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Student Experiences in English Corequisite Remediation Versus a Standalone Developmental Education Course

Findings from an Experimental Study in Texas Community Colleges

States and colleges across the United States are making changes to the way they provide academic support to incoming college students. Until recently, most colleges assessed incoming students in reading, writing, and mathematics and required students not meeting college readiness thresholds to take one or more developmental (sometimes referred to as *remedial*) courses in a subject area before students could enroll in college-level coursework. Some colleges required students to complete as many as three or four semester-long courses—and pay tuition for these courses—before earning credits toward a college degree.

As early as 2010, research indicated that very few students were making it out of these developmental education courses and into credit-bearing coursework (Bailey, Jeong, and Cho, 2010). This raised concerns that developmental education was doing more to keep students from progressing toward degrees than to provide the development needed for college

KEY FINDINGS

- Corequisite models had strongly aligned content, including a common set of course materials and the same instructor for both the college course and academic support.

- Corequisite students enrolled in more credit-bearing coursework and received more hours of reading and writing instruction in the first semester.

- Corequisite students were less likely to perceive coursework as too easy, boring, or repetitive; and they were less likely to feel embarrassed.

- Corequisite students were less likely to report individual deskwork.

- Students assigned to standalone developmental education were more likely to plan to use tutoring and more likely to perceive their instructors as believing in their potential to succeed.

coursework (Scott-Clayton and Rodriguez, 2015). If developmental education courses hinder student progress, they serve as a barrier to equity in postsecondary education because low-income students and Black and Hispanic students are disproportionately assigned to these courses (Chen and Simone, 2016).

To address concerns about the structure of developmental education, colleges have been experimenting with new approaches that accelerate students into college courses. In this report, we focus on one of these approaches to acceleration: *corequisite remediation*. Corequisite remediation requires that students deemed "not college-ready" be placed immediately into a college course while receiving aligned academic support during the same semester rather than being required to complete one or more semester-long developmental education courses before taking a college course.

A 2016 national survey found that 35 percent of colleges offered corequisite remediation in English (Rutschow et al., 2019). At least 20 states have passed legislation calling on colleges to scale corequisite models (Whinnery and Pompelia, 2018); states like California and Tennessee require corequisite remediation as the default option for all students who are deemed not college-ready. In 2011, Texas—the focus of this report—passed legislation for colleges to begin experimenting with corequisite remediation. In 2017, Texas passed additional legislation to provide corequisite remediation to most students testing below college readiness levels on the state's placement exam.

A growing number of studies reveal positive effects of corequisite remediation on student success in credit-bearing courses (Cho et al., 2012; Logue, Douglas, and Watanabe-Rose, 2019; Miller et al., 2020; Ran and Lin, 2019). Some of these studies have also documented effects on persistence and completion (Cho et al., 2012; Logue, Douglas, and Watanabe-Rose, 2019). However, little is understood about how corequisite remediation changes a student's early instructional experiences in college.

Sometimes colleges have implemented corequisite remediation as two standalone courses (the college course and the developmental course) that students take simultaneously during the same semester. These models are not that different from the traditional approach to developmental education, although students still might benefit from immediately tackling

key gateway courses and earning college credits in that first semester (Jenkins and Bailey, 2017).

However, many corequisite models are designed to improve student educational experiences by differing from developmental education in other ways. For example, the Accelerated Learning Program (ALP)—a popular English corequisite model—involves reducing class sizes, mixing students deemed college-ready with corequisite students, and closely aligning instruction between the English course and the academic support. Students in such corequisite models therefore might have greater opportunities to engage in student-centered learning and peer learning relative to those in traditional developmental education, and they might also experience a greater degree of alignment between the developmental support that they receive and their college-level coursework. It is also useful to understand how models of corequisite remediation affect other aspects of early college experiences that might determine a student's likelihood of college success, such as the rigor of coursework, the opportunities to build success skills, and the stigma that students encounter.

In 2015, the RAND Corporation, the American Institutes for Research, and the Texas Higher Education Coordinating Board (THECB) were provided with funding from the U.S. Department of Education to conduct a randomized control trial of corequisite models in Texas. Between fall 2016 and fall 2018, 1,441 students across five community colleges were randomized to either corequisite remediation or the highest level of standalone developmental education. Early impact findings from this study indicate that corequisite remediation led to improved course outcomes for students, with a 18 percentage-point increase in students passing college-level English within the first two years and an additional 1.5 credits earned on average during the first two years of enrollment (Miller et al., 2020).

In addition to evaluating academic impacts, we were interested in understanding more about students' experiences in corequisite remediation and how these experiences compare with experiences in traditional developmental education. Evidence of these differences could reveal which factors might have driven improved course outcomes for students assigned to corequisite remediation. We can build

a better understanding of where corequisite models improved upon traditional developmental education and also identify potential areas for improvement. Practitioners can use this information to design more effective corequisite approaches.

In this report, we use data from our randomized control trial to examine the differences between the early college experiences of students assigned to corequisite remediation (the treatment group) and those assigned to standalone developmental education (the control group). We identified eight areas of interest related to student experiences (using a literature review and interviews with instructors and administrators who are implementing corequisite remediation across Texas) and then examined study data that could shed light on student experiences in these eight areas. We primarily rely on quantitative analysis of student-level administrative and survey data to draw our conclusions, but we also incorporate qualitative data to provide context to those findings.

We provide a more-detailed description of the randomized control trial, our findings, and the data sources that were used for the report to examine student experiences in a separate technical appendix (RR-A810-2, *Student Experiences in English Corequisite Remediation Versus a Standalone Developmental Education Course: Findings from an Experimental Study in Texas Community Colleges—Technical Appendix*).

Corequisite Remediation Policies and Approaches in Texas

Expansion of Corequisite Remediation in Texas

As research began to indicate that students were struggling with traditional models of developmental education (Bailey, Jeong, and Cho, 2010), Texas encouraged colleges to begin experimenting with new, promising approaches to developmental education. In 2011, Texas Senate Bill 162 required major reforms to developmental education, such as the rollout of a new statewide placement exam with common statewide scores for college readiness and require-

ments that colleges begin to use multiple measures of college readiness for placement. The bill specifically required institutions to begin experimenting with different approaches to accelerating students who tested as not ready for college. The legislation did not specify that colleges had to adopt corequisite remediation, but state policymakers recommended it as one of the key approaches to acceleration that colleges should consider (at this time, corequisite remediation was referred to as *mainstreaming* in Texas).

To support experimentation and evidence-building, Texas provided grants to five community colleges and four universities to test different approaches under the Developmental Education Demonstration Project (DEDP). Institutions implemented a variety of strategies intended to improve student success in developmental education. These included efforts to redesign the developmental education curriculum and improve pedagogy; professional development for instructors and staff; the implementation of structures, such as learning communities and student supports, to help students succeed; and addressing policy issues that might be barriers to students (Booth et al., 2014). A study commissioned by THECB used administrative data to document success rates for underprepared students at DEDP sites before and after the implementation of the program; researchers conducted interviews with program administrators and staff to document the strategies that sites implemented and administrator and staff challenges and successes. The study provided examples of colleges implementing acceleration strategies, such as mainstreaming or corequisite remediation; administrators at those sites reported that these strategies showed promise in motivating students who were almost college ready and improving academic outcomes (Booth et al, 2014).

These state-funded DEDP efforts and the national movement to reform developmental education contributed to increased experimentation with these strategies across Texas colleges. By 2015, a statewide annual developmental education survey conducted by THECB indicated that 21 percent of Texas community colleges reported offering corequisite remediation in writing to some students, and a similar percentage reported doing so in math. By 2017, all community colleges in the state of Texas reported

that they were offering corequisite remediation to some students.

Statewide interview data documented in an earlier RAND report (Daugherty et al., 2018) on English corequisite remediation provide detailed information on how corequisite remediation was being implemented in Texas community colleges during this period of early scale-up. In addition to the data collected from the five randomized control trial institutions, RAND researchers conducted interviews with English faculty and administrators overseeing corequisite remediation at 31 community colleges in Texas.[1] College staff described the corequisite models that their colleges were implementing in fall 2016; researchers identified at least five types of English corequisite models (see Table 1). Community colleges across Texas developed a wide variety of English corequisite models, with variation in structure (e.g., credit hours, student-to-instructor ratios) and delivery of the academic support (e.g., classroom-based instruction, one-on-one tutoring). Design of corequisite models was primarily instructor-driven; instructor leaders attended trainings on nationally known corequisite models (e.g., ALP), or they developed their own, home-grown models.

