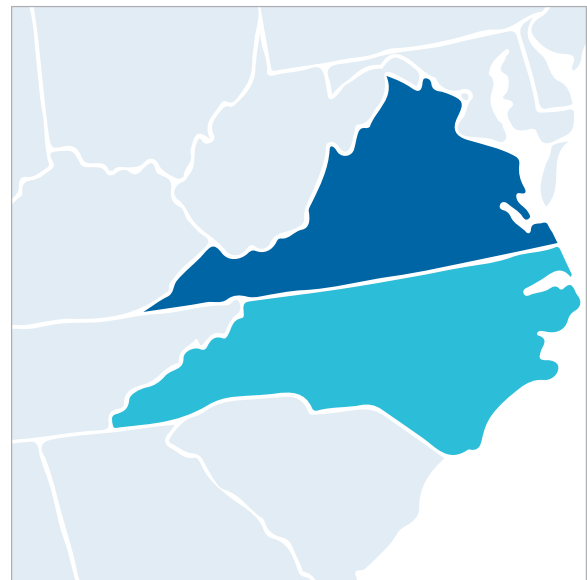

Statewide Developmental Education Reform:

Early Implementation in Virginia and North Carolina



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The Community College Research Center (CCRC), Teachers College, Columbia University, conducts research on the major issues affecting community colleges in the United States and contributes to the development of practice and policy that expands access to higher education and promotes success for all students.

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Inside This Report

The community college systems of Virginia and North Carolina are national leaders in statewide efforts to improve developmental education. Both states have recently redesigned their developmental English and math courses, as well as their assessment instruments and placement policies, in efforts to decrease developmental education referrals, reduce the amount of time students spend in developmental education, and align developmental education across colleges and with college-level courses.

Developmental English and math courses in both states went through substantial curricular and structural overhauls. Both states integrated developmental English and developmental reading, which were previously taught in separate courses, and changed the course structures to reduce the amount of time needed to complete developmental English requirements. Developmental math in both states was modified from a sequence of full-semester courses that covered a wide range of topics to shorter sequential modules, each of which covers a limited number of concepts; this allows students to receive remedial instruction in only those areas in which they have a demonstrated need, and which are required for their programs of study. Both reforms rely on customized placement instruments to more accurately assess students' reading, writing, and mathematics skills and place them into redesigned course structures.

It is too early to judge the overall effectiveness of the redesigns, but preliminary data reveal some early-stage successes. In Virginia, fewer students are placed into developmental education since the introduction of the redesigns, and a greater proportion of students are completing introductory college math and English. (Comparable data are not yet available for North Carolina.) The extent to which the redesigns have reduced the amount of time students spend completing their remedial requirements remains under study.

Preliminary findings also provide insight into common implementation challenges colleges face when engaging in developmental education reform that affect all levels of the institution. For instance, changes to instructional delivery—such as the introduction of computer-mediated developmental math courses—require faculty and students to adapt to new roles in the classroom. Further, the introduction of an integrated reading and writing curriculum can be challenging for faculty, who may be trained in only one discipline and who must cover a large number of learning outcomes in fewer course hours. Future qualitative analyses will examine these and other implementation obstacles in greater depth, as well as measures colleges have taken to mitigate them.

Introduction: Developmental Education Reforms in Two States

The community college systems in Virginia and North Carolina have embarked on ambitious redesigns of their developmental education programs that are unprecedented in terms of their substance and scale. Both states have pursued radical changes to their assessment and placement practices, as well as to curriculum and instructional delivery, and they have mandated these changes for all colleges within each system.

CCRC is studying the reforms to developmental education in the Virginia Community College System (VCCS) and the North Carolina Community College System (NCCCS) as part of its Analysis of Statewide Developmental Education Reform (ASDER) project.¹ An implementation analysis, tracing the development and planning of the redesigns through early enactment, lays the foundation for ASDER. Additional ongoing analyses investigating assessment and placement, use of instructional technology, student learning, and academic outcomes complement the implementation study. Together, these lines of inquiry will provide a comprehensive picture of the range of factors that impact new approaches to developmental education and students' academic outcomes.

In this report, we provide an overview of the developmental education redesigns in both states, including their rationale, planning, design, launch, and early implementation. We describe their similarities and differences across these dimensions; present preliminary findings; and discuss potential lessons for states, districts, and colleges pursuing reforms of developmental education.

Rationale and Goals

Nationally, a majority of students who enroll at community colleges are referred to developmental education to improve their math, reading, and writing skills in preparation for college-level work (Scott-Clayton & Rodríguez, 2012). However, many students who are referred never enroll, and of those who do, most do not complete their prescribed developmental courses (Bailey, Jeong, & Cho, 2009). Not surprisingly, low enrollment and high attrition rates in developmental education significantly hinder students' ability to complete college and attain a degree. A majority of developmental education students do not complete a certificate or degree or transfer to a four-year institution within eight years of starting their coursework at a community college (Parsad & Lewis, 2003).

Unsatisfied with similarly poor student outcomes in their states, and bolstered by philanthropic efforts to support reform,² state-level community college officials in Virginia and North Carolina made the improvement of developmental education a strategic priority. They convened task forces of college administrators and faculty to consult relevant research and interrogate existing policy and practice in order to identify the barriers to completing developmental education and introductory college-level courses and to establish goals and a framework for redesign efforts.³

Although different processes catalyzed and shaped the redesigns in Virginia and North Carolina, the states settled on a set of similar goals oriented toward improving degree attainment among students referred to developmental education. The states had three broad objectives:

- **Decreasing developmental education referrals.** The majority of incoming community college students in both states were assigned to at least one remedial course based on placement test results. Given mounting evidence that the existing system of developmental education was a barrier to academic success, both states sought to reduce the proportion of students testing into remediation. For the redesigns, this entailed improving placement accuracy and tailoring developmental education requirements to students' academic goals, thus eliminating unnecessary prerequisites. These efforts complemented ongoing initiatives to enhance K-12 partnerships and boost the college readiness of traditional students.⁴
- **Reducing time in developmental education.** Each state recognized that the traditional multicourse developmental education sequence that extends over multiple semesters can significantly delay students' college-level course-taking and create multiple opportunities to drop out. In response, the redesigns reduced the length of time necessary to complete developmental education requirements by streamlining the sequence of courses developmental students were required to take.
- **Aligning developmental education across colleges and with college-level courses.** Both state systems identified large variations in developmental education policies and practices across their colleges, as well as a lack of alignment between developmental education learning objectives and the skills and knowledge necessary to complete introductory college-level (or "gatekeeper") courses. Therefore, the redesigns sought to increase consistency in developmental education policy and practice and to improve curricular alignment.

