this group also served as ambassadors for the reform, explaining its benefits to colleagues and lobbying for expanded resources to continue improvement efforts. Finally, the participation of administrators and faculty from multiple campuses on the steering committee helped to build college-wide support for the reform.

Sustainable and coordinated activities to support reform implementation do not have to be subordinate to other start-up priorities. But they do require a functional, durable infrastructure for relevant and timely professional learning opportunities, strategic engagement and outreach efforts, and other activities to refine reforms during the early stages of their implementation. Derivations of such an infrastructure can be further applied to examine and address the challenges students face beyond developmental education.

4.3 What Does It Take to Scale and Sustain Reform?

Effectively scaling and sustaining a developmental education reform requires several conditions, including the indication of promising early outcomes; the enthusiasm and ownership of stakeholders beyond the initial group of reformers; and the human, financial, and political resources to support the new approach and its continuous refinement. We define a “scaled-up” reform as one that reaches the maximum number of students who can benefit from it, which may not be every student referred to developmental education. A sustainable reform is one that is structurally, financially, and culturally institutionalized. It has moved beyond the pilot stage and represents “business as usual” for the college. Reaching scale or sustainability does not mean that a reform is no longer in need of change or refinement. Rather, it implies that the institution is committed both to the substance of the innovation and to a mechanism for its improvement.

Although most of the reforms we examined in the scan and through fieldwork were not yet fully scaled or sustainable, our data suggest that the scaling and sustaining processes are inextricably linked. During reform planning and implementation, policymakers, administrators, and faculty make many decisions about program expansion, resource allocation, and stakeholder engagement that affect scale and sustainability. These decisions are mediated by practical considerations that vary depending on the type of reform (e.g., how resource intensive it is) and the context in which it is implemented (e.g., how open to change faculty members are).

In our sample, reform leaders varied in their approaches toward scale and sustainability, which were highly influenced by practical constraints on early implementation and the resource requirements of the reform. Most colleges opted to start the innovation with a small number of pilot sections; fewer colleges implemented the reform at full scale within a few semesters. Several colleges were forced to begin at a small scale because the formal course approval process limited the number of sections of an experimental course that could be offered. Another practical consideration was the need to have new developmental courses approved as prerequisites for college courses. For example, faculty from one college piloting a developmental pre-statistics course had to gain approval from several departments (i.e., math, economics, and social science) for

the new course to serve as a prerequisite for college statistics and other courses requiring quantitative reasoning. Before those approvals were given, there were only a small number of subsequent courses for which pre-statistics was an approved prerequisite. The math department thus offered only two sections of the pre-statistics course initially, to ensure that students who were successful would have college-level course options available.

All the colleges we studied had to navigate the course and prerequisite approval processes, but some were able to expand their reforms faster than others—particularly those where senior administrators were committed to clearing obstacles to expansion. For example, one college we examined rapidly expanded a developmental English reform, doubling the number of sections taught each year. The reform’s growth presented logistical challenges because the model required additional instructional contact hours; thus, more classroom space had to be secured. Senior administrators at the college repurposed library study rooms and conference rooms as classroom spaces to ensure that reform scaling proceeded unencumbered. In another instance, a developmental math reform that showed positive effects during a pilot phase was expanded to full scale at the start of its fourth year (i.e., all course sections used the reform model) at the urging of the college president. It is unclear that either of these reforms would have grown so rapidly or to such a large size without administrative intervention.

The scale and sustainability of a developmental education reform is also tied to its outcomes. When student outcomes are strong, reforms are more likely to be institutionalized. However, it may take multiple years for reliable data to be generated. Among the colleges we examined, developmental course completion rates were generally available after the first or second semester of implementation, although they were not always widely disseminated. Other data, such as enrollment and completion rates for introductory college courses, would not be available for at least another year. With only one exception, the colleges in our sample that had scaled their reforms were not yet in a position to rigorously assess long-term student outcomes such as graduation and transfer rates. Yet strong short-term outcomes were sufficient to garner the attention of senior administrators who relied on that evidence to justify adding and reallocating resources in support of the reforms. These resources include slots in the course schedule, staffing,

classroom space, and academic and nonacademic supports, all of which have financial implications for the institutions. At a fraction of the colleges, positive data also helped administrators justify the decision to discontinue other developmental education delivery models that appeared less effective. Additionally, our analysis suggests that strong outcome data help to broaden stakeholder support, turning some reform skeptics into believers. Such broad support appears to facilitate effective institutionalization.

Reform leaders had to adeptly manage political and cultural considerations, which interacted with issues affecting scaling and sustainability. Faculty and administrators who advocated changes to developmental education often faced resistance from other stakeholders who disagreed with their approach or who were uncomfortable with change. As a result, some reform leaders made the political decision to launch innovations at a small scale and not to call attention to their work, particularly until they had strong evidence of superior student outcomes. In their estimation, starting small reduced the perception among resistant colleagues that fundamental change was eminent and gave reformers the opportunity to refine and strengthen the innovation before suggesting its expansion.

Scaling up and sustaining reforms also requires stakeholders to attend to the early challenges that faculty almost inevitably face in reformed classrooms. However, cultural norms of autonomy and isolation in higher education make it difficult to address pedagogical challenges in systematic ways. For example, one college implementing a mainstreaming model in developmental English chose not to create structures for support and collaboration among participating faculty. Interviews with developmental English instructors revealed that they encountered a number of challenges in their classrooms related to devising new instructional activities and dealing with disruptive students. In most cases, faculty resolved these issues on their own instead of approaching colleagues for assistance. We contend that hesitancy to discuss classroom challenges with colleagues is in part a cultural artifact of higher education, where even the most collegial faculty are isolated and rarely engage one another on matters of classroom practice. The lack of collaborative infrastructure, such as regular meetings or faculty inquiry groups, only exacerbates faculty members' isolation, likely reducing opportunities to strengthen reforms.

In our sample, practical constraints, political considerations, and professional norms tended to work together to increase or decrease the pace of scaling and institutionalization. Departments that had made the case for reform, identified obstacles to success in their existing delivery models, selected a reform that was well aligned with their goals for improvement, and encouraged early input and feedback on reform efforts typically (and not coincidentally) had the political will and professional collaboration infrastructure needed to advance reform efforts in a robust manner. However, among the colleges we studied, such departments were the exception. More commonly, we observed a reactive (as opposed to reflective) reform implementation process, which likely creates obstacles to sustainability.