Institutions were also responsible for determining student eligibility for corequisite remediation. State policy required that all colleges in Texas use the same assessment and a common college-ready cut score. However, institutions could determine which ranges of test scores below the common college-ready threshold qualified students for entry into corequisite

TABLE 1

Five Types of Corequisite Models Commonly Implemented in Texas, Fall 2016

Type	Description	Percentage of Surveyed Colleges
Paired-course models	The college course and the academic support remained relatively similar to the traditional approach to developmental education. There might be efforts to strengthen connections between the two courses, but typically, classes retained separate instructors and focused on separate coursework. Corequisite students also typically enrolled in separate sections of the college course from college-ready students and did not attend the course and the academic support as a learning community.	27
Extended instructional time models	The academic support was delivered as an extension of time spent in the college course, with the academic support portion of the corequisite and the college course typically indistinguishable to students as two separate components. Scaffolding was embedded throughout the course. The college course and the academic support were always taught by the same instructor and focused on the same coursework, and sections of the college course were typically populated entirely by corequisite students (i.e., there were no efforts to intentionally mix corequisite students with college-ready students).	23
ALP-based models	The academic support was offered as a separate supplementary class session adjacent to the college-level course. Corequisite students were co-enrolled with college-ready students in the college course; the smaller group of corequisite students were then enrolled together in the academic support portion as a learning community. The same instructor taught both the college course and the academic support portions of the corequisite model; instructors largely drew on coursework from the college course with some supplementary assignments.	18
Academic support service models	The academic support was provided through weekly use of an existing college support service, typically tutoring in the writing center or participating in instructor office hours. Tutoring models often used a different instructor for the academic support; office-hour models relied on the same instructor to provide the academic support. Corequisite students were typically mixed into sections of the college course with college-ready students. The academic support focused almost exclusively on assisting students with coursework from the college course, although occasionally instructors assigned additional work to address individual needs.	14
Technology-mediated models	The academic support was provided in a lab where students worked independently with computer-adaptive software to receive support with basic concepts related to the college course. The instructor overseeing the academic support was often different from the instructor of the college-level course. Corequisite students were typically enrolled in separate sections of the college course from college-ready students.	11

NOTE: Percentages do not sum to 100 percent because three colleges did not fit into any one category and were therefore classified as "other" or "combination" models.

remediation and whether other measures might be used to determine eligibility. In fall 2016, most colleges restricted access to corequisites only to students who were just few points away from the state's college-ready cut scores; students testing at lower levels were still placed in traditional developmental education courses. These students who were eligible for corequisites would have been previously been placed into the top level of developmental education. In most cases, these strict eligibility rules meant that colleges only offered a few corequisite course sections.

Although the structure of and eligibility requirements for corequisite remediation were determined at the institution level, instructors typically had substantial autonomy in the classroom. Our interviews with instructors and administrators overseeing English corequisite models suggested that colleges often required certain textbooks and that students write a certain number of essays for the college-level course; otherwise, instructors had the freedom to determine the content of assignments and instructional strategies used in both the college-level course and the academic support portion. Although academic departments often encouraged instructors to attend conferences with sessions on corequisite remediation and share strategies and lessons learned with their colleagues, many colleges did not require any formal training specifically on corequisite instruction before becoming an instructor for such courses. In the early years of implementation, instructors often volunteered or were hand-picked to teach corequisite sections. Both adjunct and full-time instructors taught corequisite remediation (and standalone developmental education courses).

As evidence continued to grow on the promise of corequisite remediation, states began to pass legislation calling for institutions to scale this specific reform. In spring 2017, Texas was the second state to pass legislation calling for institutions to move toward enrolling most developmental education students into corequisites. Texas House Bill 2223 required that 75 percent of students who were enrolled in developmental education be placed into corequisite remediation by fall 2020, with gradual scaling beginning in fall 2018.[2] The state also provided more-specific guidance to colleges on how corequisites should be implemented in response to this policy. For example, THECB specified which college-level courses were eligible for corequisite remediation and provided guidance that course content should be closely aligned between the college-level course and the academic support portion of the corequisite. Finally, the state rolled out funding and resources to support statewide professional development for instructors, administrators, advisors, and other school staff as they scaled corequisite models.

Corequisite Remediation in the Five Study Colleges

The randomized control trial largely occurred prior to the scaling of corequisite remediation under Texas House Bill 2223; only one of the five study colleges continued to randomize students into the fall 2018 semester. All five community colleges volunteered to participate in the research study in fall 2015; all five had reputations as leaders in adopting developmental education reforms and other new initiatives. In addition, these five institutions were among the largest community college systems in the state, were located near urban regions of Texas, and had large, diverse student populations. For these reasons, the study institutions might not have been representative of all Texas community colleges. The corequisite models implemented at these five colleges represented only three of the five models being implemented statewide (see Table 1).

The corequisite models across the five colleges all consisted of a three credit-hour English composition course paired with an additional, required academic support portion that ranged from one to three credit hours. The traditional placement option was a stand-alone integrated reading and writing developmental education course that varied across colleges from three to five credit hours. Colleges A and B based the design of their corequisite model on the popular ALP model (see Table 2). The model called for students above and below the college-ready threshold on the placement exam to be mixed in the college-level course instead of being enrolled in separate sections. The students who had not been deemed college-ready (i.e., the corequisite students) then remained in the classroom with the same instructor for an additional

TABLE 2
Designs of the Corequisite Models that We Evaluated

	ALP		Extended Instructional Time	Academic Support Service	
	College A	College B	College C	College D[a]	College E
Content					
Co-enrollment in college course and academic support in same subject	Co-enrolled (English 1301 course, Integrated Reading and Writing academic support)				
Degree to which support coursework/ objectives aligned	Common coursework, objectives				
Length/intensity					
Number of credits/ contact hours for academic support portion	1/48	1/16	1/16	1/up to 16	1/16
Length of course/ academic support portion, in weeks	16/16	16/8	16/16	16/16 (or fewer)	8/8
Instruction					
Instructional approach for academic support	Classroom instruction	Classroom instruction	Classroom instruction	Tutoring	Tutoring
Instructor for college course/academic support	Same instructor	Same instructor	Same instructor	Same instructor	Different instructors
Student population					
Student-to-instructor ratio in course/ academic support	20/10	25/10	22/22[b]	30/5	25/10
Mixing of students by ability in course	50% of students test below college ready	40% of students test below college ready	no requirement	16.7% of students test below college ready	40% of students test below college ready

[a] In fall 2018, College D began to offer a second corequisite model that was identical to College A's except that class sizes were slightly larger (25 students per section). More than 80 percent of College D's study students were placed into the original corequisite model.
[b] This model integrates the course and academic support.
NOTE: Information on model design came from interviews with administrators and instructors and course documentation.

course session immediately following the college-level course. The academic support drew primarily on the college English coursework, though the specific assignments and instructional approaches varied across instructors.

The designs of the corequisite models at College A and B differed in a few ways. Course sizes differed slightly, and College A offered three hours of academic support each week for the full 16 weeks of the semester (as prescribed in the standard ALP model), while College B offered two hours of academic support each week for the first eight weeks of the semester.

College C developed a corequisite model in which the academic support was integrated directly into the college-level English course as an additional hour of course time each week across the 16 weeks of the semester. Corequisite students were enrolled in different sections of English from college-ready students; all 22 students remained in the course for the full four hours each week. Although instructors sometimes provided some supplementary course assignments with the additional time that they had, the academic support was largely provided around the coursework from the college-level course.

Colleges D and E developed corequisite models that we classified as academic support service models. College D required students to attend weekly office hours sessions with their college-level English instructors, and College E required students to attend weekly tutoring sessions in a writing center, where the support provided came from instructors or tutors that differed from their English instructors. As with the other corequisite models, instructors occasionally assigned additional coursework during the academic support but primarily provided support around assignments from the English course. Both colleges offered one credit-hour supports. College D extended the course and the academic support across the full 16 weeks of the semester and allowed students who were performing well in the college-level course to stop attending the academic support portion of the corequisite later in the semester. College E accelerated the entire corequisite model (course and academic support) into an eight-week term so that students received eight hours of weekly instruction rather than four.

The five colleges had different requirements for staffing and training. Both adjunct and full-time instructors taught in corequisite remediation and standalone developmental education courses. Colleges A, B, C, and D all required that the same instructor teach both the college course and the academic support portion of the corequisite model, while College E used a single full-time instructor to teach the college English course and used adjunct tutors to provide tutoring support. Corequisite instructors were typically drawn from the pool of instructors teaching the college-level English course; in some cases, these instructors had also taught standalone developmental education. At most of the colleges, corequisite remediation instructors volunteered to teach the courses; College B was the only college that assigned instructors to corequisite remediation. In terms of training, College D was the only college to require on-site training and certification of all instructors before teaching corequisites. Most of the instructional leads across the five colleges who were involved in designing the corequisite model had participated in national trainings on corequisite remediation (largely focused on the ALP model), and English departments often encouraged new instruc-

tors to participate in national and local professional development at faculty conferences that focused on corequisite remediation. Statewide and institutional professional developmental efforts greatly expanded after the passage of House Bill 2223 in 2017.

Approaches to Assessing the Effects of Corequisite Remediation on Student Experiences

Corequisite remediation is designed to provide different experiences for students relative to what they would have experienced through the traditional approach of requiring a standalone developmental education course prior to coursework for credit. By definition, corequisite remediation requires immediate enrollment in a college-level course, ensuring that students will immediately have opportunities to earn credit. Corequisite remediation also can reduce the overall number of developmental education credits students have to take, allowing more room on schedules for credit-bearing coursework. Early opportunity to make progress in earning college credit has been shown to improve college outcomes (Jenkins and Bailey, 2017).

Our five study colleges designed their corequisite models to enhance student experiences in other ways. For example, the colleges made efforts to align the academic support portion of the corequisite closely with the coursework in the college-level course, structured the courses in ways that facilitated peer effects and peer learning, and tried to increase the opportunities for individualized instruction. The developmental education literature also highlights key elements of student experiences in early college coursework—such as building success skills (e.g., study skills, social and emotional competencies) and reducing exposure to stigma—that might be important for supporting student success and useful to consider as we examine student experiences in corequisite remediation.