Planning Process

State system leadership began the redesign process by convening administrators and faculty in system-wide taskforces and committees to plan and promote their developmental education redesigns. In Virginia, the Developmental Education Task Force was established in September 2008. This group of college administrators, faculty, and staff studied the outcomes of developmental education students and presented a series of recommended areas for reform in September 2009 (Virginia Community College System, Developmental Task Force, 2009). Similarly, in September 2009, the president of the NCCCS appointed a developmental education state policy team comprised of system office personnel, state board members, K-12 and other statewide policymakers, college presidents, chief academic officers, developmental education faculty, student services staff, and research and planning officers. They developed design principles to inform North Carolina's redesigns of developmental math and English and disseminated them in February 2011. Notably, the Virginia taskforce and the North Carolina policy team were intentionally structured to gather input from the faculty and administrators who work most closely with developmental education students, as well as to garner broad support for reform within their respective systems.

In addition to creating these centralized structures, the leadership in both states sought to engage a broader representation of faculty, staff, and administrators through large-scale communication efforts. For example, the chancellor of the VCCS held a series of town hall meetings, which allowed college stakeholders to ask questions and share their perspectives on developmental education reform. These open forums also sought to tamp down concerns that the redesign was an attempt by the VCCS leadership to take over campus and classroom practices (Asera, 2011). Similarly, NCCCS senior administrators and members of the state board conducted a “SuccessNC Listening Tour,” visiting each of the 58 community colleges in the system. Faculty, staff, and administrators at each college had the opportunity to discuss barriers to student success and describe practices they viewed as promising. Feedback received during the listening tour guided the efforts of the state policy team.

Virginia and North Carolina also relied on committees devoted to math, English, and assessment and placement to translate recommendations and design principles into course structures, curricula and learning outcomes, and placement test items and cut scores (see, e.g., Virginia Community College System, Developmental English Team, 2011). Typically, these committees were populated by college faculty, staff, and administrators. The VCCS English and math redesign committees, for example, were each co-chaired by one retired and one current college president and included developmental education faculty; student services administrators; and faculty from diverse disciplines, including career and technical education. The NCCCS asked colleges to nominate potential committee members and selected a diverse group of faculty, staff, and administrators to participate.

The timeline to the right shows the redesign planning activities in Virginia and North Carolina. Both state systems emerged from this process with specific plans for reforming the curricula, course structures, and assessment and placement practices for developmental English and math. The VCCS decided to integrate reading and writing instruction into tiered developmental English courses, modularize developmental math into nine units,

VA	2008	NC
September 2008 Developmental Education Task Force (DETF) convened		
September 2009 DETF releases findings and recommendations	2009	September 2009 Developmental Education Initiative (DEI) state redesign policy team established
August 2010 Math redesign team recommends modularizing math	2010	
September 2010 English redesign team recommends integrating reading and writing and introducing tiered course structure		
November 2011 Virginia Placement Test–Math implemented	2011	February 2011 DEI state redesign policy team releases design principles
Spring 2012 Colleges implement developmental math redesign	2012	Spring 2012 Redesigned developmental math curricula beta-tested
Fall 2012 Virginia Placement Test–English implemented		Fall 2012 Redesigned developmental math courses piloted; redesigned developmental English curricula beta-tested
Spring 2013 Colleges implement developmental English redesign	2013	February 2013 Multiple Measures for Placement Policy approved
		April 2013 Diagnostic math test implemented
		Fall 2013 Colleges fully implement developmental math redesign; redesigned developmental English courses piloted
	2014	Fall 2014 Colleges fully implement developmental English redesign
	2015	April 2015 Diagnostic English test implemented

and implement customized placement tests. Similarly, the NCCCS chose to adopt compressed developmental English courses that integrate reading and writing instruction, modularize developmental math into eight units, and introduce multiple new placement practices. Together, these reforms could mean less time spent in developmental courses, consistent experiences across colleges, and streamlined entry into college-level courses.

Redesigned Developmental Education Curricula and Course Structures

English

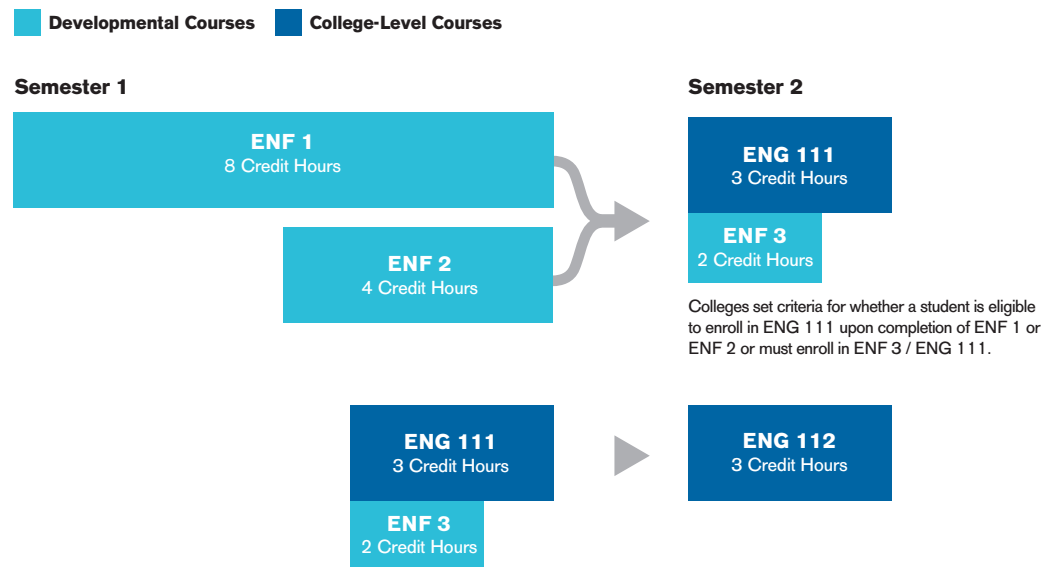
Developmental English courses went through a substantial curricular and structural overhaul in Virginia and North Carolina. Both states integrated developmental English and developmental reading, which were previously taught as separate courses at most colleges.⁵ The integration of developmental English and developmental reading streamlined the number of required courses and reduced the time it would take for a student to become eligible for introductory college composition (i.e., ENG 111⁶) and other college courses. Virginia introduced tiered, variable-credit, one-semester English Fundamentals (ENF) courses. North Carolina created a sequence of eight-week Developmental Reading and English (DRE) courses.