In the next section, we apply our insights about the commonly faced challenges and promising approaches documented in this section to present a framework for adopting and adapting reforms. The framework privileges *how* reformers implement developmental education innovations over *which* reforms they pursue. It also highlights the ways in which developmental education reform processes can help to establish and enhance organizational assets that can be used to support other change efforts.

5. Adoption and Adaptation Framework

In this section, we present a framework for reshaping the dominant orientation toward education reform. Currently, practitioners, policymakers, and most researchers focus on identifying and emulating best practices, but focusing on “what works” oversimplifies a complex set of processes that is highly dependent on individual will, capacity, and context. We contend that how, where, and with whom reforms work are equally if not more important considerations. In community colleges, developmental education reforms are enacted by practitioners with varying levels of pedagogical proficiency, leadership ability, and commitment to change. Some colleges have adequate financial resources and strong human resources, but others lack these basic organizational assets. Few colleges have cultures that reward the experimentation, risk-taking, and analytic focus that are needed to create structures, policies, and practices that will likely improve student outcomes substantially—and it takes many years for such cultures to

develop. As a result, we have observed reforms that generate promising results at one college but not at others; we have also witnessed colleges struggling to scale and sustain seemingly high-potential reforms. Absent a systematic focus on strengthening individual and institutional resources in conjunction with reform efforts, educational outcomes will likely not be dramatically altered by reforms.

The adoption and adaptation framework reflects a multifaceted view of reform, context, and process that is grounded in our data on developmental education reform and informed by the research literature. We frame adoption and adaptation as a set of processes (or *components*) to help practitioners engage in purposeful and sustainable activities that will increase the impact of their developmental education reforms while strengthening organizational capacity. Additionally, the adoption and adaptation framework can serve as a series of checkpoints for policymakers to consider as they mandate particular developmental education reform models, develop and deploy supports for community colleges, and assess the effectiveness of reform efforts. The framework is not meant to be prescriptive but rather to be used as a heuristic, informing the multitude of decisions required to enact reform.

In the sections that follow, we describe what adoption and adaptation are and define a set of framework components that we believe are influential. Within each component, the activities we highlight are not necessarily indicative of the full range of options at stakeholders' disposal, but our broader framework components are likely generalizable to a variety of reform approaches.

5.1 Adoption

The *adoption* phase of a developmental education reform encompasses three components: diagnosis, selection, and preparation. Community colleges are subject to a variety of external and internal forces that influence which reforms are adopted and how they are adopted. Because some of these forces can be counterproductive, it is important that policymakers and reform leaders recognize potential pitfalls and approach the reform process with reliable information, a range of reasonable options, and an awareness of resource requirements. We suggest that stakeholders pay particular attention to the most salient reasons for poor developmental education outcomes through rigorous diagnostic processes. Stakeholders should then examine how potential interventions specifically

address the diagnosed issues so that the most appropriate reform approaches are selected. Finally, stakeholders should consider ways to identify and mobilize the resources necessary to effectively prepare for reform. Engaging in these activities as part of the reform adoption process can help institutions implement new approaches to analysis and information sharing that have broad implications for their organizational capacity.

Diagnosis. The purpose of diagnosis is for colleges to determine the most salient obstacles to student success in developmental education and to identify and prioritize a set of student needs that can be addressed through reform. In a robust diagnostic process, a coalition of stakeholders works to collect and analyze data on the outcomes and experiences of students referred to developmental education. The stakeholders also review evidence on existing reforms in order to select a reform that aligns with the student needs they identify. The research and analysis that is the basis of diagnosis helps colleges to establish the case for reform and to focus on a set of realistic priorities. Without data-informed diagnostic activities, reformers may select an approach without understanding how the reform will meet the needs of their students. Importantly, the mechanisms for collaboration and data-informed decision making established during diagnosis lay the foundation for all other components of the adoption and adaptation framework.

To understand the obstacles to student success in developmental education, administrators and faculty can review course pass rates and grade distributions, longitudinal data on student progression across course sequences, student performance on specified learning outcomes, and data disaggregated by student characteristics (e.g., demographic characteristics, placement exam scores). These data may also shed light on the number of students who could potentially benefit from a reform, which can guide initial scaling plans. Invariably, analyses will generate additional questions about the causes of student underperformance; reform leaders might explore these questions by conducting focus groups or surveys to capture faculty and student perspectives, or by reviewing artifacts of classroom practice, such as student work and curricular materials. Analyses of data on student performance should serve as the lens through which practitioners then begin to examine evidence on various reform approaches. To understand the range of reform options available, colleges can use the knowledge, creativity, and expertise of their faculty as well as external resources, including

professional conferences and associations, research publications, disciplinary groups, and informal information networks.

A robust diagnostic process requires representation and input from stakeholders from across the college and can catalyze collaboration and information sharing that did not previously exist within a community college. In addition to developmental education faculty, the group of stakeholders might include institutional researchers, faculty from other disciplines, tutors, advisors, and other student support professionals; a diverse group is more likely to represent a range of perspectives on obstacles to student success. Convening this team early in the reform process helps to build widespread and longstanding support for the reform. The culture of information sharing and collaboration that diagnosis can help to establish not only improves the implementation of particular developmental education reforms but also provides a strong foundation for approaching a wide variety of institutional improvement efforts.

Selection. The goal of selection is to choose a reform model that aligns with the student needs identified during the diagnosis process. To do so, reformers must understand the theories of action behind potential reforms (i.e., what the reforms are designed to accomplish and how they address specific obstacles to student success). That understanding can be used to identify a reform that addresses students' most salient needs and that can be effectively implemented, given a college's institutional culture and resources. During the selection process, reformers may choose to experiment with different approaches or with variations on a single approach to further inform their decision making. They also may identify other institutional changes that are necessary to implement the selected reform, which can be addressed during the preparation component of the adoption and adaptation framework.