In this section, we document our analysis of eight areas in which we believed that corequisite remediation could potentially change student experiences—areas where we would examine con-

trasts between students assigned to corequisite remediation and students assigned to standalone developmental education courses. In Table 3, we provide an overview of these eight areas.

Our process for identifying these areas of focus was iterative. First, we scanned the literature for theories of (1) why corequisite remediation was believed to work and (2) what other aspects of developmental and adult education were believed to be important to supporting postsecondary success. Second, beginning in fall 2016, we conducted site visits with our five randomized control trial colleges and collected data from instructors, students, and administrators to understand which aspects of corequisite remediation practitioners were viewed as critical to the effectiveness of their corequisite models. Third, we

TABLE 3

Areas with Possible Student Experience Differences Between Corequisite Remediation and Standalone Developmental Education Courses

Contrast Area	Description
Early opportunities to make progress (gain momentum)	The more time that students spend in college, the less likely they are to complete a degree.[a] In addition, most students who start college by taking developmental education courses are unlikely to receive any sort of credential.[b] Completion of college-level gateway courses is an important predictor of student success. Early accumulation of college credit and early completion of gateway coursework might help students overcome barriers to entering other college coursework and reassure students that they are making progress toward a degree, which, in turn, might lead to increased motivation and confidence and an increased sense of belonging.[c] For students with limited financial resources, saving time and money by avoiding developmental education coursework also might be important to success.[d]
Intensity/compression of academic practice	Compressing coursework to allow for more-concentrated instructional time over a shorter period can improve learning and course performance relative to less-concentrated instructional time over a longer period.[e]
Rigor of coursework and expectations	Less-rigorous approaches to instruction (e.g., skill-and-drill activities) might be less effective in supporting learning; instructional methods that require deep inquiry and critical thinking might be more effective. Exposing students to rigorous coursework and expectations and providing students with opportunities to struggle (with appropriate scaffolding and support) might help improve engagement and build confidence; in contrast, exposing students to coursework that feels too easy and repetitive of high school coursework might be demotivating.[f]
Alignment of academic remediation with college coursework	The purpose of developmental education is to prepare students for college-level coursework; developmental education coursework that is more closely aligned to college level coursework is of higher quality because it will better prepare and ensure the success of students in coursework and eventual degree completion.[g]
Opportunities for student-centered learning	Several aspects of student-centered learning might help support student success. First, increased opportunities for one-on-one or small group interactions are associated with improved student outcomes.[h] Student-centered instructional strategies, such as *active learning approaches* (e.g., group projects, journal writing) and contextualization,[i] also have been shown to be valuable for student learning. Finally, differentiation of instruction through assessment of individual student needs and tailoring of instruction to meet those needs can improve student course performance and improve the efficiency of developmental education.[j]
Opportunities for peer learning	Educational settings can shape students' abilities to learn from their peers in several different ways. First, courses might pair lower-performing students with higher-performing peers, leading to a phenomenon often referred to as *peer effects*.[k] Another strategy for enhancing peer learning is forming *learning communities*, in which students attend classes with common cohorts. The literature suggests that learning communities can potentially enhance peer learning and improve student success, although findings are mixed.[l] Finally, peer-involved instructional strategies (e.g., peer editing, group work) might increase opportunities for peer interactions and enhance student learning.[m]
Support for success skills (e.g., study skills, social and emotional competencies)	Developmental education students might benefit from support in areas beyond academic readiness, such as self-efficacy, self-regulation, and study skills. Research suggests that social and emotional and study skills are related to college success.[n] Use of support services like tutoring,[o] supplemental instruction, and office hours can lead to improved course performance and improved persistence and completion outcomes; some might consider smart use of these support services as a critical student success skill.[p]

Contrast Area	Description
Exposure to stigma	Developmental education is often considered to have a stigma and students enrolled in these courses can become discouraged and embarrassed by participating in classes that are considered different and lesser than college-level coursework.[q]

[a] ALP, undated; Belfield, Jenkins, and Fink, 2019; Belfield, Jenkins, and Lahr, 2016; Boroch et al., 2007; Jaggars, Edgecombe, and Stacey, 2014.
[b] Clovis and Chang, 2019; Xu and Ran, 2020.
[c] Bickerstaff, Barragan, and Rucks-Ahdiana, 2012; Cho et al., 2012; Driscoll, 2007.
[d] Bailey, Jeong, and Cho, 2010; Melguizo, Hagedorn, and Cypers, 2008.
[e] Anastasi, 2007; Anderson and Anderson, 2012; Austin and Gustafson, 2006; Daniel, 2000; Rosen, Howell, and Johnson, 1982; Roueche and Roueche, 1999; Sheldon and Durdella, 2009; Tatum, 2010; Wlodkowski, 2003.
[f] Barragan and Cormier, 2013; Boroch et al., 2007; Boylan, 2002; Edwards and Beattie, 2016; McCabe and Day, 1998; Perin, 2002. It is worth noting that we heard some concerns from practitioners about corequisite remediation being too rigorous for students, but we did not have any literature base that supported these concerns.
[g] ALP, undated; Boroch et al., 2007; Boylan, 2002; Bracco et al., 2015; Charles A. Dana Center et al., 2012; Cho et al., 2012; Grubb and Cox, 2005; Jenkins, 2011; McCabe and Day, 1998; Perin, 2002; Sperling, 2009.
[h] ALP, undated; Boroch et al., 2007; Cho et al., 2012.
[i] Boroch et al., 2007; Goldrick-Rab, 2007; Massachusetts Community College Executive Office, 2006.
[j] Boroch et al., 2007; Boylan, 2002; Charles A. Dana Center et al., 2012; McCabe and Day, 1998; Schwartz and Jenkins, 2007.
[k] Hanushek et al., 2003; Hoxby, 2000; Sund, 2009.
[l] ALP, undated; Andrade, 2007–2008; Bailey and Alfonso, 2005; Barnes and Piland, 2010; Bloom and Somo, 2005; Boroch et al., 2007; Boylan, 2002; Mayer et al., 2013; Minkler, 2002; Visher et al., 2010, 2012; Weiss, Mayer et al., 2015; Weiss, Visher et al., 2015.
[m] Boylan, 2002; Sperling, 2009; Schwartz and Jenkins, 2007.
[n] ALP, undated; Boroch et al., 2007; Boylan, 2002; Charles A. Dana Center et al., 2012; Cornick, Guy, and Beckford, 2015; Landis, Altman, and Cavin, 2007; Majer, 2009; McCabe and Day, 1998; Nakajima, Dembo, and Mossler, 2012; Proctor et al., 2006; Schwartz and Jenkins, 2007; Spitzer, 2000; Vuong, Brown-Welty, and Tracz, 2010; Zajacova, Lynch, and Espenshade, 2005.
[o] Boylan, 2002; Boroch et al., 2007; Rutschow and Schneider, 2011.
[p] Boylan, 2002; Charles A. Dana Center et al., 2012; Cho and Karp, 2013.
[q] Basic Skills Agency, 1997; Boroch et al., 2007; Hall and Ponton, 2005; Koch, Slate and Moore, 2012; MacDonald, 1987; Pedelty, 2001; Schmitt et al., 2007; Valeri-Gold et al., 1997.

used interview data from 31 additional community colleges to consider broader perspectives of how corequisite remediation might benefit students relative to standalone developmental education. Finally, we conducted an additional round of literature review to identify supplementary literature in areas of potential contrast identified through our primary data collection.

We drew on a range of quantitative and qualitative data sources from our randomized control trial to examine contrasts in student experiences in corequisite remediation versus traditional developmental education. We provide an overview of these data sources in Table 4, and we provide additional details on these data sources and the randomized control trial sample in the technical appendix. For example, we show that these two groups of students were similar across key characteristics that might be associated with academic success (i.e., evidence that randomization was successful). This helps ensure that any differences that we found between the two groups of students were driven by course placement, rather than other factors.

This report primarily focuses on our findings from student-level data sources, including administrative records and a follow-up survey that we admin-istered to students approximately seven months after enrollment in corequisite remediation or standalone developmental education. These student-level measures are representative and allowed us to test for unbiased, statistically significant differences between students who were assigned to corequisite remediation and students who were assigned to a standalone developmental education course. We also draw on qualitative data—faculty surveys; focus groups and interviews with students, instructors, and faculty; and classroom observations—to provide context to the quantitative findings and offer insights into areas that we were not able to measure with student administrative and survey data.

An overview of our primary measures from administrative and student survey data are detailed in Table 5. Although we refer to these measures as capturing *student experiences* throughout this report, our measures actually capture structural aspects of the courses that might shape student experiences (e.g., class size, instructional hours), students' perceptions of their course experiences (e.g., instructor use of various strategies, how easy the course seemed), and self-reported behaviors (e.g., participation in tutoring).