Prior to the redesign, VCCS students referred to the lowest levels of developmental English and reading were required to complete two writing courses (ENG 1 and ENG 3) and two reading courses (ENG 4 and ENG 5). The credit-hour requirements of these courses varied across colleges, but on average, students who placed into the lowest levels of developmental English and reading had to complete approximately 16 developmental credits to progress to college-level English. With the redesigned ENF courses, students enroll in one-semester courses with different credit-hour requirements based on their placement test results. (A description of the new assessment and placement systems is presented later in this report.) Students assessed at the lowest levels of reading and writing proficiency enroll in ENF 1, an eight-credit integrated developmental English and reading course.⁷ Students assessed at a higher level of reading and writing proficiency but who are still substantially short of college-ready enroll in ENF 2, a four-credit course. Students who are assessed as only modestly below college-ready enroll in ENF 3, a two-credit course, as a corequisite with ENG 111 (College Composition I). ENF 1 and ENF 2 are designed as direct, one-semester pathways to ENG 111, allowing students to complete developmental and gatekeeper English in one year.⁸

ENF courses differ not only in the number of credits they are worth but also in the portion of reading and writing learning outcomes that are covered in their curricula. While students who place into ENF 1 are taught the entire set of learning outcomes, those who place into ENF 2 or ENF 3 are taught a subset of these outcomes. For example, in the eight-credit ENF 1 course, 30 out of 120 academic hours are devoted to making sure students are able to analyze college-level texts

for stated or implied main ideas and major and minor supporting details. In ENF 2, the suggested time for covering the same learning outcome is reduced to 10 academic hours out of the total 60 academic hours that make up the four-credit course. Additionally, different competencies for this learning outcome are addressed in the two courses. In ENF 1, there are four designated competencies, with an emphasis on *identifying* the major components of a text (topic, main idea, major and minor supporting ideas), whereas in ENF 2, the competency levels increase, and the emphasis is placed on both *explaining* these components and including all of them in an outline.

Figure 1. Virginia Developmental and College-Level English Progression



North Carolina's redesigned developmental English model streamlined course offerings in a different way than Virginia's did. The state's sequences of three one-semester courses in reading and in writing were transformed into a combined, three-level series of eight-week (i.e., mini-mester) courses. Students enroll in DRE 096, DRE 097, or DRE 098, depending on their placement test score. Each DRE course is worth three credits and runs for eight weeks. A student who places into DRE 096, the lowest level of developmental English, could conceivably complete the developmental English requirements and the gatekeeper English course (which some colleges offer in eight-week sessions as well as 16-week sessions) in one year. Under the old course model, it would have taken this student two years to complete ENG 111. North Carolina colleges also have DRE corequisite options that students can take with ENG 111 (Expository Writing) and with other entry-level, credit-bearing college courses. The highest level developmental English course, DRE 098, can be offered as either a stand-alone course or as a corequisite with any college-level course besides ENG 111. The purpose of the DRE 098 corequisite option is to contextualize reading and writing proficiencies using assignments and resources that are linked to the college-level course, while still focusing on the DRE 098 learning outcomes. A few colleges also offer DRE 099, a two-credit bridge course that serves as a corequisite for ENG 111 and is mainly meant to provide supplemental support to students completing gatekeeper English.

Math

Developmental math in both states was modified from a sequence of full-semester courses that covered a wide range of topics to shorter sequential modules, each of which covers a limited number of concepts. The VCCS math redesign created nine one-credit modules, designated with the new course prefix “MTE.” North Carolina developed eight one-credit modules and renamed the courses with the prefix “DMA.” MTE and DMA courses typically run for four weeks, allowing students to take multiple modules per semester.¹⁰

Figure 3. Virginia Developmental Math Modules

MTE 1 Operations with Positive Fractions	MTE 2 Operations with Positive Decimals and Percents	MTE 3 Algebra Basics	MTE 4 First Degree Equations and Inequalities in One Variable	MTE 5 Linear Equations, Inequalities, and Systems of Linear Equations in Two Variables
MTE 6 Exponents, Factoring, and Polynomial Equations	MTE 7 Rational Expressions and Equations	MTE 8 Rational Exponents and Radicals	MTE 9 Functions, Quadratic Equations, and Parabolas	

Figure 4. North Carolina Developmental Math Modules

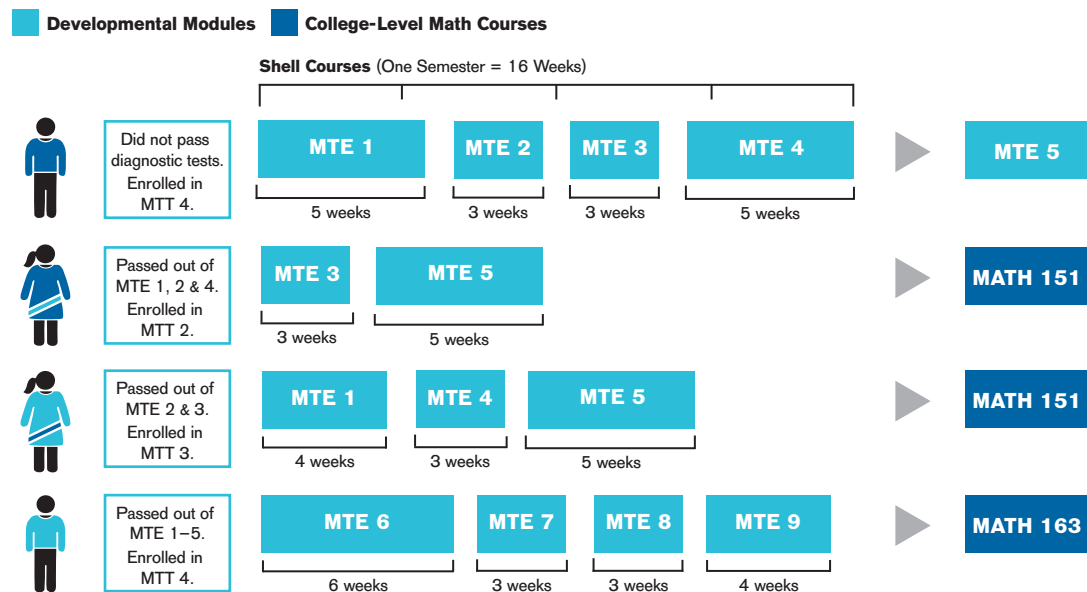
DMA 010 Operations with Integers	DMA 020 Fractions and Decimals	DMA 030 Proportions, Ratios, Rates, and Percents	DMA 040 Expressions, Linear Equations, Linear Inequalities	DMA 050 Graphs and Equations of Lines
DMA 060 Polynomials and Quadratic Applications	DMA 070 Rational Expressions and Equations	DMA 080 Radical Expressions and Equations		

Colleges determine which modules students must complete based on two criteria. The first is students’ placement test results. Each state developed a diagnostic math placement test, which allows students to place into or out of discrete modules. (The redesigned assessment and placement systems are described in the next section.) The second criterion is the math requirements for students’ chosen programs of study. For example, liberal arts majors in Virginia must complete or place out of MTE 1 through MTE 5 in preparation for MTH 151 and MTH 152 (Math for Liberal Arts); those in North Carolina must complete or place out of DMA 010 through DMA 050 in preparation for MAT 143 (Quantitative Literacy) and MAT 152 (Statistical Methods 1). Students majoring in science, technology, engineering, and mathematics (STEM) must complete or place out of MTE 1

through MTE 9 in Virginia and DMA 010 through DMA 060 or DMA 080 in North Carolina to enroll in higher level algebra and precalculus.¹¹

Additionally, the VCCS and NCCCS created “shell courses” as part of the math redesigns, which colleges can offer in 16-week or other variable-week schedules. These courses, named MTT and DMS in Virginia and North Carolina, respectively, were designed to facilitate more efficient registration. They allow colleges to group students at different levels and with different module completion requirements in the same course section. The shell courses also permit students to register for a single course in a semester rather than registering for up to four separate one-credit courses. The length of a shell course depends on the number of modules a student intends to complete. For example, MTT 4 is typically 16 weeks, and students are required to complete four modules to pass the course; DMS 030 is typically 12 weeks, and students must complete three modules to receive a passing grade. Colleges in both states may choose to offer modularized developmental math via MTE/DMA one-credit courses, MTT/DMS shell courses, or both. Figure 5 illustrates students’ different progression patterns through developmental math shell courses to college-level math based on their placement scores and major requirements. The four hypothetical examples in this figure show that students may take different amounts of time to complete the modules within the parameters of the MTT course.