During selection, reformers consider the obstacles to student success identified during diagnosis, look internally and externally at the reform options, and make informed decisions about the most appropriate approach to pursue. For example, colleges with multi-course developmental education sequences that identified student attrition between courses as a significant obstacle may elect to adopt compressed course structures. Likewise, faculty members struggling to improve students' ability to transfer and apply mathematical learning across courses may choose to redesign the developmental math

curriculum to emphasize conceptual understanding in addition to procedural fluency. Colleges can support the selection process by testing specific elements of reforms. For example, faculty pursuing a technology-infused developmental math redesign may use different instructional software programs in different sections of the same course and assess which one appears to contribute to stronger student learning outcomes. English faculty considering a mainstreaming approach may create experimental sections, with varied placement exam cutoff scores, to examine whether the model holds promise for all or just some students.

Selection activities increase the likelihood that a reform will be picked based on stronger empirical grounds and modified in ways that enhance its impact. Equally important, selection activities foreground the institutional resources necessary to implement reforms. Thus, the selection process helps to focus reform implementation while generating a sustainable orientation toward organizational change. An organizational culture that promotes analysis, informed decision making, and experimentation becomes an essential resource during the reform refinement and scaling processes.

Preparation. The preparation process includes a series of practical activities necessary to effectively launch a developmental education reform. It may include activities related to the reform itself, such as curriculum development and faculty training, as well as institutional accommodations or actions, such as schedule changes, space allocation, and student recruitment. Preparation activities vary depending on the reform and the context in which it is implemented, and reform leaders inevitably have to address a range of unforeseen issues. As faculty members and administrators prepare to launch the reform, the reform becomes tangible and visible to a broader audience. Preparatory activities, then, must affirm that change is imminent and that those who engage in reform will be provided support and encouragement.

Reforms that depart substantially from the previous instructional delivery model may require new or revised curricular materials as well as training to familiarize faculty with those materials. Colleges can support such reforms by providing a small group of faculty members released time from teaching to develop and revise curriculum. Involving multiple faculty members ensures that a diversity of experiences and perspectives is represented in the curriculum development process without overburdening any

individual. A focus on curriculum and related faculty development issues may be needed, for example, in reforms that work to improve alignment between developmental coursework and the college curriculum. Such reforms often require the creation of materials, assignments, and assessments that replicate college-level tasks, albeit with slightly lower performance expectations. Although this type of reform creates a better aligned and more relevant curriculum for both faculty and students, it also introduces more uncertainty about performance criteria and grading. As a result, faculty members can expect to encounter a number of challenges in the early semesters of redesigned developmental education courses, and colleges should plan to provide ongoing faculty development that is grounded in day-to-day classroom practice.

Preparation requires a range of activities related to student recruitment, including information campaigns about upcoming changes to developmental education offerings with clear messaging about new course numbers, prerequisites, and other potential points of confusion. Administrators, faculty members, and counselors need to anticipate student behavior and perform targeted outreach to ensure that students understand their options and make informed enrollment decisions. Stakeholders may find information about students' course-taking patterns generated during diagnosis to be useful during the preparation component of the framework. Existing classes, orientations, and advising sessions are high-potential venues for sharing information and addressing confusion; and personalized, ongoing correspondence with students can reinforce their understanding of enrollment criteria and processes.

Strong preparation for a developmental education reform does not merely rest on high-quality instructional materials or course sections filled with well-informed students. Rather, preparation is the start of a set of ongoing activities aiming to adjust the reform to its context—or the context to the reform—to support the reform's optimization in the service of broader student success goals. The preparation component of the framework leverages and augments critical organizational resources, such as information and structures created during diagnosis and selection, to identify and address the range of practical considerations necessary to launch a reform. Importantly, in the preparation process, reformers engage a broad representation of college stakeholders—including counselors, financial aid personnel, registrars, and student information system

managers—in discussions and planning efforts that are relevant to the reform and likely relevant to other endeavors.

5.2 Adaptation

The *adaptation* stage of our framework outlines ways that practitioners can think about their activities once a developmental education reform has launched. We present a set of recursive components—assessment, refinement, and scaling—that, when coordinated, can help colleges to optimize and sustain a reform. We assume that early implementation will not represent the ideal model of the reform and that changes will be required. As in the adoption stage, colleges’ activities during the adaptation stage may be influenced by internal and external forces that can negatively impact implementation. However, practitioners learn as much from mistakes as they do from successes, and what they learn can be used to strengthen elements of the intervention and to enhance the implementation process. Successful adaptation of a reform also relies on professional learning and collaboration—utilizing infrastructure for faculty support and other organizational assets established during the earliest stages of reform (i.e., diagnosis).

Assessment. The assessment process entails continually collecting and analyzing a range of data on the implementation process and its outcomes. It also involves helping stakeholders to build their ability to interpret data and translate it into concrete action. Without accurate and reliable data and the knowledge and skills required to convert that data into meaningful action, it is unlikely that any developmental education reform will reach its potential. Reformers can build on the structures and practices developed during diagnosis and selection to support various activities during assessment. Activities may include: examining the reform and how it is being enacted; reviewing performance metrics related to intervention goals; and gathering and sharing feedback among a broad coalition of faculty, staff, and administrators.

For example, faculty reform leaders may work together to assess the strengths and weaknesses of new curricula or course structures in preparation for modifications during the first semester or two of implementation. This could be accomplished through weekly meetings in which faculty examine artifacts of practice, such as students’ assignments and assessments, in order to identify particularly challenging concepts for students, less effective assignments (e.g., flawed writing prompts), or pedagogical approaches that

generate better student performance. Using common assignments and assessments can help to facilitate this process for faculty. Simultaneously, colleges could engage a broader representation of stakeholders—including those involved in the reform and those not yet engaged—in the assessment process through reviews of early implementation and outcomes. Faculty, administrators, and staff could gather together for presentations and discussions of data related to relevant performance metrics. Data on some performance metrics will be appropriate to consider in early semesters (e.g., developmental course completion), whereas other data should be assessed after the reform has had time to mature and potentially expand (e.g., gatekeeper course pass rates). Reviews of reform performance should be part of an ongoing process and should provide insights into outcomes such as developmental education course and sequence completion, persistence, gatekeeper course enrollment and pass rates, and the performance of various student subgroups (e.g., outcomes by race/ethnicity or gender). Qualitative assessments of stakeholders' perceptions and experiences, collected through surveys or focus groups, may help to explain the quantitative outcomes.