TABLE 4

Data Sources for Examining Contrasts in Student Experiences

Data Source	Description
Administrative data	THECB collects detailed longitudinal data on the characteristics of courses taken by students and their grades and credits earned in those courses. We used data for all 1,441 enrolled students from our random control trial sample.
Student follow-up survey data	We conducted a survey of students in our fall 2016, fall 2017, and fall 2018 cohorts, approximately seven months after their respective enrollments; we had a total sample of 1,163. The response rate was 62 percent overall (n = 723), with a substantially lower response rate for the fall 2018 cohort (32 percent versus 67 percent). Overall, survey respondent characteristics were similar to our overall population across most student characteristics. We weighted our survey data to account for sampling and differential response rates.
Instructor survey	During the fall 2017 and fall 2018 semesters, we surveyed all instructors teaching English Composition I (including corequisite remediation sections) and all instructors teaching Integrated Reading and Writing. The response rate was 51 percent across semesters; we focused on 112 responses for instructors teaching corequisite remediation and standalone developmental education sections. College E was excluded from this data because it only participated in the study in fall 2016.
Interviews and focus groups with administrators, instructors, and students	We conducted site visits in fall 2016, fall 2017, and fall 2018. These visits included in-person, semistructured interviews and focus groups with administrators (n = 21 interviews), control and treatment instructors (n = 34 focus groups), and control and treatment students (n = 39 focus groups).
Classroom observations	During site visits in fall 2016, fall 2017, and fall 2018, we conducted observations of both control and treatment classrooms (n = 58).

NOTES: We collected a student baseline survey at the time of randomization, and some of the student characteristics on which we collected data are used as controls in our statistical analysis to test findings. However, this table is limited to data sources that were used to measure student experiences.

We examined differences between students assigned to corequisite remediation (treatment) and students assigned to standalone developmental education (control) for each of these measures, focusing on the weighted average values. These averages include all students who were *assigned* to corequisite remediation or traditional developmental education and enrolled in college. However, some of these students did not end up in the assigned course for various reasons, such as retesting, misplacement, or scheduling issues. In other words, our estimates represent the intent-to-treat effect on our student experience measures rather than the effect on those actually treated. We provide additional detail on our analytic model in the technical appendix. Because some students assigned to the control group were actually enrolled alongside treatment group students in the college-level English course (and vice versa), our findings may understate the differences between the two courses by attributing student experiences to their assigned courses rather than the actual courses of enrollment.

Our approach was limited in several ways. First, although different corequisite models might shape student experiences differently depending on how the models are designed and implemented, we did not have a large enough sample of students to examine how contrasts in student experiences differed across corequisite models or colleges. In addition, our data do not allow us to pinpoint what might have been driving the differences that we observed in student experiences. The perceptions of students might have been shaped by structural aspects of the corequisite model, the types of instructors teaching corequisites, or the instructional approaches and coursework used in the classroom; we were not able to distinguish which of these aspects might have been contributing to differences in our student experience measures.

Given the lack of relevant theory and measures relevant to student experiences in corequisite remediation, we had to both develop theory and create or adapt measures for our survey. More work is needed to continue to refine strong measures in these eight areas. For example, we were unable to identify measures of alignment that could be directly compared across our treatment and control groups. We faced space constraints on the student survey for detailed scales across our eight areas of interest; in many

TABLE 5
Student-Level Measures of Contrasts in Student Experiences

Contrast Area	Student-Level Measure (source of data)
Early opportunities to make progress	• Number of college credits attempted in the first semester (administrative data) • Opportunity to take college English course in first semester (administrative data) • Perception that student is on track to finishing degree on expected timeline (student survey data)
Instructional intensity/ compression	• Number of hours of instruction assigned over the course of the semester (administrative data) • Self-reported weekly hours spent on the course (student survey data) • Perception that the amount of time for the course was sufficient (student survey data)
Rigor	• Perception that course felt academically overwhelming (student survey data) • Perception that course success was because of the course being too easy (student survey data) • Perception that student was academically prepared for the course (student survey data) • Perception that course was repetitive of high school (student survey data) • Perception that course was too easy, that the course was never too hard (student survey data) • Perception that course was boring (student survey data) • Perception that it would have been more appropriate to take a higher- or lower-level English course (student survey data)
Alignment of remediation with college courses	• Perception that the academic support portion helped student to learn material for college course (student survey data) • Perception that the material in the academic support portion was consistent with the college course (student survey data) • Perception that the course taken helped to prepare students for future reading and writing coursework (student survey data)
Opportunities for student-centered learning	• Class size (administrative data data) • Perceived frequency of individual attention from the instructor (student survey data) • Perceived frequency of instructor use of activities that encourage active learning, such as peer feedback, individual desk work, group work, and discussions (student survey data) • Perceived frequency of student engagement in terms of discussion participation, asking questions, and out-of-class work with peers (student survey data)
Opportunities for peer learning	• Perceived reading/writing/study skills/confidence relative to peers (student survey data) • Perceived frequency of engagement in instructional activities that encourage or discourage peer engagement, such as peer feedback, individual desk work, group work, and discussions (student survey) • Perception that student was successful because of help from other students in the class (student survey data)
Support for success skills	• Perception that the instructor believed in the student's potential to succeed (student survey data) • Perception that the instructor helped the student to improve learning strategies (e.g., study skills, time management, notetaking, class participation) (student survey data) • Use of office hours, writing center, and tutoring during semester (student survey data) • Plans to use office hours, writing center, and tutoring in the future (student survey data)
Exposure to stigma	• Perception that developmental education slows student progression (student survey data) • Awareness of enrollment in a developmental education course (student survey data) • Embarrassed about having been enrolled in the assigned course (student survey data)

cases, we relied on newly developed items or on single-item measures that were pulled from existing scales. Furthermore, student survey measures were collected several months after the end of the semester; therefore, they might be subject to error because of the passage of time (i.e., recall error). Despite these limitations, we believe that the findings provide valuable insights into how corequisite remediation might be affecting student experiences relative to traditional approaches to developmental education.

Findings on How Placement into Corequisite Remediation Affects Student Experiences

In this section, we present findings on some of the key differences in student experiences for students placed into corequisite remediation in eight areas of interest.

We present only a subset of our findings in this report for the sake of brevity, but include a full set of results across all of our student-level measures in

Table 2.1 of the technical appendix. To add context to some of these student-level findings, we draw on qualitative findings from our interviews and focus group, instructor survey, and observation data. We describe data sources in detail in the online technical appendix.

Early Opportunities to Make Progress

We examined three student-level measures of opportunity to make early progress in earning college credit from administrative and survey data: (1) enrollment in college-level reading or writing in the first semester, (2) credits attempted in the first semester, and (3) a student's perception of being on track to finish their degree within the timeline planned. We found evidence favoring corequisite students for the first two measures, while we found no differences for the third measure.

Literature often highlights early access to college-level coursework as one of the main benefits of corequisite remediation (Community College Research Center, 2014). By definition, corequisite remediation requires students to enroll in at least one college-level course immediately. In the models we studied, corequisite remediation required students to complete fewer overall credit hours of developmental education coursework, opening up room on schedules for college-level coursework in early semesters. Research indicates that this early credit momentum is related to higher rates of graduation (Jenkins and Bailey, 2017).

To determine whether students in corequisite remediation were more likely to perceive that they were making momentum toward a degree, we asked "Are you currently on track to finish your degree on the same timeline that you thought you would be when you started attending this school?" There was no difference between treatment and control students in terms of the degree to which they reported being "on track" or "moving faster than planned" (see Table 2.1 in the technical appendix).

We found that students assigned to corequisite remediation were 26 percentage points more likely to attempt a college English course in the first year relative to students placed into a standalone developmental education course (Miller et al., 2020). We also examined overall attempted credits in the first semester and found that while students assigned to corequisite remediation enrolled in the same number of credits overall (including developmental education coursework and college credit), they were able to attempt nearly two additional transferrable credits on average in the first semester by shifting from developmental education coursework into credit-bearing coursework (see Figure 1).

Although we did not find differences in perceived progress toward a degree, our interview and focus group data also suggested that some students and school leaders viewed momentum as a valuable aspect of corequisite remediation. Instructors and administrators discussed the ability to move more quickly through gateway courses and earn college credit as a major benefit of corequisite remediation, while students tended to frame it as "saving time" or "saving money" on college or not "wasting time" on unnecessary coursework.

Compression/Intensity

We examined three student-level measures of intensity of practice on reading and writing coursework drawn from administrative and survey data: (1) the total number of instructional hours associated with the course in the first semester, (2) self-reported time spent on coursework outside class, and (3) perceptions of whether the time spent in the course was adequate.

We found evidence favoring corequisites on the first measure, while we found no differences between students assigned to corequisite remediation and students assigned to standalone developmental education on the other two measures.