Figure 5. Examples of Student Placement and Progression in MTT Shell Courses



Neither state prescribed precisely how the modularized developmental math curriculum was to be delivered in the classroom, but the effective integration of technology was encouraged. Tech-

nology use varies between the one-credit standalone courses and the shell courses. Specifically, most MTE and DMA courses are lecture-based and use instructional technology (such as Pearson's MyMathLab) for homework and sometimes for assessments. Lecture or other whole-class instructional activities are feasible in these courses because all students are working on the same module content at more or less the same pace. By contrast, the majority of shell courses utilize a computer-mediated instructional delivery model. Computer-mediated instruction uses instructional software as the primary means of content delivery, practice, and assessment in the classroom.¹² In these classes, faculty typically circulate throughout the room, providing one-on-one support to students. Computer-mediated instruction also helps to facilitate the heterogeneous grouping of students in shell courses. Students working on different modules at different paces progress independently through their required modules using a set of standardized software-based lessons.

A core component of the developmental math redesigns is the principle of mastery. Mastery requires that students demonstrate a full understanding of the material in a module by completing assignments and assessments at a specified performance level before progressing to the next module or college-level math course. Although the state systems have provided guidance regarding performance expectations,¹³ colleges have some discretion in defining what constitutes mastery. For example, some institutions require a minimum cumulative grade across all module assignments and assessments. At other colleges, a minimum score on the final assessment determines whether or not a student can move on. In computer-mediated courses, mastery is also reflected in performance requirements programmed into the instructional software. Students may be required to earn grades of 100 percent on a series of homework assignments before being allowed to take a quiz (also with a minimum score requirement) or otherwise progress within a module.

The curricula of the redesigns are arithmetic- and algebra-focused, with more advanced algebraic concepts (e.g., rational expressions) covered in the later modules. Additionally, North Carolina has encouraged a "contextual and conceptual" approach to delivering the curriculum, which includes beginning modules with "rich application" opportunities and introducing meaningful context before "the procedural skills for problem solving." The curriculum guide states that "deep understanding of mathematical concepts is as much the goal as is the ability of students to perform the required skills" (North Carolina Community College System, 2012) and defines conceptual learning outcomes for each module. The guide also provides sample introductory application exercises and sample problems. The Virginia developmental math redesign does not have an explicit contextual and conceptual focus; however, a curriculum guide was prepared and made available to colleges.

The developmental math redesigns in Virginia and North Carolina involve significant structural, curricular, and pedagogical modifications to remedial math, as well as prerequisites changes for certain college courses. These changes support the broader student success goals that inspired the redesigns.

The modularized courses and diagnostic placement tests attempt to pinpoint students' mathematical deficiencies and limit remediation to identified areas of weakness. The redesigns also eliminate intermediate algebra as a prerequisite for liberal arts college math, where historically, advanced

algebraic concepts either were not present or were retaught within the college course.¹⁴ These changes were intended to decrease developmental education referrals, reduce the time required to complete developmental math, and increase alignment between developmental math and college math. Like the developmental English redesigns, the redesigns of developmental math create consistency in courses, credit hours, and entry placement requirements across all community colleges within each state.

The redesigns' diagnostic approach to placement and course-taking is supplemented by mastery requirements in an effort to more systematically ensure that students are prepared for subsequent coursework. Students can no longer fail to demonstrate proficiency on discrete topics and pass a developmental math course.

Redesigned Assessments and Placement Policies

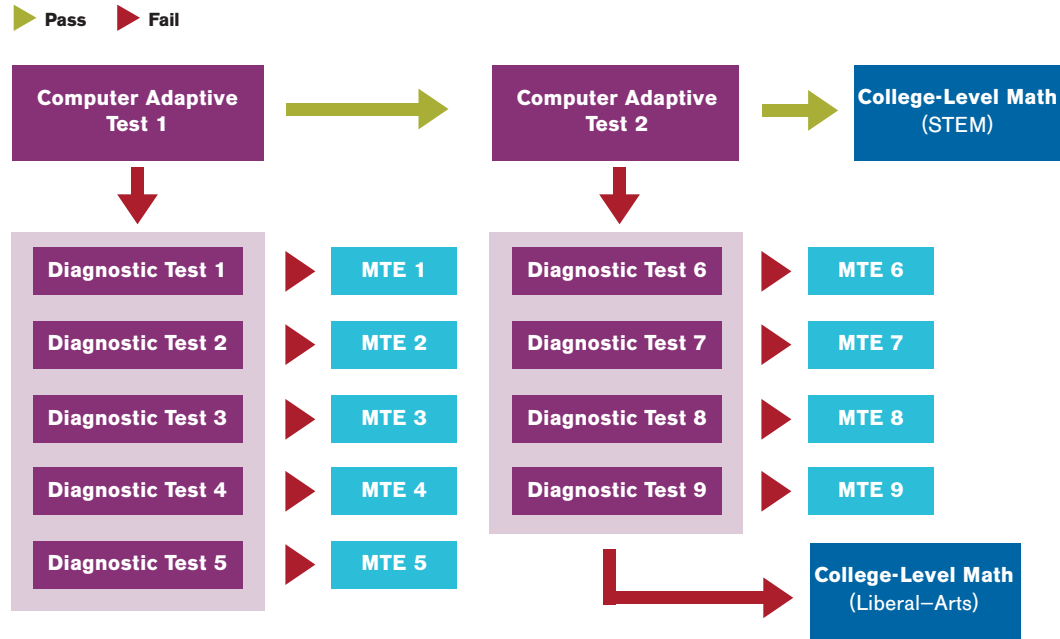
Customized Assessment and Placement

Virginia and North Carolina developed new customized assessment and placement systems in order to improve course placement accuracy and standardize assessment and placement policies system-wide.¹⁵ Notably, the redesigns of assessment and placement for math have included changes to both assessment instruments and placement policies. In both states, students no longer have to complete the equivalent of intermediate algebra to be eligible to enroll in college math courses for liberal arts majors. For English, placement policies are essentially unchanged; however, each state made significant modifications to its assessment instrument. Finally, Virginia and North Carolina introduced performance floors—minimum levels of demonstrated proficiency in math and English—as part of their assessment and placement systems. Students who fail to reach the minimum performance requirements are referred to adult basic education or other basic skills remediation alternatives.