Assessment informs a range of potential post-launch activities to improve reforms and serves as a model for formative evaluation efforts designed to generate relevant and actionable information. Although critical to the developmental education reform context, assessment is a fundamental mechanism for broader organizational improvement, as both the assessment process and its findings can powerfully shape institutional practices. Analyzing, sharing, and learning how to use data fosters a culture of data transparency (i.e., where data are widely available and trusted) and reliance (i.e., where everyday use of data is the norm). Such a culture has the potential to break down silos between academic departments, temper the distrust of reform skeptics, and generate a common understanding of how decisions are made.

Refinement. The goal of refinement is to work toward improving developmental education reforms by executing grounded and contextualized activities on an ongoing and systematic basis. In a strong refinement process, reformers use information garnered during assessment to address a reform's weaknesses and build on its strengths. They also use feedback to improve implementation processes—particularly those processes that pave the way toward reform optimization and institutionalization. The type of refinement

we advocate in the adoption and adaptation framework extends beyond small, uncoordinated improvements made by individual practitioners. Instead, it emphasizes changes that will have broad, significant organizational impacts and may require shifts in the roles and expectations of various stakeholders. Without continuous efforts to refine a reform, colleges may find that it generates only short-term gains. A lack of refinement work also increases the risk that ineffective practices will become institutionalized and that the reform will be prematurely displaced.

Refinement activities may include changes to the substantive components of a reform, such as its structure, curriculum, and pedagogy. For example, during early implementation of a mainstreaming reform, assessment results may highlight attendance issues in the supplemental course. Specifically, faculty may find that students are less likely to attend the supplemental course if it is offered on a different day than the college-level course. In response, the college may change the class schedule in subsequent semesters so that the college course and the supplemental course are offered back to back. Likewise, faculty implementing a modularized developmental math reform may review data on exam performance and unit completion and identify content that students struggle with, which slows or stops their progress through the course modules. Faculty may then reevaluate how that content is introduced, the types of assignments students complete, and the ways students are assessed. They may also experiment with alternative curricular and pedagogical approaches in different sections of the same course to uncover and address obstacles to student learning. Moreover, faculty leaders seeking to improve the modularized math curriculum may recruit colleagues who are not teaching in the reform to participate in the refinement process, thereby bringing in fresh perspectives.

In addition to improving the reform itself, the refinement process should improve the implementation process. For instance, reform leaders who are initiating formative assessment activities may recruit their colleagues in order to benefit from the expertise of a broader group of faculty. Similarly, administrators may underwrite continued released time for reform leaders to support their work toward formal course approval, faculty outreach efforts, or other refinement activities. Activities such as these, which address *how* reforms are implemented, must occur in concert with changes to the reform model.

Refinement of specific reforms simultaneously draws on and strengthens organizational practices that are necessary for broader, deeper, and continuous institutional improvement. These practices, such as faculty collaboration and information sharing, benefit reform efforts directly, but they also can engender a shift in the organizational culture. They do so by setting the expectation for the kind of risk taking and experimentation required to improve a range of student outcomes and by creating the infrastructure that is necessary to support improvement efforts. Refinement thus results in an improved reform and a stronger institution.

Scaling. The purpose of scaling is to institutionalize a reform and the resources needed to sustain it so that it serves all of the students who can benefit from it. The scaling process entails drawing on the information generated through assessment and refinement to determine which students gain most and which gain least from a reform. It also involves marshaling and deploying resources ranging from base budget funding to stakeholder engagement to support reform improvement, expansion, and institutionalization. Scaling can be impeded by institutional constraints and other forces, such that a reform does not serve all who could benefit from it and thus does not optimally contribute to improved college-wide student success. Yet purposeful assessment, planning, and resource management can help to ensure that the reform is not relegated to the margins of the institution, vulnerable to abandonment, and unable to generate more than modest impacts.

To develop an effective scaling plan, reformers may convene a task force comprised of a diverse group of faculty and administrators charged with analyzing data on the reform. The task force would examine how student outcomes within a reform, or across a reform and the traditional instructional delivery model, vary by placement level, demographic characteristics, and other factors. The group would also examine the costs of the reform in light of the comparative outcomes. Reforms deemed cost effective could then be integrated into a college's base budget; doing so might require the college to pare down or dismantle less effective approaches to developmental education. To garner the resources to institutionalize the new reform, particularly at the expense of other models, reformers would likely need to engage in an information sharing-campaign to bolster political will and support. Reformers could share outcome data, examples of student work, and narratives of

participating teachers and students with developmental and college-level faculty, administrators, and support staff through meetings, correspondence, and publications.

Reformers often experience a tension between the pressure to act quickly to improve outcomes and the desire for additional time to amass and analyze data for assessment and to experiment and refine the reform. As a result, the pace of reform scaling differs depending on the college's approach to implementation, the circumstances driving reform, and the constraints present. Regardless of the pace and scope of reform, scaling draws on mechanisms for collaboration, data use, dissemination, and engagement that have been cultivated throughout the adoption and adaptation processes. These mechanisms ensure that stakeholders, especially faculty, continue to examine and improve on their efforts to support student success. Sustaining and nurturing a collaborative and analytical approach both supports effective reform implementation and institutionalizes practices that are necessary for broader organizational improvement.

6. Conclusions and Implications

The Scaling Innovation project has provided an unprecedented lens into developmental education reform. Our data sample and analysis allowed us not only to examine different types of reforms but also to explore the similarities and differences in their implementation processes and the implications of that variation for a range of stakeholders and potentially for student outcomes. The study revealed that colleges tend to enact developmental education reforms in ways that may undermine their potential benefits, as logistical concerns unintentionally weaken implementation. Most reform processes lack mechanisms for reflecting on and counteracting implementation shortcomings, further magnifying the effects of the concessions made during implementation. Moreover, we identified a tendency for colleges to adopt minimally disruptive, small-scale approaches, which lack the breadth and depth to substantially improve college-wide student outcomes. These findings may partially explain why developmental education reform efforts to date have had limited impacts.