FIGURE 1

Opportunities to Earn Early College Credit and Gain Momentum

Credit hours attempted in the first semester
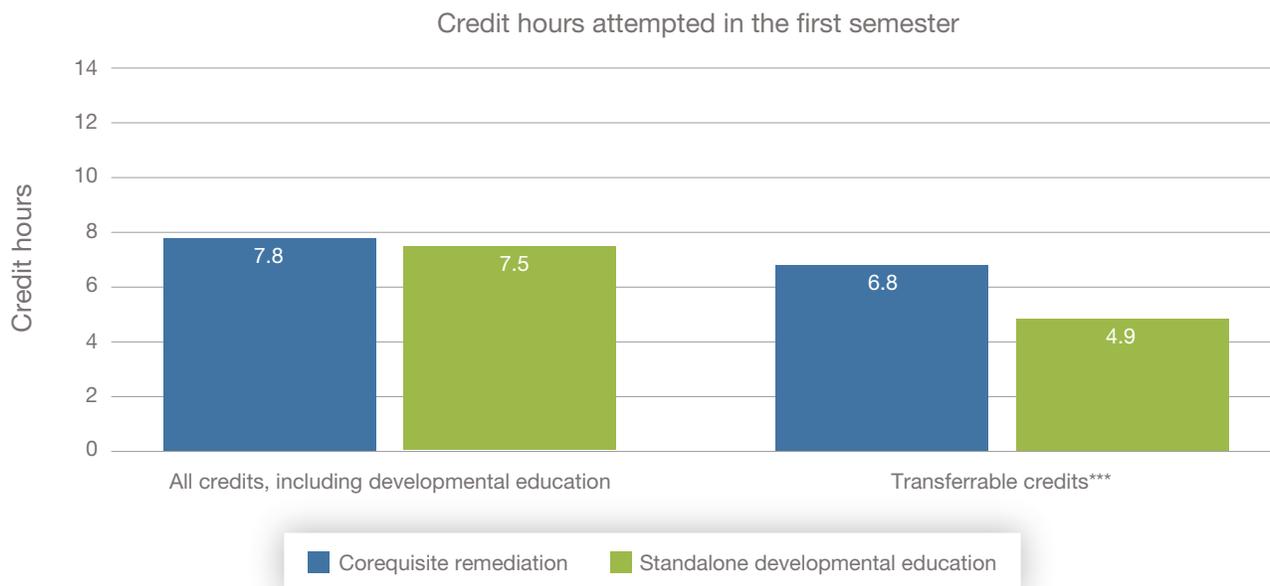
SOURCE: Data are drawn from THECB administrative files.
NOTES: Numbers represent the average total number of credits attempted in the first semester by students assigned to corequisite remediation (treatment) and standalone developmental education (control). *** represents statistically significant differences at the $p < 0.01$ level.

By design, corequisite remediation compresses developmental education reading and writing and college-level English coursework into a shorter period of time (a single semester rather than two). In doing so, corequisite remediation typically increases the intensity of practice (i.e., the number of hours spent on coursework) that a student receives with regard to reading and writing. Some argue that the opportunity to practice reading and writing more frequently within a compressed time frame can help to support learning and skill-building (e.g., Austin and Gustafson, 2006; Boylan, 2002). In our interviews and focus groups, students and instructors often discussed the additional, structured time for students to work on English coursework in the academic support as a major benefit of corequisite remediation.

Several of the corequisite models that we examined were among the least intensive of those offered across the state, with only one hour of weekly academic support required in addition to the college course. Across our five colleges, administrative data suggested that the students in our sample who were assigned to corequisite remediation averaged nearly ten additional instructional hours in reading and writing over the course of a semester—approximately 37 additional minutes per week over a 16-week semester (row 1, Table 6).

The degree to which corequisite remediation was structured to build in additional weekly instruction on reading and writing varied from college to college. At Colleges B, C, and E, the amount of weekly instruction required for the corequisite model was the same as the standalone developmental education (four hours), so there was no increase in overall intensity. However, College E compressed its corequisite model into an eight-week term, which required six weekly hours in the English course and up to two hours in the writing center, compared with four weekly instructional hours for the full-semester standalone developmental education course. Corequisite models at Colleges A and D required one additional hour of weekly instructional time relative to the standalone developmental education course.

Our findings indicated that students assigned to corequisite remediation had more classroom-based instructional time on average, but we found no dif-

TABLE 6

Total Hours of Formal Contact with a Reading and Writing Instructor in the First Semester

	Assigned to Corequisite Remediation	Assigned to Standalone Development Education
Total first semester reading/writing instructional hours (sample average)	66.8***	57.2
Corequisite model instructional hours		
College A	96	80
College B	64	64
College C	64	64
College D	64, 96 (fall 2018 only)	48
College E	64 (compressed to eight weeks)	64

NOTES: Data are drawn from THECB administrative files. Numbers in row 1 represent the average total number of instructional contact hours reported for a student in reading and writing coursework in the first semester by assignment to corequisite remediation or standalone developmental education. Students not enrolled in reading or writing courses received a 0. Students who did not enroll in college at all were excluded from the analysis, although similar differences were found for the full sample. $n = 1,436$; $p = 0.000$.

*** represents statistically significant differences between the treatment and control groups at the $p < 0.01$ level. The remaining rows represent the expected number of instructional contact hours students would receive if they attended all class sessions, as prescribed by the institution's model.

ference in our survey measure that examined self-reported time spent on coursework outside the classroom. Approximately 53 percent of students in both the treatment and control groups reported spending two hours or less on coursework outside class (see Table 2.1 in the technical appendix).

Finally, we were interested in the degree to which students perceived the amount of time in the course to be sufficient (i.e., whether they had enough time to learn the material).

There were no statistically significant differences between students assigned to corequisite remediation and standalone developmental education; approximately 28 percent of students assigned to corequisite remediation reported that the number of hours spent on the course and the academic support was "not quite enough" or "not nearly enough" time to learn the material, compared with 31 percent of students assigned to traditional developmental education (see Table 2.1 in the technical appendix). We also did not hear any concerns from students or instructors in either group about course time being insufficient for the material students needed to cover.

Rigor of Content and Instruction

We examined the following seven survey measures to assess differences in perceived rigor: (1) a student's perception that the course felt "academically overwhelming"; (2 and 3) two items on whether a student perceived the course as being "too easy"; (4) a student's perception of whether the course "repeated things from high school"; (5) a student's perception of whether the course was "boring"; and (6 and 7) two items on perceptions of the student's level of academic readiness for the course taken.

We found evidence suggesting that corequisite remediation was more rigorous on four of these measures, while we found no differences for the other three measures.

Administrators and instructors described efforts to ensure a high level of rigor for the college courses in corequisite models, equivalent to what other college-ready students enrolled in college-level English would experience. To ensure a high level of rigor, some colleges mixed corequisite students and students deemed college-ready in the same sec-

tions and reported this as a valuable way to ensure (equally) rigorous instruction for all students.

The corequisite sections of the college-level English course all used the same textbooks and had the same essay requirements as the sections of English without corequisite students, although corequisite students often had supplementary assignments and sometimes had supplementary textbooks for the academic support portion. In many cases, instructors teaching corequisite remediation were teaching or had previously taught noncorequisite sections of English, so they understood the rigor of instruction required for that course. However, students in corequisite remediation were also receiving additional instructional support with material during the academic support portion, so that may have also shaped their perceptions about the rigor of the work.

Although colleges often focused on defining the rigor of corequisite remediation relative to other sections of the college-level course, we were interested in understanding how the level of rigor in corequisite remediation compared with the level of rigor in standalone developmental education. The literature raises some concerns that developmental education coursework relies to a greater degree on "skill-and-drill" activities (e.g., completing grammar worksheets), which focus on rote practice and are less likely to encourage critical thinking. More-rigorous coursework might be more engaging for students and require more effort, and engagement and effort are believed to enhance learning (e.g., Barragan and Cormier, 2013; Edwards and Beattie, 2016). The immediate placement of corequisite students into these courses might help to increase learning to the degree that coursework and expectations in college courses were more rigorous than those in developmental education.

Our findings on rigor indicated some of the largest differences between corequisite remediation students and standalone developmental education students across all of our measures (Figure 2). Students assigned to corequisite remediation were less likely to report that their course was "too easy," "repeated things from high school," and "was boring."

Qualitatively, we found evidence of rigorous instruction in both corequisite remediation and standalone developmental education. Focus groups with instructors, observations, and course docu-

ments indicated that the college English coursework and the standalone developmental education coursework was similar in many ways; it largely consisted of essays and reading assignments. However, some reported that the standalone developmental education course had shorter or fewer writing and reading assignments. Although we heard about and observed the occasional use of grammar worksheets and other types of skill-and-drill activities in the standalone developmental education course, we also heard about corequisite instructors incorporating reading, grammar, and other basic skills education in the academic support portion of the corequisite model. During classroom observations, we found that instructors in both types of courses asked challenging questions and encouraged students to think critically about the material (i.e., questions that required students to make connections and explain thinking rather than basic single-response questions), although we observed substantial variation across instructors within and across institutions.

In focus groups, developmental education instructors occasionally expressed concerns that the rigor of the college-level course might be overwhelming for students who were not quite ready for the material. However, evidence from student survey data does not support these concerns. Students who were placed into corequisite remediation were slightly more likely to report that the course felt academically overwhelming at the beginning of the semester, but we found no difference in self-reported feelings of being academically overwhelmed by the end of the semester (Figure 3).

Student focus group data suggested that students were aware of corequisite remediation as a unique opportunity and a chance to take a higher-level course; this might have driven some of the additional anxiety that corequisite students reported at the beginning of the semester. However, the rigor of the college-level course was often described in a positive way; students argued that the more-challenging coursework helped build confidence about their ability to succeed in college courses. The extra support that corequisite students received with their more-rigorous coursework also might have helped to shape perceptions around rigor and lessened feelings of being academically overwhelmed. Overall, the data do not suggest that corequisite remediation was too rigorous for students.