Both states rolled out their new math placement tests first, which share some characteristics but also differ in substantial ways. The Virginia Placement Test–Math (VPT-M) was launched in November 2011 and consists of computer adaptive and diagnostic components.¹⁶ Students who do not show proficiency on the first computer adaptive test, which assesses arithmetic and introductory algebra skills, are directed to a series of diagnostic tests for MTE 1 through MTE 5. Students who show proficiency in arithmetic and introductory algebra are directed to a second computer adaptive test, which assesses intermediate algebra skills. Those who do not demonstrate proficiency in intermediate algebra are directed to a series of diagnostic tests for MTE 6 through MTE 9; those who do show proficiency in intermediate algebra qualify to enroll in precalculus and may be given an additional assessment to evaluate their preparedness for calculus. The North Carolina Diagnostic Assessment and Placement (NCDAP) math test was introduced in April 2013 and is not computer adaptive;¹⁷ rather, students take six diagnostic tests that align to the content of the

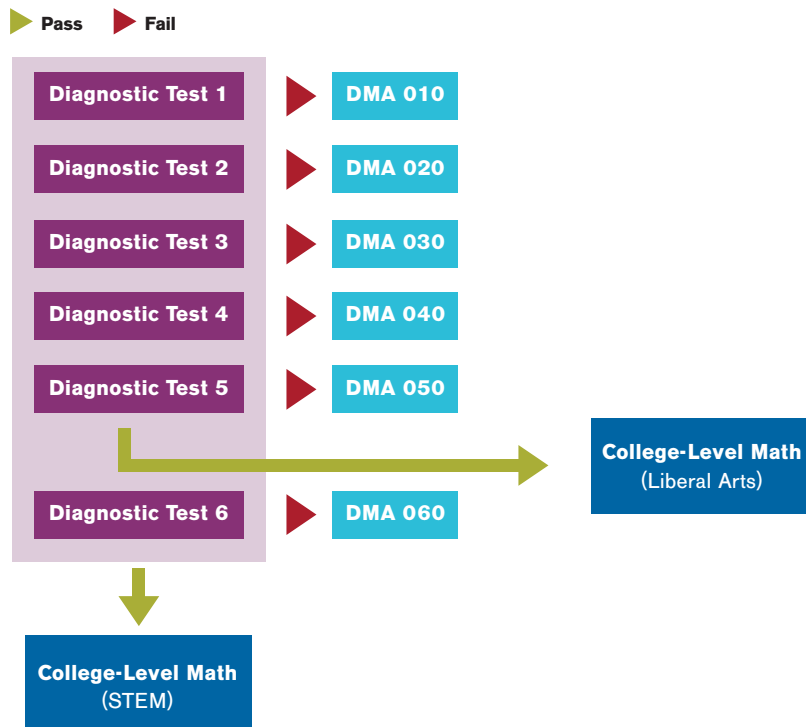
first six developmental math modules.¹⁸ Students who demonstrate proficiency on the diagnostic tests for DMA 010 through DMA 050 are eligible to enroll in liberal arts math, and those who demonstrate proficiency on all six diagnostic tests can enroll in college math courses up to pre-calculus. Figures 6 and 7 illustrate the components of the new placement tests and how students progress through them depending on their performance.

Figure 6. Virginia Placement Test for Math

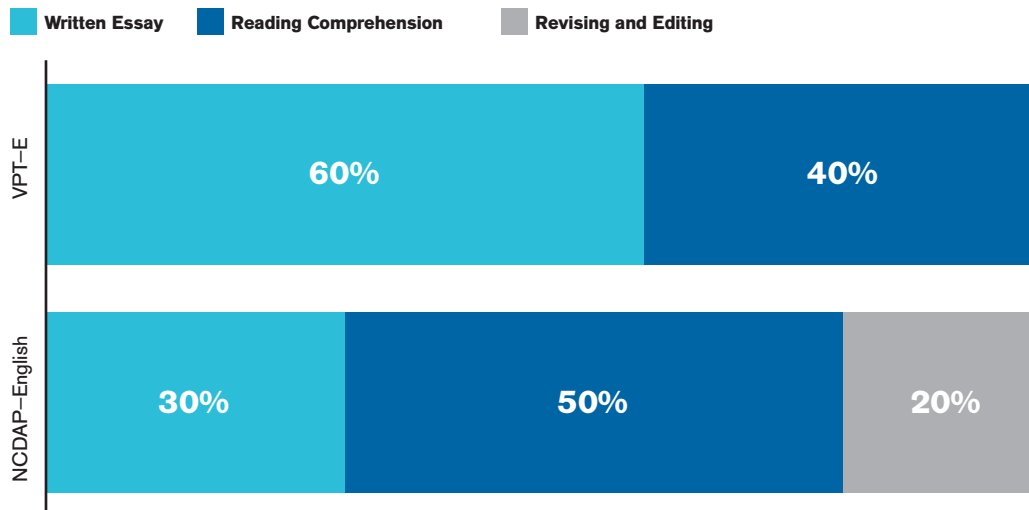


Note. Students who fail computer adaptive test 1 and pass diagnostic tests 1–5 are directed to diagnostic tests 6–9. Students who are directed to diagnostic tests 6–9 and pass them all are eligible to take STEM math.

Figure 7. North Carolina Placement Test for Math



The Virginia Placement Test–English (VPT-E) was introduced in October 2012 and is designed to assess students’ writing, reading comprehension, grammar, vocabulary, and research skills. The written essay portion grades students on five dimensions (organization, focus, development and support, vocabulary, and sentence structure and mechanics—each of which is graded separately on a scale from 1 to 6) and constitutes 60 percent of a student’s VPT-E score. A 40-item multiple-choice test assesses a range of reading and writing fundamentals and is worth 40 percent of the score. The NCDAP English exam was introduced in April 2015 and consists of three components. Reading comprehension questions comprise 50 percent of the score; multiple-choice revising-and-editing questions constitute 20 percent of the score; and a written essay is worth 30 percent of the score. Both essay exams are graded immediately using artificial intelligence capabilities in the testing software. Figure 8 illustrates the major components of the Virginia and North Carolina English placement tests.

Figure 8. Virginia and North Carolina English Placement Test Components

Note. In order to compare how core test components are weighted on each state's test, the "reading and writing fundamentals" portion of the VPT-E is labeled "reading comprehension" to be consistent with North Carolina.