The phenomena we discuss in this paper are not unique to developmental education or community colleges. Education reforms in the K-12 system similarly have

generated relatively small and fleeting effects. Policy researchers have attributed the small magnitude of reform impacts to the difficulty of identifying the underlying obstacles to student success and precisely targeting interventions to address those obstacles within school contexts that may not be particularly receptive (Elmore, 2008; Payne, 2010). The insights from the policy literature align with our analysis, but they do not fully reflect the limitations imposed by the purpose and structure of developmental education. Most benefits associated with new structural, curricular, or pedagogical approaches in developmental education will likely only accrue to students at the start of their college careers, when they are enrolled in remedial coursework. Therefore, reforms that strengthen developmental education may contribute to better outcomes, but by themselves, they will not eradicate high attrition rates or low graduation and transfer rates among community college students.

Although the effects of developmental education reforms on longer term student outcomes have not been substantial, their significance for organizational improvement cannot be overstated. In the reform context, developmental education is a proving ground where colleges can enhance their analytic capabilities and engagement strategies and marshal human, political, and financial resources in ways that can potentially advance widespread student success. To do so, reformers must employ a range of institutional resources from the time they first conceive of the need for reform through to the reform's institutionalization. Our data suggest that reformers can use institutional resources in ways that not only support the implementation of a specific developmental education reform but also expand institutional capacity. For example, reform leaders who implemented an ambitious curricular redesign of a developmental math course discussed the potential for their conceptual learning approach to reshape the college's entire math curriculum. In another instance, within a year of the start of a carefully orchestrated accelerated developmental math reform, faculty in the English department at the same college consulted with their math colleagues to plan and enact their own acceleration strategy. One faculty team leading a developmental English reform that integrates reading and writing has presented at statewide student success conferences, illustrating how the innovation contributes to the college's broader success agenda. The scope of our analysis precludes us from tracking the results of the connections between the developmental

reforms we studied and other change efforts; however, the knowledge and resources developed through developmental education reform certainly have broader applications.

In developing the adoption and adaptation framework, we aimed to organize and describe reform processes to help guide practitioners and policymakers as they implement reforms to developmental education and other areas. The adoption portion of the framework emphasizes three major components of the conceptualization and planning phases of reform: diagnosis, selection, and preparation. The adaptation portion of the framework highlights considerations that arise once a reform has launched, encompassing distinct yet recursive assessment, refinement, and scaling processes. The framework calls attention to organizational assets that, when established early, can create stability during implementation.

The developmental education reform process is fraught with challenges, but the stakes are too high to not pursue it aggressively. A system in which only one third of students who are referred to developmental education complete their remedial requirements seriously undermines academic progress, increases costs to taxpayers, and discourages millions of students. The societal implications are equally devastating. Many community college dropouts struggle to secure employment paying a family-sustaining wage and may need to rely on an inadequate yet costly social service system. Further, educational under-attainment and poverty have intergenerational effects (Ratcliffe & McKernan, 2010; Rouse & Barrow, 2006; Wagmiller & Adelman, 2009). Community college faculty, staff, and administrators, in partnership with the policymakers, funders, and researchers, have important roles to play in helping to break this cycle. In this paper, we have defined a path forward—through developmental education reform and toward broader institutional improvement. Community colleges may be just a piece of the larger puzzle of educational achievement, economic mobility, and productive citizenship, but given their equity-focused missions, they are poised to lead.

References

- Bailey, T., Jeong, D. W., & Cho, S. W. (2010). Referral, enrollment and completion in developmental education sequences in community colleges. *Economics of Education Review*, 29(2), 225–270.
- Belfield, C., & Crosta, P. M. (2012). *Predicting success in college: The importance of placement tests and high school transcripts* (CCRC Working Paper No. 42). New York, NY: Columbia University, Teachers College, Community College Research Center.
- Boatman, A. (2012). *Evaluating institutional efforts to streamline postsecondary remediation: The causal effects of the Tennessee Developmental Course Redesign Initiative on early student academic success* (NCPR Working Paper). New York, NY: National Center for Postsecondary Research.
- Boatman, A., & Long, B. T. (2010). *Does remediation work for all students? How the effects of postsecondary remedial and developmental courses vary by level of academic preparation* (NCPR Working Paper). New York, NY: National Center for Postsecondary Research.
- 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., & Barnett, E. A. (2008). *Final report of the Charles Stewart Mott Breaking Through initiative*. Unpublished manuscript.
- Bryk, A. S., Gomez, L. M., & Grunow, A. (2010). *Getting ideas into action: Building networked improvement communities in education*. Stanford, CA: Carnegie Foundation for the Advancement of Teaching.
- Bryk, A. S., & Schneider, B. (2002). *Trust in schools: A core resource for improvement*. New York, NY: Russell Sage Foundation.
- Bryk, A. S., Sebring, P. B., Allensworth, E., Luppescu, S., & Easton, J. Q. (2010). *Organizing schools for improvement: Lessons from Chicago*. Chicago, IL: University of Chicago Press.
- Cho, S. W., Kopko, E., Jenkins, D., & Jaggars, S. S. (2012). *New evidence of success for community college remedial English students: Tracking the outcomes of students in the Accelerated Learning Program (ALP)* (CCRC Working Paper No. 53). New York, NY: Columbia University, Teachers College, Community College Research Center.
- Christensen, C. M., & Eyring, H. J. (2011). *The innovative university: Changing the DNA of higher education from the inside out*. San Francisco, CA: Jossey-Bass.