FIGURE 2

Student Perceptions of the Degree to Which Courses Were Too Easy, Repetitive, and Boring
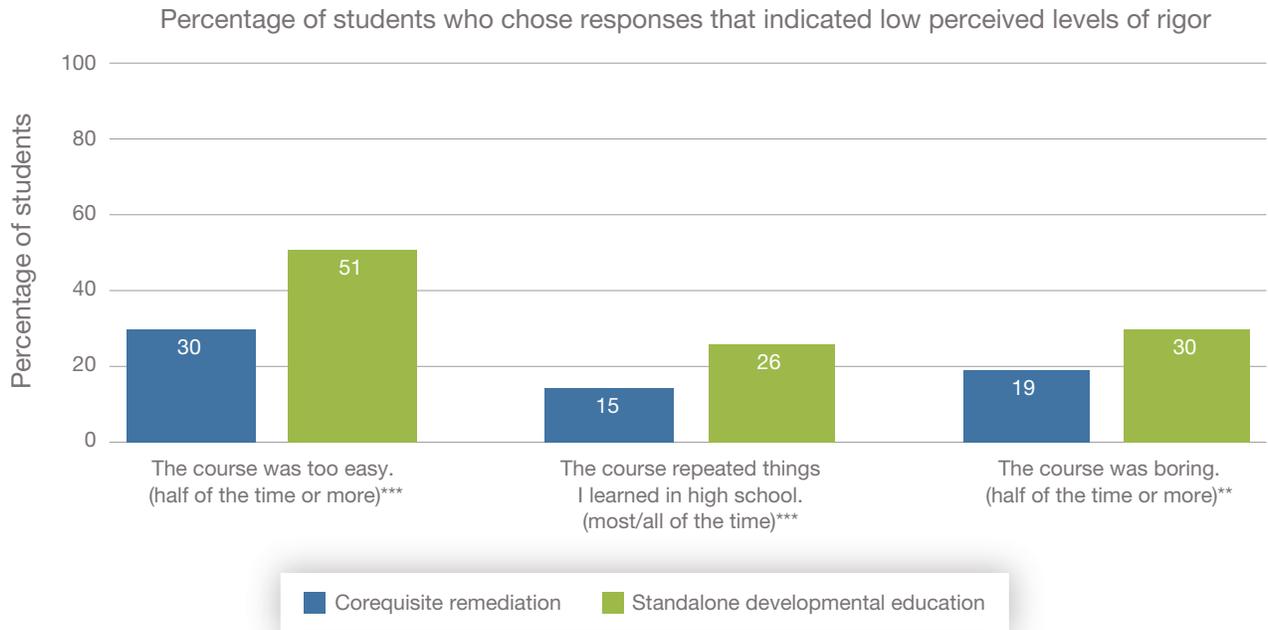
Percentage of students who chose responses that indicated low perceived levels of rigor
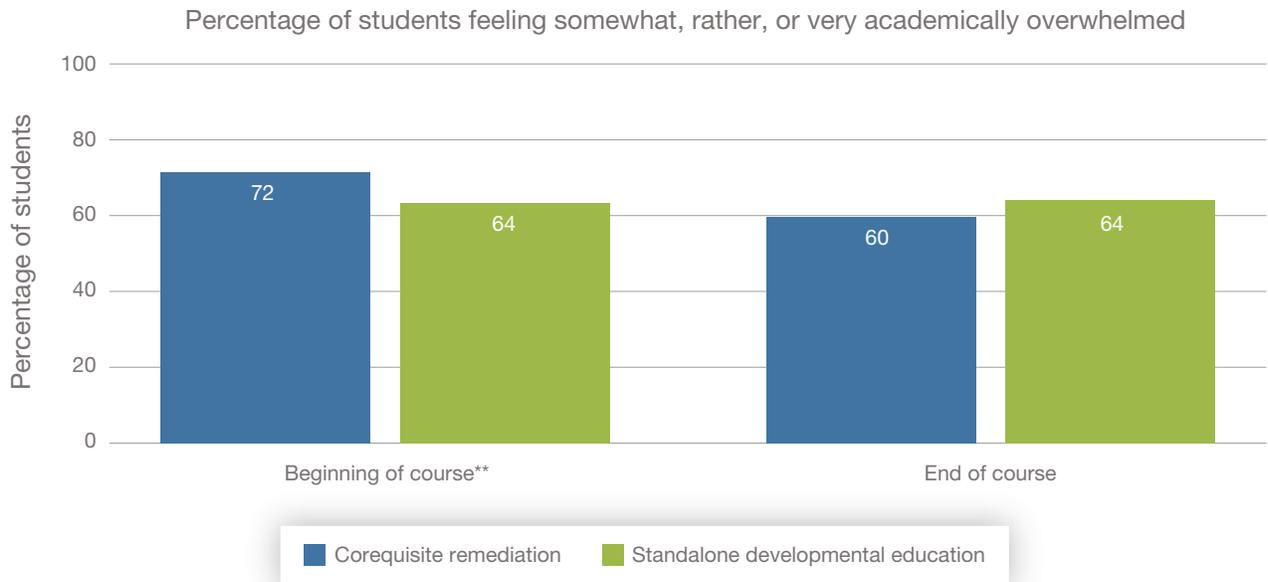

SOURCE: Data are drawn from the student follow-up survey.

NOTES: Results represent weighted average responses for students assigned to corequisite remediation (treatment) or standalone developmental education (control). ** represents statistically significant differences at the $p < 0.05$ level. *** represents statistically significant differences at the $p < 0.01$ level.

FIGURE 3

Student Perceptions of the Degree to Which They Felt Academically Overwhelmed

Percentage of students feeling somewhat, rather, or very academically overwhelmed

SOURCE: Data are drawn from the student follow-up survey.

NOTES: Results represent weighted average responses for students assigned to corequisite remediation (treatment) or standalone developmental education (control). ** represents statistically significant differences at the $p < 0.05$ level.

Alignment of Academic Remediation with College Coursework

We examined four survey measures of alignment: (1) perceptions that the academic support portion helped the student to learn material for college course; (2) perceptions that the material in the academic support portion was consistent with the college course; and (3 and 4) perceptions that the reading and writing coursework taken in the first semester helped to prepare students for future coursework. We assessed contrasts for only measures 3 and 4 because the first two items were asked only of corequisite students. Given weaknesses with the student-level measures, we considered qualitative data to a greater degree in assessing alignment.

We did not find evidence of differences between students assigned to corequisite remediation and standalone developmental education on our two survey measures. Qualitative data suggested that corequisite remediation likely had a greater degree of alignment between developmental education and college coursework.

Given that the purpose of developmental education is to prepare students for college-level coursework, strong alignment between the two is considered an important dimension of high-quality developmental education (e.g., Perin, 2002; Grubb and Cox, 2005). Administrators and instructors with whom we spoke often described strong alignment across the college course and the academic support portion of the corequisite as valuable. Four of the five models were designed with the same instructor for both the English course and the academic support portion, and instructors reported that this allowed for real-time alignment between course content and the support.

On the questions asked only of corequisite students, we found that more than 60 percent of students assigned to and enrolled in corequisite remediation reported that the material in the aca-demic support was consistent with the material in the English course most or all of the time, and more than half of students reported that the academic support helped them to learn the material in the English course most or all of the time (Figure 4).

Our other two measures examined responses to a question asking students "To what degree did your course prepare you for the reading and writing you encountered this semester?" This question is not an ideal measure of alignment for two reasons. First, the ability of a course to prepare students for future coursework might be driven by other aspects of the course (e.g., rigor, building of success skills). Second, differences in first- and second-semester coursework between the two groups of students resulted in different comparisons; corequisite students were reporting on how well the corequisite model (college course and academic support) prepared them for a more advanced English composition course, while standalone developmental education students responded to how their course prepared them for the entry-level English composition course. These different points of reference suggest that we might not be able to make direct comparisons between student responses.

When we did make comparisons, we did not find statistically significant differences between the two groups in the percentage reporting that their fall course prepared them well for follow-on courses; about half of students across both groups reported that their courses helped to prepare them "a great deal" for their reading and writing in second semester courses (see Table 2.2 in the technical appendix).

Our qualitative evidence suggested substantially higher levels of alignment between the college course and the academic support portion of the corequisite model relative to the standalone developmental course and the college course. Students in corequisite remediation typically focused on a common set of materials (i.e., readings, essays) across the academic support portion and college course. Although the learning objectives addressed by standalone developmental education and college-level English were aligned at the state level and both courses focused largely on essays and readings, students assigned to traditional developmental education across all of our study colleges had to complete two sets of coursework in two different semesters. They did not have the

opportunity to benefit from the streamlined course materials and daily real-time alignment that corequisite models offered. For example, we observed and often heard about corequisite instructors using the additional course time or office hours to explore an area where they had just noticed students struggling with coursework that same day. This ability to center the developmental reading and writing support around the college coursework, rather than providing it sequentially, was described as huge improvement over the traditional structure of developmental education.

Opportunities for Student-Centered Learning

We used administrative and survey data to examine nine measures of opportunities for student-centered learning: (1) class sizes; (2) perceived frequency of individual attention from the instructor; and (3 through 9) perceived frequency of instructor use of and student engagement in student-centered instructional activities, including individual desk work, peer feedback, asking questions in class, two measures of group work, and two measures of participation in discussions.

We found that corequisites had smaller class sizes and standalone developmental education courses were more likely to use individual desk work, but we found no differences across the other seven measures.

Student-centered instruction has long been viewed as an important approach to supporting learning in the classroom. There are at least two ways that opportunities for student-centered learning were discussed around corequisite models. First, many corequisite models aimed to provide more opportunities for personalized time with the student and instructor. For example, colleges reduced class sizes and developed models that emphasized one-on-one support in the academic support portion of the corequisite model. Use of such instructional approaches as active learn-

ing, differentiation, and contextualization are also important to supporting student-centered learning (e.g., Boroch et al., 2007; Massachusetts Community College Executive Office, 2006). These student-centered approaches can be used in both corequisite remediation and standalone developmental education classrooms to support learning.