The reforms of developmental education in Virginia and North Carolina rely on customized placement instruments to more accurately assess students' reading, writing, and mathematics skills and place them into redesigned course structures. The assessment instruments work in tandem with new placement policies and developmental education curricula and courses to support the goals of the redesigns. Specifically, more accurate placement of students into discrete developmental math modules, along with placement policies that lower the prerequisites for liberal arts math, may not only reduce developmental referrals but also accelerate students' progress through developmental education. For English, there is the expectation that the inclusion of a writing sample on the new tests improves placement accuracy into each state's accelerated developmental English pathway. Further, the new placement instruments and policies were standardized statewide, so that all colleges within each state use the same instruments and criteria to place students into developmental education or college-level courses. Those placement results become portable, allowing students to enroll in developmental education courses at other community colleges without retesting for up to two years in Virginia and five years in North Carolina.

North Carolina's Multiple Measures for Placement Policy

In February 2013, the state board of the NCCCS approved the Multiple Measures for Placement Policy. This policy, formally called *Multiple Measures for Placement Using High School Transcript GPA and/or Standardized Test Scores*, includes hierarchical measures that colleges should use to establish whether a student is ready to enroll in college-level courses. The primary measure utilized under this policy is an unweighted grade point average (GPA) of 2.6 or higher for students who have graduated from high school within five years of college enrollment. This measure allows eligible recent high school graduates to enter any gatekeeper English or math course without tak-

ing the placement test. If the GPA benchmark is not met, colleges can use ACT or SAT scores in specific subject areas to determine a student's college readiness. Students who do not meet the GPA or ACT/SAT criteria must take the placement tests to be placed into English and math courses. North Carolina colleges began implementing the Multiple Measures for Placement Policy voluntarily as early as fall 2013. Mandatory implementation of the policy is effective fall 2016.¹⁹

Early Research Findings and Implications

Although it is too early to judge the overall effectiveness of the redesigns of developmental education in Virginia and North Carolina, preliminary data suggest that certain facets of the redesigns are helping the states to achieve their goals. Analyses of qualitative data affirm some early-stage successes and highlight significant implementation challenges the systems and colleges have confronted. Insights from these analyses may support refinement activities in Virginia and North Carolina and inform developmental education improvement efforts elsewhere. Here, we present early findings from CCRC's ASDER project, drawn from qualitative and quantitative data, and discuss lessons for the field.

Preliminary Findings

Fewer students are placing into developmental education in Virginia.

Early analyses of placement rates indicate that fewer community college students have been referred to developmental math and English in Virginia since the new placement tests and policies went into effect. Eighty-one percent of students enrolling in a Virginia community college for the first time in fall 2010 placed into developmental math, compared with 57 percent of students in fall 2012, after the new test and placement policies were implemented (Rodríguez, 2014). Similarly, 58 percent of the fall 2010 pre-redesign cohort was assigned to remedial English courses, but by fall 2013, after the redesign was introduced, that figure declined to 42 percent.²⁰ The analyses reveal no substantial differences in characteristics between the pre-redesign and post-redesign students. Thus, these declines in developmental education referrals are likely attributable to the changes to the math and English placement tests and, for math, lower prerequisite requirements for introductory college math courses for liberal arts majors.

Due to the timing of the launch of the new customized placement tests, comparable data on changes to developmental education referral rates are not yet available for North Carolina. When those data are available, they will have to be examined relative to the impact of the Multiple Measures for Placement Policy, which goes into effect statewide in fall 2016.

More college-ready students are completing introductory college math and English courses in Virginia.

Relative to their pre-redesign peers, more than twice as many first-time-in-college VCCS students in the fall 2012 cohort were eligible to enroll in college math, and more than a third more students in the fall 2013 cohort were deemed college-ready in English. As a result, more students enrolled in and successfully completed gatekeeper math and English courses in Virginia's community colleges after the implementation of the redesigns. Of all college-math-placed students in the fall 2012 cohort, 18 percent completed a college math course with a grade of C or higher within one year, compared with 8 percent of the fall 2010 cohort. Among fall 2013 students directly referred to college English, 37 percent completed the course within a year, compared with 25 percent of the fall 2010 cohort. The pool of students eligible to enroll in college English upon entry increased after the redesign due to the statewide implementation of a corequisite course model, in which the highest level of developmental English (ENF 3) is paired with college English (ENG 111).²¹ Including the group of corequisite-eligible students, a total of 48 percent of post-redesign enrollees successfully completed college English in one year, a 70 percent increase over pre-redesign outcomes.

As these findings suggest, changes to assessment instruments and placement policies can have immediate and large impacts on important outcomes, such as gatekeeper course completion. These changes are most likely to affect students who historically would have been placed in upper level developmental courses. Less is known about the impacts of changes to curricula and course structures for students referred to lower levels of developmental education (who would have been in developmental education pre-redesign and post-redesign). ASDER analyses exploring the differential effects of the redesign across levels of developmental need are underway.

Developmental math modules provide both opportunities and obstacles to progression.

By introducing diagnostic testing for placement into discrete developmental math modules, Virginia and North Carolina sought to ensure that students only take the developmental math they need for their intended programs of study. Preliminary descriptive analyses of Virginia data suggest that students are placing out of some modules.²² Forty-seven percent of the fall 2012 first-time-in-college cohort taking the diagnostic tests for modules 1–5 in Virginia placed into three or fewer modules. The opportunity to take less math, however, may not translate into more rapid completion of remedial requirements. The average pass rate across all stand-alone MTE courses in fall 2012 was 65 percent, meaning students finished 2.6 modules on average per semester, or at a pace of roughly five completed modules over the course of an academic year. There are similar performance challenges for students enrolled in shell courses. More than half of students in the fall 2012 cohort who registered for a MTT course enrolled in MTT 4 (i.e., had to complete four modules to pass the shell course). Seventeen percent of these students completed at least four modules and passed the course in a single semester. Forty-one percent of MTT 4 enrollees completed no modules and needed at least an additional semester to complete their developmental math requirements.

Developmental math course performance is influenced by institutional-level decisions about how to structure course offerings. Colleges offering modules as standalone one-credit courses have

increased the number of potential exit points within the developmental sequence, and an assessment of students' enrollment patterns suggests significant attrition remains a problem. Forty-four percent of students who placed into and enrolled in MTE 1 and who required additional modules did not enroll in any subsequent modules during the academic year. Although the shell courses reduce exit points, the large proportion of enrolled students who fail to complete even one module in a semester suggests pacing is a significant issue in shell courses, despite aggressive measures to keep students on track.

Changes to instructional delivery may require difficult adjustments from faculty and students.

Observation and interview data from faculty and students in computer-mediated developmental math courses reveal that students must be much more self-directed in these courses relative to traditional lecture courses. Students must assume greater responsibility for their learning, while instructors must relinquish some control of the learning environment. Adapting to these changes in student and instructor roles can be challenging for some. Students must engage with the software as the primary source of instruction and practice, and determine when and how to ask faculty for assistance. Faculty must adjust to a role akin to an instructional coach and figure out how to assess student learning and progress through a variety of check-in strategies and through data analytics available in the software. This adjustment can be especially difficult for nontraditional students who have less experience with computers and for faculty who strongly believe that lecture is the best way for developmental students to learn math.

Fully integrated reading and writing courses are challenging to implement.