- Coburn, C. E. (2003). Rethinking scale: Moving beyond numbers to deep and lasting change. *Educational Researcher*, 32(6), 3–12.
- Edgecombe, N. (2011). *Accelerating the academic achievement of students referred to developmental education* (CCRC Working Paper No. 30). New York, NY: Columbia University, Teachers College, Community College Research Center.
- Edgecombe, N., Jaggars, S. S., Baker, E. D., & Bailey, T. (2013). *Acceleration through a holistic support model: An implementation and outcomes analysis of FastStart@CCD*. New York, NY: Columbia University, Teachers College, Community College Research Center.
- Elmore, R. F. (2008). *School reform from the inside out: Policy, practice, and performance* (5th printing). Cambridge, MA: Harvard Education Press.
- 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.
- Grubb, W. N. (with Gabriner, R.). (2012). *Basic skills education in community colleges: Inside and outside of classrooms*. New York, NY: Routledge.
- Hern, K. (with Snell, M.). (2010, June/July). Exponential attrition and the promise of acceleration in developmental English and math. *Perspectives*. Retrieved from <http://www.rpgroup.org/sites/default/files/Hern%20Exponential%20Attrition.pdf>
- Hill, P. T., & Celio, M. B. (1998). *Fixing urban schools*. Washington, DC: Brookings Institution Press.
- Hinds, S. (2011). *More than reshuffling: Lessons from an innovative remedial math program at The City University of New York*. New York, NY: City University of New York.
- Jenkins, D., Jaggars, S. S., & Roksa, J. (2009). *Promoting gatekeeper course success among community college students needing remediation: Findings and recommendations from a Virginia study* (Summary Report). New York, NY: Columbia University, Teachers College, Community College Research Center.
- Karp, M. M., Bickerstaff, S., Rucks-Ahidiana, Z., Bork, R. H., Barragan, M., & Edgecombe, N. (2012). *College 101 courses for applied learning and student success* (CCRC Working Paper No. 49). New York, NY: Columbia University, Teachers College, Community College Research Center.
- Katsinas, S. G., & Tollefson, T. A. (2009). *Funding and access issues in public higher education: A community college perspective*. Tuscaloosa, AL: University of Alabama, College of Education, Education Policy Center.

- Kazis, R., Vargas, J., & Hoffman, N. (Eds.). (2004). *Double the numbers: Increasing postsecondary credentials for underrepresented youth*. Cambridge, MA: Harvard Education Press.
- Knapp, L. G., Kelly-Reid, J. E., & Ginder, S. A. (2012). *Enrollment in postsecondary institutions, fall 2011; financial statistics, fiscal year 2011; and graduation rates, selected cohorts, 2003–2008* (NCES Report No. 2012-174rev). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics.
- Marcus, J. (2011). Old school: Four-hundred years of resistance to change. In B. Wildavsky, A. P. Kelly, & K. Carey (Eds.), *Reinventing higher education: The promise of innovation* (pp. 41–72). Cambridge, MA: Harvard Education Press.
- Martorell, P., & McFarlin, I., Jr. (2011). *Does failing a placement exam discourage underprepared students from going to college?* (National Poverty Center Working Paper No. 11-14). Ann Arbor, MI: University of Michigan, Gerald R. Ford School of Public Policy, National Poverty Center.
- Partnership for 21st Century Skills. (2010). *21st century readiness for every student: A policymaker's guide*. Tucson, AZ: Author.
- Payne, C. M. (2010). *So much reform, so little change: The persistence of failure in urban schools* (2nd printing). Cambridge, MA: Harvard Education Press.
- Pellegrino, J. W., & Hilton, M. (Eds.). (2012). *Education for life and work: Developing transferable knowledge and skills in the 21st century*. Washington, DC: National Academies Press.
- Perin, D. (2012). Teaching academically underprepared students in community colleges. In J. S. Levin & S. Kater (Eds.), *Understanding community colleges* (pp. 87–103). New York, NY: Routledge.
- Quint, J., Byndloss, D. C., Collado, H., Gardenhire, A., Magazinnik, A., Orr, G., Welbeck, R., & Jaggars, S. S. (2011). *Scaling up is hard to do: Progress and challenges during the first year of the Achieving the Dream Developmental Education Initiative*. New York, NY: MDRC.
- Ratcliffe, C., & McKernan, S.-M. (2010). *Childhood poverty persistence: Facts and consequences* (Urban Institute Brief No. 14). Washington, DC: Urban Institute.
- Reardon, S. F. (2012). The widening academic achievement gap between the rich and the poor. In G. J. Duncan & R. J. Murnane (Eds.), *Whither opportunity? Rising inequality, schools and children's life chances* (pp. 91–116). New York, NY: Russell Sage Foundation.

- Rose, M. (2005). *Lives on the boundary: A moving account of the struggles and achievements of America's educationally underprepared* (3rd ed.). New York, NY: Penguin Books.
- Rose, M. (2012). *Back to school: Why everyone deserves a second chance at education*. New York, NY: New Press.
- Rouse, C. E., & Barrow, L. (2006). U.S. elementary and secondary schools: Equalizing opportunity or replicating the status quo? *Opportunity in America*, 16(2), 99–123.
- Rutschow, E. Z., & Schneider, E. (2011). *Unlocking the gate: What we know about improving developmental education*. New York, NY: MDRC.
- Scott-Clayton, J. (2012). *Do high-stakes placement exams predict college success?* (CCRC Working Paper No. 41). New York, NY: Columbia University, Teachers College, Community College Research Center.
- Scott-Clayton, J., & Rodríguez, O. (2012). *Development, discouragement or diversion? New evidence on the effects of college remediation* (NBER Working Paper No. 18328). Cambridge, MA: National Bureau of Economic Research.
- Shugart, S. (2012). The challenge to deep change: A cultural history of higher education. *Planning for Higher Education*, 41(2), 1–11.
- Twigg, C. A. (2005). *Increasing success for underserved students: Redesigning introductory courses*. Saratoga Springs, NY: National Center for Academic Transformation.
- Tyack, D., & Cuban, L. (1995). *Tinkering toward utopia: A century of public school reform*. Cambridge, MA: Harvard University Press.
- Visher, M., Schneider, E., Wathington, H., & Collado, H. (2010). *Scaling up learning communities: The experience of six community colleges*. New York, NY: National Center for Postsecondary Research.
- Visher, M., Weiss, M. J., Weissman, E., Rudd, T., & Wathington, H. (with Teres, J., & Fong, K.). (2012). *The effects of learning communities for students in developmental education: A synthesis of findings from six community colleges*. New York, NY: MDRC.
- Wagmiller, R. L., & Adelman, R. M. (2009). *Childhood and intergenerational poverty: The long-term consequences of growing up poor*. New York, NY: Columbia University, Mailman School of Public Health, National Center for Children in Poverty.
- Zeidenberg, M., Jenkins, D., & Scott, M. (2012). *Not just math and English: Courses that pose obstacles to community college completion* (CCRC Working Paper No. 52). New York, NY: Columbia University, Teachers College, Community College Research Center.