Across our full sample, students assigned to corequisite remediation were enrolled in classes that averaged 14.6 students per section (when considering both the college course and the academic support portion), compared with an average of 18.3 students per section for those assigned to standalone developmental education (see Table 2.1 in the technical appendix). This was driven by reduced class sizes in the academic support portion of the corequisite model; three of the colleges capped these sections to ten students, while College D capped these sections to five students. These sections were therefore substantially smaller than the typical standalone developmental education courses, which enrolled 20 to 30 students. However, students assigned to corequisite remediation spent only a portion of their time in these small academic support sections, and the college-level English courses were sometimes capped at slightly higher levels than developmental education courses (e.g., 25 students, rather than 22). Therefore, the overall course size differences when we considered both portions of the corequisite model ended up averaging only four students.

Administrators and instructors commonly reported that smaller class sizes in the academic support portion were a valuable aspect of their corequisite models, providing instructors with more opportunities for one-on-one time with students. However, we found no differences in the degree to which students perceived that they had received one-on-one attention from the instructor. Approximately 69 percent of students assigned to both corequisite remediation and standalone developmental education reported one-on-one attention from the instructor half of the time or more (see Table 2.1 in the technical appendix).

The use of instructional strategies that encouraged active learning and the engagement of students in these activities can play roles in shaping student opportunities for student-centered learning. Survey findings indicated that students assigned to stand-

FIGURE 4

Student Perceptions of Whether Corequisite Academic Support Helped with the College-Level Course
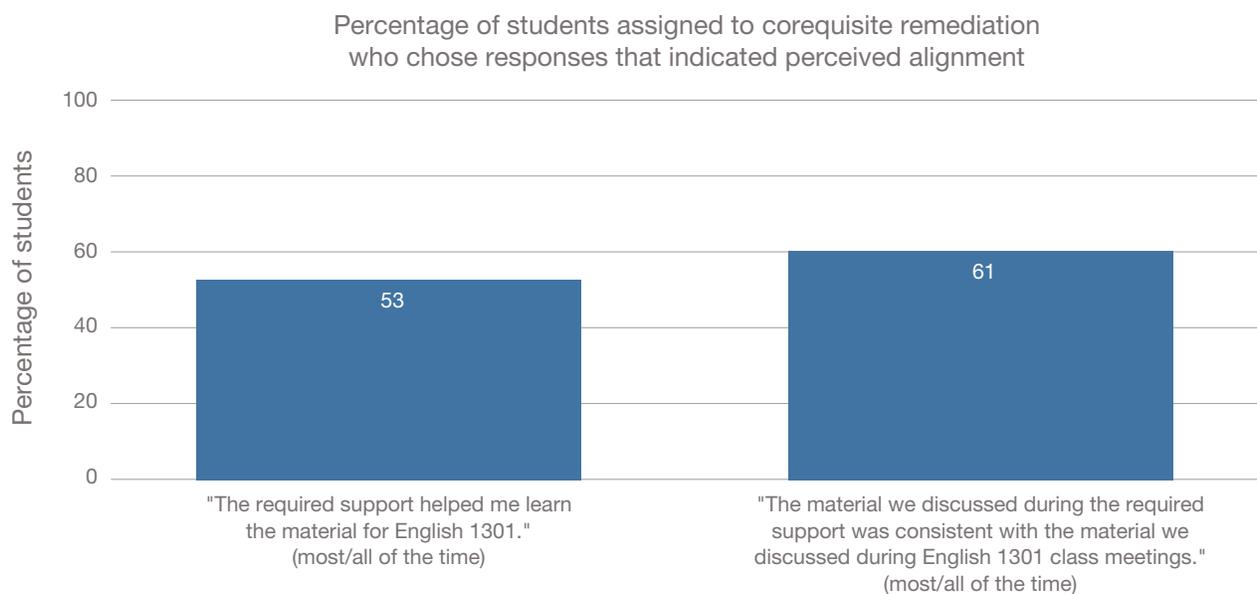
Percentage of students assigned to corequisite remediation
who chose responses that indicated perceived alignment

SOURCE: Data are drawn from the student follow-up survey.

NOTES: Results represent weighted average responses for students assigned to corequisite remediation (treatment). We were not able to ask comparable questions of control students regarding alignment across developmental education and college coursework because these courses were taken sequentially, rather than concurrently, in the first semester.

alone developmental education were more likely to report that their instructor asked them to engage in individual desk work, an individualized form of active learning (Figure 5). However, we found no statistically significant differences in the degree to which students perceived instructors as spending time on active leaning activities with peers (e.g., peer feedback, group work, class discussion).

Our qualitative findings mirrored our student survey findings. We found evidence of active learning approaches across both corequisite remediation and standalone developmental education courses, with frequent use of group work, peer editing, journal writing, and active class discussions. When we surveyed instructors, we found that those teaching standalone developmental education were more likely to report time spent individually on desk work, especially when it came to the use of personalized instructional software (Table 2.2 in the technical appendix). Several of the colleges structured part of the standalone developmental education course as a lab, and this time was typically used for personalized tutoring through computer-adaptive tutor-

ing software programs or instructor support while students worked individually on assignments. The college-level English courses did not have accompanying labs, although the academic support portion of corequisite models was often used to provide one-on-one support with coursework (with the exception of computer-adaptive software use, which was not common in any of the corequisite models). When we observed individual desk work time, we often saw instructors roving around the classroom or calling students up one by one as students worked independently. Additional lab and individual desk work time in standalone developmental education courses might have provided instructors with an opportunity to provide individualized attention to students despite the somewhat larger class sizes relative to the corequisite remediation courses.

We also used qualitative data to examine several other dimensions of student-centered instruction, including efforts to differentiate instruction to meet the needs of individual students and efforts to make connections of course material to "real life" content that feels meaningful to students (an example of

FIGURE 5

Student Perceptions of How Frequently They Participated in Instructional Activities
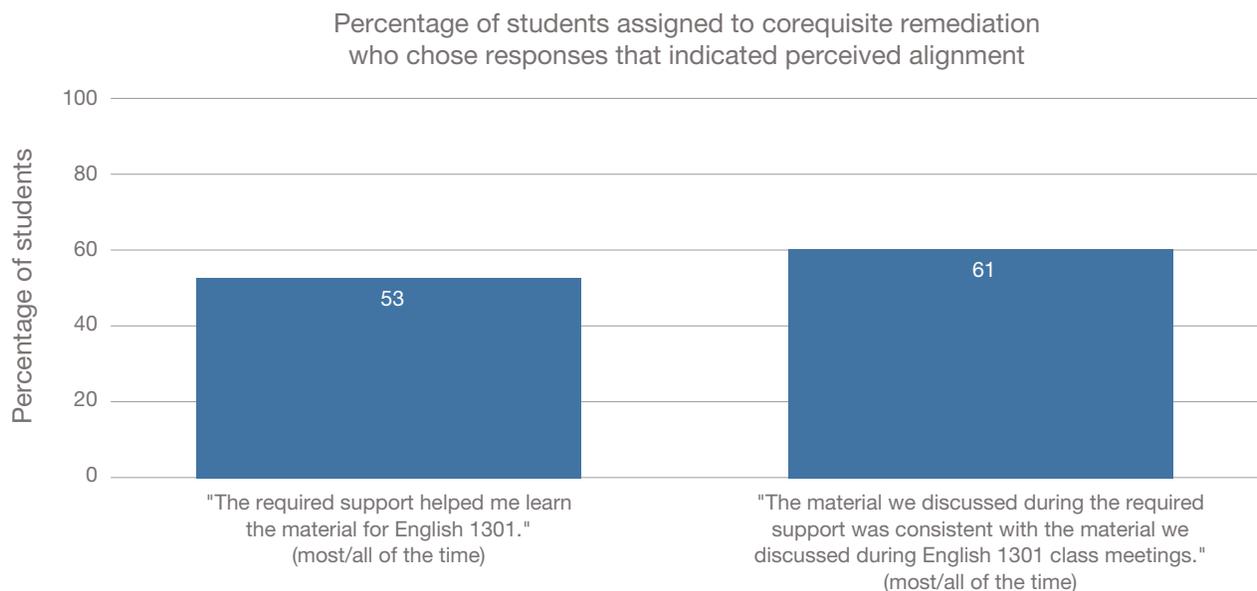
Percentage of students assigned to corequisite remediation
who chose responses that indicated perceived alignment

SOURCE: Data are drawn from the student follow-up survey.
NOTES: Results represent weighted average responses for students assigned to corequisite remediation (treatment). We were not able to ask comparable questions of control students regarding alignment across developmental education and college coursework because these courses were taken sequentially, rather than concurrently, in the first semester.

contextualized learning). In an effort to differentiate coursework, standalone developmental education instructors were more likely to report varying the pacing of assignments to meet student needs (e.g., through self-paced instructional software), while corequisite instructors were more likely to report varying the content of assignments (e.g., allowing students to choose essay topics; see Table 2.2 in the technical appendix). We commonly observed instructors across both types of courses trying to relate course material to individual student experiences during classroom instruction and focus on topics that students could connect to. For example, one classroom that we observed watched scenes from the popular movie *Get Out* and were asked to relate themes from the movie to themes in a poem that students had recently read. Students often had the opportunity to choose essay topics that were meaningful to them, and instructors selected readings that focused on current events that they believed students could relate to, with coursework touching on such topics as gun violence, immigration, and pop culture.