In the case of developmental English, our data suggest the introduction of an integrated reading and writing curriculum and streamlined courses presents challenges for a large proportion of faculty, particularly during the first few semesters of implementation. The developmental English curriculum teams in both states sought to seamlessly integrate reading and writing curricula within developmental English courses and to align developmental English learning outcomes to those of college English. The process resulted in consistency, but the redesigned course structure gave faculty fewer hours to address a large number of learning outcomes. For example, the VCCS developmental English curriculum guide lists eight broad learning objectives and 36 more specific objectives for the ENF courses. Faculty teaching ENF 2, in particular, described the difficulty of effectively teaching these learning objectives in a four-credit-hour course. Interviews with developmental English instructors revealed significant pedagogical challenges and time pressures, exacerbated by a dearth of curricular materials designed for integrated reading and writing at the developmental level.²³ Additionally, the learning objectives for these courses tend to focus on distinct reading or writing skills, leaving the actual integration to faculty, who may have little experience teaching both reading and writing, much less teaching both disciplines together in a systematic fashion. These implementation challenges speak to the need for more high-quality curricular materials and ongoing faculty learning opportunities to assist developmental English instructors with a range of pedagogical and curricular issues.

Lessons for the Field

The community college systems of Virginia and North Carolina are national leaders in statewide efforts to improve developmental education. States including Colorado, Connecticut, Florida, and Texas have followed suit, altering assessment and placement policies and instructional delivery approaches in attempts to limit the number of students assigned to remediation; hasten their completion of developmental education requirements; and increase the proportion of students completing developmental English and math, enrolling in and passing college courses, and completing credentials and transferring. As the earliest examples of statewide developmental education redesigns, the reforms of Virginia and North Carolina may offer important lessons for other states, even as we await data on their overall effectiveness.

Reforms may have differential impacts on student subgroups.

Preliminary analyses indicate that gatekeeper course completion rates are considerably higher for students who avoid developmental education altogether or coenroll in minimal developmental education and gatekeeper courses. Although the long-term benefits of large-scale developmental education avoidance and corequisite courses have yet to be established, other research affirms their positive short-term effects (Cho, Kopko, Jenkins, & Jaggars; Roksa et al., 2009). The Virginia outcomes discussed in this report are consistent with those positive short-term findings, suggesting that expanding eligibility for college course-taking may jump-start academic momentum for the students who qualify. It is less clear whether reforms such as modularized developmental math and integrated reading and writing courses (delivered in a one-semester, tiered structure or a mini-mester sequence) are effective for students with more significant remedial needs. As documented elsewhere, a reform may have larger impacts for some developmental education students and smaller impacts for others (Edgecombe et al., 2014). This differential is particularly important to understand given the scarcity of effective reforms for the most academically underprepared students. It is critical to consider the impacts of reforms on subgroups of students while they are in developmental education and to incorporate subgroup analyses based on level of developmental need, race/ethnicity, or other characteristics into outcomes evaluations.

How reforms translate at the institutional level varies considerably.

To truly understand the implementation and outcomes of a developmental education redesign, it is critical to assess the effects of the prescribed policies and practices at the institutional level and observe how institutions adapt over time. Typically, colleges confront myriad challenges related to implementation during early semesters (Edgecombe, Cormier, Bickerstaff, & Barragan, 2013). Their severity depends on how much the reform departs from previous developmental education practices, the effectiveness of planning activities, and the availability of resources, among other factors. For example, colleges in Virginia and North Carolina that had previously delivered math via computer-mediated instruction found the developmental math redesign less difficult to implement. Moreover, change efforts frequently generate unintended consequences. College functions, including advising, registration, and financial aid, may be affected in unanticipated ways. For instance, at the conclusion of the first four-week session, many Virginia colleges implementing MTEs were confronted with course registration modifications for students who did not success-

fully complete module requirements. Those students had to drop the modules they were enrolled in for the second, third, and fourth sessions and reenroll in the module they did not complete, along with the other required modules. This “add-drop-swap” process was labor intensive, requiring college staff to verify module completion and promptly reach out to students who required schedule changes.

Statewide reform-planning efforts should engage stakeholders from across a range of college departments from the outset; utilize scenario analyses to understand the implications of the reform for different college functions; and flexibly allocate resources to impacted functions during planning, launch, and refinement periods. Reform leaders also should build in an infrastructure for formative assessment to catalog variability in implementation so that meaningful support resources for implementation, which are typically neglected, can be developed and deployed effectively.

Reforming developmental education alone is unlikely to generate substantially improved outcomes.

One of the biggest challenges to the long-term success of the developmental education redesigns in Virginia and North Carolina is their weak linkages with other aspects of the student experience. Students’ college lives remain segmented, making it difficult for them to navigate disparate remedial and college-level courses, potential majors, and the array of available academic and nonacademic supports (Bailey, Jaggars, & Jenkins, 2015). Few reforms focused solely on developmental education have shown significant, long-term effects (Edgecombe et al., 2014). In comparison, highly structured, sustained, and comprehensive initiatives, such as the City University of New York’s Accelerated Study in Associate Programs (ASAP), which mandates full-time enrollment in the first year in prescribed majors and provides intensive academic and nonacademic supports, are more robust and impactful. ASAP is also considerably more expensive to implement than reforms to developmental education alone.²⁴

Virginia and North Carolina have other statewide improvement initiatives underway that could directly or indirectly support the goals of their developmental education redesigns. The VCCS has a large middle college program, affordability initiatives, and new models of faculty development and evaluation. Similarly, the NCCCS instituted a streamlined, comprehensive transfer articulation agreement and has voluntarily expanded its Completion by Design activities, among others. Numerous student success initiatives are also underway at individual colleges, signaling the need for strategic coordination of these efforts.

Conclusion

The redesigns of developmental education in Virginia and North Carolina are striking in terms of their scale and their departure from the remedial status quo. They are anchored by ambitious goals to address the structural and curricular weaknesses of the traditional multicourse developmental education sequence. They leverage acceleration strategies and address the alignment of curricula and courses to achieve these goals. Additionally, both states aspire to more accurately assess and

place students through customized tests. Although the overall reliability of these tests is unknown and likely limited, given the inherent weaknesses of single-measure instruments (Belfield & Crosta, 2012; Scott-Clayton, 2012; Scott-Clayton, Crosta, & Belfield, 2014), leaders in both states recognized that it is critical to consider changes to placement alongside any reforms to developmental education curricula and courses.

The full impacts of the redesigns, including the effects on long-term outcomes such as graduation and transfer, as well as variations in short- and long-term effects across student subgroups, will require more time to assess. Early findings indicate that a larger proportion of students are placing into and completing college-level math and English in one year since the redesigns were instituted. This sizeable and immediate positive effect is a result of changes in assessment and placement, not the delivery of developmental education. The impacts of the reforms to the developmental education curricula and courses necessitate a longer follow-up period to measure. Preliminary descriptive examinations of data on Virginia's developmental math modules suggest that progression through course requirements is slow for most students in both one-credit courses and shell courses. The analyses underway will determine whether this slow progression (likely through less content, given module-specific placements and prerequisite changes) is better or worse than progression for students in the old multi-course developmental math sequence.