Appendix A: Scaling Innovation Partner Programs

A.1 Accelerated Learning Program

Project Lead: Peter Adams, Community College of Baltimore County

Replicating Colleges: Atlantic Cape Community College, Harford Community College, LaGuardia Community College, and Patrick Henry Community College

The Accelerated Learning Program (ALP) mainstreams developmental writing students into college-level English in an effort to raise the success rates and lower the attrition rates for students referred to developmental writing. Students referred to the upper level developmental writing course are invited to register for a designated ALP section of introductory college level English (ENG 101). Participation in ALP is voluntary, and any student placed in the upper level writing course is eligible.

ALP sections of ENG 101 have ten seats reserved for ALP students. The other 12 seats are designated for students placed into ENG 101. The ten ALP students also register for an ALP companion course, which meets immediately following ENG 101 and is taught by the same instructor. This course functions as a workshop to provide the targeted support that basic writers need to succeed in ENG 101. The ENG 101 class is conducted just like a traditional 101 class. ALP instructors consider it essential to maintain the same standards and cover the same material in the ENG 101 course section with ALP students as they would in any other 101 section. An important feature of ALP is the relationships that develop among the ten students in the companion course and between the basic skills students and their instructor. According to Peter Adams, the ALP project lead, bonding between students likely contributes to improved persistence.

The primary goal for the instructor in the companion course is to maximize the ALP students' likelihood of success in ENG 101 through a range of activities. Typically, an instructor in the companion course may:

- answer student questions that were not addressed in the ENG 101 class,
- discuss ideas for upcoming essays in the ENG 101 section,
- review drafts of essays the students are working on for ENG 101,

- assign students short papers that reinforce or prepare students for ENG 101 class discussions,
- work with students on grammar and punctuation,
- discuss how to succeed as a college student, and
- discuss problems interfering with students' progress in ENG 101.

A.2 California Acceleration Project

Project Leads: Katie Hern, Chabot College; and Myra Snell, Los Medanos College

Community of Practice Colleges: Berkeley City College, Butte College, Cañada College, City College of San Francisco, College of Alameda, College of the Canyons, College of Marin, Cuyamaca College, Diablo Valley College, Fullerton College, Gavilan College, Imperial Valley College, Irvine Valley College, Laney College, Los Angeles Harbor College, Los Angeles Valley College, Los Angeles Trade Technical College, Moreno Valley College, Mt. San Jacinto College, Palomar College, Pasadena City College, Riverside City College, San Diego City College, San Diego Mesa College, San Diego Miramar College, Santa Monica College, Skyline College, Solano Community College, and Yuba College

The California Acceleration Project (CAP) supports the state's 112 community colleges to redesign their developmental English and math curricula and increase student completion by limiting the number of "exit points" in the developmental course sequence, where students can exit the sequence by not passing or not enrolling in the next course. CAP advocates reducing the length of the developmental sequence to achieve this goal. In addition to eliminating exit points, CAP encourages faculty to reconsider the content of existing sequences and ask, "Is what we're *teaching* in remedial sequences what students truly need to succeed in college-level courses?" CAP introduces faculty to a range of models of acceleration, including mainstreaming models where students enroll directly in college-level courses, open-access integrated reading and writing courses (such as the English pathway at Chabot College), open-access pre-statistics courses (such as the Path2Stats program at Los Medanos College), and compression models that combine levels of the existing developmental course sequence. To assist colleges with

redesigning their developmental English and math programs, CAP proposes a multipart framework for change that includes redesigning curricula, overhauling placement exams, and supporting professional development for faculty members.

Curricular redesign. CAP is motivated by the idea that rather than requiring all students to complete a generic English, reading, or algebra-based curriculum, literacy and math instruction should be aligned with students' educational pathways. Current models of developmental education often divide complex skills and ways of thinking into discrete subskills, which are typically presented to students in a linear, step-by-step curriculum. In the CAP model, students are instead immersed in challenging, authentic literacy and quantitative tasks and provided targeted reviews of foundational skills at the moment they are relevant to the higher order work at hand.

Overhaul of placement system. A second component of CAP's framework for change involves considering the role of placement exams in students' attrition. CAP pushes colleges to think beyond partial solutions, such as test review courses, and instead to redesign both assessment instruments and the curricula to which they are related. One promising alternative to tracking students into various levels of remediation involves using assessment to identify students in need of additional support to meet the challenges of accelerated developmental and college-level courses.

Faculty development to support teaching in new models. The changes CAP advocates require classroom faculty to change not only what they teach but also how they teach it. To make this transition, faculty need models of real-life accelerated classrooms and the support of peers with whom they can share ideas, troubleshoot student issues, and reason through questions and concerns. To that end, CAP has convened two Communities of Practice in Acceleration, bringing together faculty teams from colleges around the state to plan curricula and pedagogy for pilot versions of accelerated courses.

A.3 Concepts of Numbers for Arithmetic and Prealgebra

Project Lead: Barbara Lontz, Montgomery County Community College (MCCC)

Participating Colleges: Berkshire Community College and Reading Area Community College

The Concepts of Numbers math redesign was introduced to address the decline in students' success rates in Math 010, which is MCCC's lowest level mathematics course. Concept of Numbers teaches arithmetic and prealgebra via a conceptual approach rather than the traditional curricular sequence of topics (e.g., whole numbers, fractions, decimals, and prealgebra).

All the objectives of a traditional arithmetic and prealgebra course are covered, but they are taught in a different sequence. Each traditional topic and skill is repeated in multiple conceptual units. For example, the Addition Unit includes the addition of whole numbers, fractions, decimals, signed numbers, like terms; equations using the addition property; and perimeter and other applications that involve addition. Students again review whole numbers, fractions, decimals, and so forth in the Subtraction Unit. The course begins with a historical perspective that gives students background information to help them understand the evolution of our present system of numbers. The contributions of many cultures, including the Egyptian, Babylonian, African, Roman, and Mayan cultures, are presented in this unit. The discussion of the real number system follows and is perhaps the most important unit in the course, as it gives context to all of the concepts that follow.

The Concepts of Numbers approach to teaching math attempts to create active learners. Instead of presenting definitions and providing examples and practice problems, students are asked to figure out problems before a rule is given. Though their solutions may not utilize the shortest methods, students usually find a way to solve the problem, and the discovery-based approach makes them active participants in their own learning. Thus, students are less likely to forget the "rules" because they can *recreate* the algorithm.

MCCC has published a Concepts of Numbers curriculum that is used by faculty and students. All full- and part-time faculty are given the opportunity to receive training

on the new course either individually or in group orientations. Ongoing conversations and course materials are located on a Blackboard site, to which all faculty have access.

The Concept of Numbers approach was expanded in the spring 2010 semester when more than 50 percent of students enrolling in Math 010 were instructed under the new approach. A comparative analysis of course pass rates suggests that students were more successful in Concepts of Numbers courses than they were in the traditional Math 010 course. In fall 2011, all of the arithmetic courses at Montgomery County Community College were taught using the new curriculum to ensure that students would be provided the content and critical thinking skills necessary to be successful in their arithmetic course and beyond.

Appendix B: Methods

The findings and framework presented in this paper draw on two qualitative data sources: a scan of developmental education instructional reforms, conducted in 2011; and fieldwork conducted at 11 Scaling Innovation partner colleges in 2011 and 2012. We describe the data collection and analysis activities for each strand of work below.

B.1 Instructional Scan

The research team cataloged 66 innovations (41 in math, 21 in English and/or reading, and four in both math and English) across 52 colleges engaged in developmental education reform. Some colleges had more than one innovation, and six innovations were being implemented at a large number of colleges through regional or national initiatives (e.g., Statway). We classified the reforms we identified into several categories (see Table 1 in section 3). Occasionally, we found reforms with characteristics that fit into more than one category (for instance, a learning community that included a contextualization component). In those instances, we tallied the innovation as a singular reform but cataloged the separate features to capture the variability in reform efforts within the field.

Criteria for inclusion were informed by a review of the empirical literature on developmental education reform and intended to capture reforms that represented changes to curricula, course structure, and/or pedagogy. Although there are many innovations that aim to improve various facets of developmental education, we focused on innovations related to teaching and learning because these aspects of the community college student experience are highly important but little understood. We did not include innovations that targeted developmental education assessment and placement practices and policies, which have been studied extensively. We also did not focus on initiatives that exclusively dealt with student supports, although they are an important component of student success in community colleges. Reforms focused on professional development activities were not included in our study unless they were linked to serving students' instructional needs differently. Finally, we avoided examining policy reforms unless they were connected to a curricular, structural, or pedagogical innovation.

CCRC researchers identified developmental education innovations that met the established criteria through existing relationships with reform leaders, professional

associations and networks, conference proceedings, and online communities. For example, we conducted a detailed search of the RP Group website and the Getting Past Go blog. Additionally, we reviewed a list of previous winners of the League for Innovation in the Community College’s annual competition that was posted on their website. We also sought recommendations from faculty members, administrators, and other researchers familiar with the developmental education reform landscape. This search process was largely completed online and by phone. In some instances, word of mouth led us to an innovative faculty member or department with no documentation of their reform efforts. In those cases, the innovation was noted but ultimately not included in our final tally. CCRC staff members collected written documentation describing the reform and student outcome data, when available, from community colleges. Data from the initial search were entered into a database.

In addition to cataloging reforms that met our criteria, the CCRC research team conducted interviews and classroom visits at a subset of colleges to learn more about reform activities and to help ground future fieldwork at Scaling Innovation partner colleges. CCRC researchers conducted 29 semi-structured interviews with administrators and faculty members and 12 classroom visits. The interviews and classroom visits provided detailed information about the reform process for 20 of the 66 innovations.

B.2 Fieldwork at Partner Colleges

In order to gain a more thorough understanding of reform processes, CCRC developed partnerships with colleges and faculty members leading three scaled-up, high-potential instructional innovations. We refer to the colleges where these reforms originated as “innovating” colleges and detail their models in Appendix A. As part of the Scaling Innovation project, leaders from the innovating colleges partnered with faculty at other institutions to adopt and adapt their models. We refer to their partner sites as “replicating” colleges.

Over the course of four semesters, CCRC researchers conducted fieldwork at 11 replicating colleges (see Table 2). Our data sources included 165 interviews with faculty members, administrators, and staff at innovating and replicating colleges; 30 focus groups with a total of 153 students; 75 observations of developmental education classrooms; and 37 observations of planning meetings, faculty development activities,

and other gatherings related to the developmental education innovations. Interviews were administered based on semi-structured protocols and were tape-recorded with research participants' permission. Classroom observations were documented through structured observation protocols. Course syllabi, handouts, assessments, and other documents related to instruction or policies were collected when available. Debriefing memos were generated at the conclusion of each site visit to summarize insights gained during the trip and to begin identifying emerging themes and findings.

To understand how colleges initiate, scale, and sustain reform, we coded interviews, observation notes, and debriefings using ATLAS.ti qualitative data analysis software. The research team developed a coding scheme to identify the ways in which colleges engaged in reform, from the time of reform selection through the reform refinement processes. Codes were repeatedly refined to capture themes emerging from the analysis. The research team met regularly to discuss and solidify components of the framework and other important themes.

Table 2
Fieldwork Sites

Reform	Innovating College	Fieldwork Sites
Accelerated Learning Program (ALP)	Community College of Baltimore County (CCBC)	Patrick Henry Community College; LaGuardia Community College
California Acceleration Project (CAP)	Chabot College (accelerated integrated reading and writing)	Yuba College; Fullerton College
	Los Medanos College (accelerated pre-statistics)	Community College of San Francisco College of the Canyons; Cuyamaca College
Concepts of Numbers for Arithmetic and Prealgebra	Montgomery County Community College (MCCC)	Berkshire Community College; Reading Area Community College