Our qualitative analyses have chronicled the redesign implementation processes in Virginia and North Carolina, identifying challenges colleges encountered and the strategies they used to mitigate those challenges. Early findings align with evidence from similar reforms and scaling efforts elsewhere (Bickerstaff & Scaling Innovation Team, 2014; Edgecombe et al., 2013; Quint et al., 2011). Notably, both states attempted to engage a broad representation of faculty, administrators, and staff across a range of reform-planning activities. Despite these efforts, the full impact of the redesigns on certain college functions, such as financial aid and registration, was not known until they launched. In these instances, many colleges set up new systems, policies, and procedures to manage the demands of the redesigns.

Additional reforms to increase student success are underway in both states. These efforts seek to improve college readiness, affordability, academic planning, programs of study, transfer, labor market linkages, and other areas, and are important complements to the states' developmental education redesigns. The ability of any one of these initiatives to significantly improve student outcomes is limited. However, if integrated cohesively and implemented effectively, the potential of a multi-pronged improvement strategy to generate better outcomes rises considerably.

Endnotes

1. ASDER is a three-year study funded by the Bill & Melinda Gates Foundation. Data collection activities took place over five semesters and included visits to 34 colleges, during which 398 faculty members; 470 students; and over 300 administrators, advisors/counselors, and other college staff participated in interviews and/or focus groups. Students also completed background surveys. CCRC researchers observed 105 developmental education classes. Interviews and focus groups were audio-recorded with consent, transcribed, and coded for data analysis. Data from observation protocols were extracted based on complementary codes in preparation for analysis. Academic outcomes are being analyzed using student unit record data provided by the VCCS and the NCCCS.
2. Portions of both the Virginia and North Carolina developmental education redesigns were funded by the Bill & Melinda Gates Foundation and Lumina Foundation through the Developmental Education Initiative, an effort to support state- and college-level developmental education reforms.
3. For instance, policymakers and practitioners consulted a CCRC report by Roksa, Jenkins, Jaggars, Zeidenberg, and Cho (2009) on improving gatekeeper course success rates among students referred to remediation.
4. Both state systems engaged with K-12 partners to reduce the need for developmental education among incoming students. Given that this strategy relied heavily on policies and practices at the K-12 level, discussion of this strategy is outside of the scope of this report.
5. Prior to the redesigns, some North Carolina community colleges offered integrated developmental reading and writing courses. These courses were listed in the state's common course catalog as ENG 075, ENG 085, and ENG 095.
6. Both states use the same course prefix and number for introductory college composition. In Virginia, ENG 111 is named College Composition I; in North Carolina, ENG 111 is named Expository Writing.
7. The VCCS instituted a minimum placement score requirement for students seeking to enroll in developmental English. Those students scoring below the minimum are directed to adult basic education or other basic skills alternatives. In fall 2013, 1.1 percent of students were placing below the minimum score for developmental English.
8. Colleges have discretion as to whether a student who passes ENF 1 or ENF 2 is eligible for ENG 111 or is required to take the ENF 3/ENG 111 corequisite option.
9. DRE curriculum designers borrowed the integrated reading and writing cycle model from Chabot College in California, which integrated developmental reading and writing in the early 1990s. For more information, see the CCRC evaluation of the accelerated developmental English model at Chabot (Edgecombe, Jaggars, Xu, & Barragan, 2014).
10. A limited number of colleges give students five weeks to complete a module.
11. There is variation among Virginia's community colleges in terms of the prerequisite requirements for College Algebra, but typically, students are required to complete through MTE 9. In North Carolina, a mathematics curriculum improvement project, which was focused on streamlining introductory college math course offerings, standardized prerequisites and eliminated duplicate courses.
12. Computer-mediated instruction differs from online instruction in that students are physically present in the classroom.
13. According to the VCCS *Curriculum Guide for Developmental Mathematics*, "students must demonstrate mastery of units with scores of at least 75% on the final assessment of each unit before taking the subsequent unit or course" (Virginia Community College System Developmental Math Curriculum Team, 2011, p. 3).

14. Data from the VCCS indicate 65 percent of community college students enrolled between 2004 and 2009 were liberal arts (or non-STEM) majors.
15. The VCCS contracted with McCann Associates to develop their customized assessments; the NCCCS contracted with the College Board to develop their customized assessments. Both states assembled committees of faculty, staff, and administrators to work with the test developers.
16. Computer adaptive tests are designed to adapt to the examinee's ability level. The test's difficulty adjusts based on students' responses in order to examine each student more specifically in areas of demonstrated weakness rather than areas of demonstrated strength. For example, if a student performs well on an item, a more difficult question will follow.
17. Following the release of the test, the NCCCS identified problems with the cut scores and issued temporary placement testing policies, which stayed in effect until the test was rereleased in February 2014. From May 2013 to February 2014, colleges had the option of either administering the previously used placement test (ACCUPLACER/COMPASS) or administering part one of the North Carolina Diagnostic Assessment and Placement (DMA 010 to DMA 050) and setting their own cut scores.
18. The NCCCS, in consultation with the colleges, decided to test only through DMA 060 when the placement test was rereleased in February 2014, as internal analyses suggested that passing DMA 060 was associated with success in introductory college-level algebra-based courses.
19. This policy draws on predictive validity research on assessment instruments and the policy implications conducted by CCRC. The research found that a student's high school GPA was significantly more predictive of a student's college outcomes (in terms of number of credits earned and GPA) than the existing placement tests. Using simulations, it also found that the percentage of students misplaced decreased when high school GPA was used rather than the placement tests. See Belfield and Crosta (2012) for further information; see also Scott-Clayton, Crosta, and Belfield (2014).
20. These findings are based on analyses by CCRC researchers Olga Rodríguez, Jessica Brathwaite, and Nikki Edgecombe, which are planned for inclusion in a future report on college English placement, enrollment, and performance in Virginia.
21. Northern Virginia Community College had a similar corequisite model in place before the statewide redesign, pairing the highest level of development English (ENG 9, a three-credit course) with college English (ENG 111). Roughly 10 percent of the fall 2010 cohort placed into this course pairing.
22. See Bickerstaff, Fay, and Trimble (2015) for an implementation and early outcomes analysis of modularization in developmental mathematics.
23. A paper examining the implementation of integrated reading and writing courses in Virginia will be released in late 2015.
24. While ASAP is expensive, a recent experimental study (Scrivener et al., 2015) found it to be cost effective. Because the program substantially boosted completions, the cost per degree was lower in ASAP than in the usual college services.
25. Completion by Design is a student success initiative funded by the Bill & Melinda Gates Foundation intended to assist participating community colleges in increasing completion rates through comprehensive institutional transformation. See <http://completionbydesign.org/> for more information.

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