Opportunities for Peer Learning

To examine whether corequisite remediation led to increased opportunities for peer learning relative to standalone developmental education, we examined 13 measures: (1) the degree to which peers were "college ready" in reading and writing; (2 through 5) perceived reading ability, writing ability, study skills, and confidence relative to peers; (6 through 12) perceived frequency of instructional activities that encouraged or discouraged peer interactions (e.g., group work, classroom discussion, individual desk work); and (13) perception that student was successful because "other students helped them."

We found evidence favoring corequisite remediation on three of these measures and found no differences between students assigned to corequisite remediation and standalone developmental education on the other ten measures.

According to the literature and our conversations with administrators and instructors, there are at least three ways that college classrooms might leverage peers to support student learning. First, the mixing of students of different abilities might offer opportunities for students to learn from peer effects (Hanushek et al., 2003; Hoxby, 2000; Sund, 2009). Four of the five colleges (excluding College C) designed their corequisite models to mix college-ready students with students assigned to corequisites in the college-level course. Second, instructors can employ instructional strategies that encourage peer interactions (e.g., group work, peer editing) to enhance the opportunities that students might learn from each other (Boylan, 2002; Schwartz and Jenkins, 2007; Sperling, 2009). These strategies could be used in both corequisite remediation and standalone developmental education. Finally, corequisite models, such as the ALP, structure the corequisite as learning communities in which cohorts of students and an instructor share multiple class periods (i.e., the college course and academic support), allowing them to develop a stronger sense of community and enhance learning. Although these learning communities have been shown to improve student outcomes in some cases, the evidence of their effectiveness has been mixed (e.g., Boroch et al., 2007; Mayer et al., 2013; Visher et al., 2012; Weiss, Mayer, et al., 2015). The colleges with ALP-based models incorporated learning communities.

By design, students assigned to corequisite remediation were enrolled in the English course with students with higher placement exam scores in writing and reading across four of the five colleges (college-ready students); this mixing of students by ability aimed to capitalize on peer effects. When we asked students about their perceptions of their abilities relative to peers, we found that students assigned to standalone developmental education were more likely to report above-average study skills relative to their classmates, but we did not find differences on other traits (Figure 6).

The instructional approaches that we examined to derive information on student-centered learning also provide critical evidence on opportunities for peer learning. Students in corequisite remediation and standalone developmental education reported similar opportunities to engage in group activities, classroom discussions, and other peer-involved activities. However, students assigned to standalone developmental education were more likely to report engaging in individual desk work, suggesting that students in standalone developmental education might have had fewer opportunities to learn from their peers.

We also asked students directly whether they felt that their peers had played a role in their course success. Although other measures of opportunities for peer learning favored students assigned to corequisite remediation, there were no differences in student perceptions that peer learning was key to their success in the course. Instructors and students in both groups reported opportunities to learn from peers as being valuable, but peer learning was not often emphasized as a critical factor driving the success of corequisite remediation. In particular, few students or instructors emphasized the mixing of students by ability as playing a role in enhancing peer learning. Some instructors did not perceive assessment scores as being great indicators of student ability and argued that many of their students assigned to corequisite remediation were equally or more prepared than those who had tested college ready.

When students and instructors did emphasize peer learning, they focused more often on the learning community aspects. Students and instructors in ALP models described the extra time together as a small group during the academic support portion of the corequisite model as helping to build a greater level of comfort and support among the students enrolled in corequisite remediation. For example, one group of students at College A described their cohort of corequisite students as "the tribe." Students were less likely to describe interaction with and support from their college-ready peers who did not attend the academic support portion of the corequisite.

Support for Success Skills

To examine how the support provided around success skills in corequisite remediation compared to standalone developmental education, we examined eight student-level measures: (1) perception that the instructor believed in the student's potential to succeed; (2) perception that the instructor helped the student to improve learning strategies (e.g., study skills, time management, notetaking, class participation); (3 through 5) use of office hours, the writing center, and tutoring during the semester of random assignment; and (6 through 8) plans to use office hours, writing center, and tutoring.

We found evidence favoring standalone developmental education for two of our eight measures, while we found no differences between students assigned to corequisite remediation and standalone developmental education for the other six measures.

The literature and our interviews with administrators and instructors suggested that developmental education was about more than academic preparation, emphasizing that these courses play an important role in developing other success skills. These success skills can include both study skills (e.g., note-taking) and social and emotional competencies—sometimes referred to by colleges as *noncognitive skills*—such as self-regulation and self-efficacy. Colleges have also made efforts to encourage students to regularly make use of tutoring and office hours as another essential success skill. Study skills and social and emotional competencies have been shown as related to academic success in the literature (e.g., Cornick et al., 2015; Landis, Altman, and Cavin, 2007; Proctor et al., 2006).

Student survey data suggest that students were receiving support around success skills at high levels across both types of courses (Figure 7). We did not have survey items that explicitly asked about instructor efforts to build social and emotional competencies, but we identified our survey item about the instructor's belief in student potential to succeed as being the closest indicator for this type of support. Students assigned to corequisite remediation were slightly less likely to report that their instructor believed in their potential to succeed relative to students assigned to standalone developmental education. We found no difference in the degree to which students perceived support for study skills. Perceived support was high across both course types and measures.

Given that the structure of corequisite models at two of the five colleges included the use of such academic support services as tutoring and office hours, we were also interested in the degree to which corequisite remediation might have helped to build habits of support service use as another type of success skill. We asked students whether they had used these academic support services during the semester of random assignment, and we also asked about their plans to use the services going forward (Figure 8). We did not find any statistically significant differences in the reported use of services during the semester of random assignment. However, when we asked about future plans to use academic support services, we found that corequisite remediation students were less likely to report plans to use tutoring in the future.

In focus groups, some instructors overseeing standalone developmental education courses reported concerns that the reduced time for the academic support under some models of corequisite remediation might crowd out that time that instructors had to build student success skills. In addition, they raised concerns that corequisite instructors who traditionally had focused on teaching college-level courses might be less attentive to the need to develop these success skills. Instructor survey data indicated that standalone developmental education instructors were more likely to report that building study skills and noncognitive skills were important goals of the course relative to corequisite instructors (see Table 2.2 in the technical appendix). Coupled with the evidence from the student survey that those assigned to corequisite remediation were less likely to plan to use tutoring in the future, standalone developmental education courses might have, in fact, placed a greater emphasis on encouraging tutoring use as a success skill.
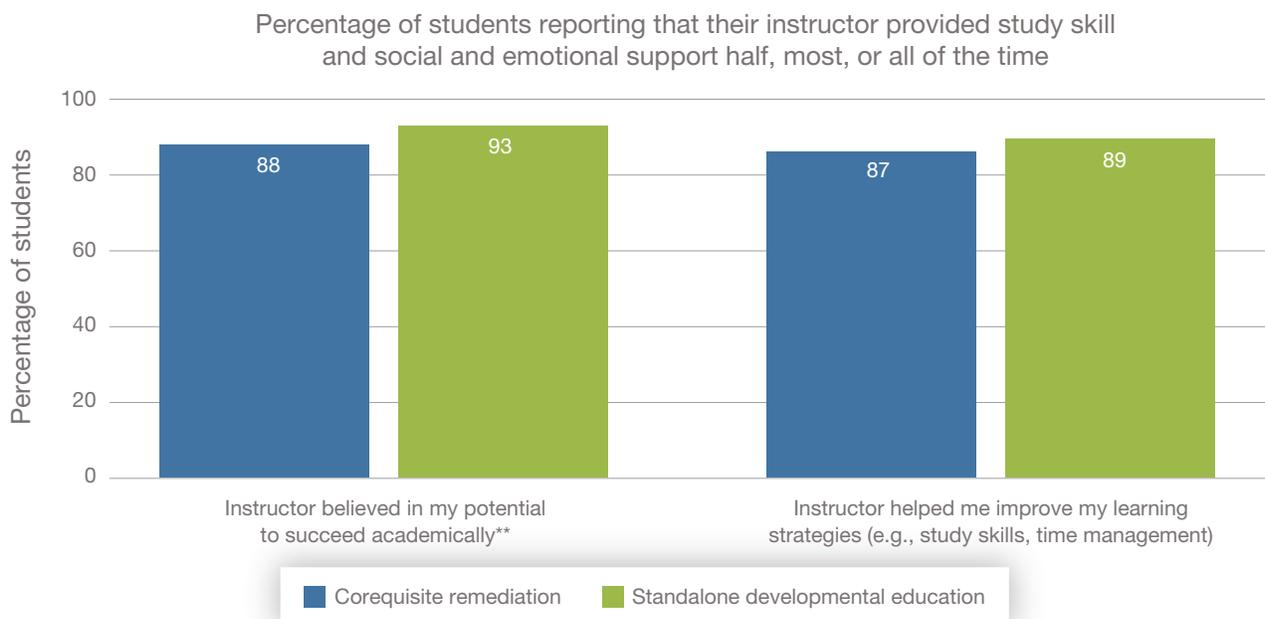
FIGURE 6

Student Perceptions of Their Traits Relative to their Peers
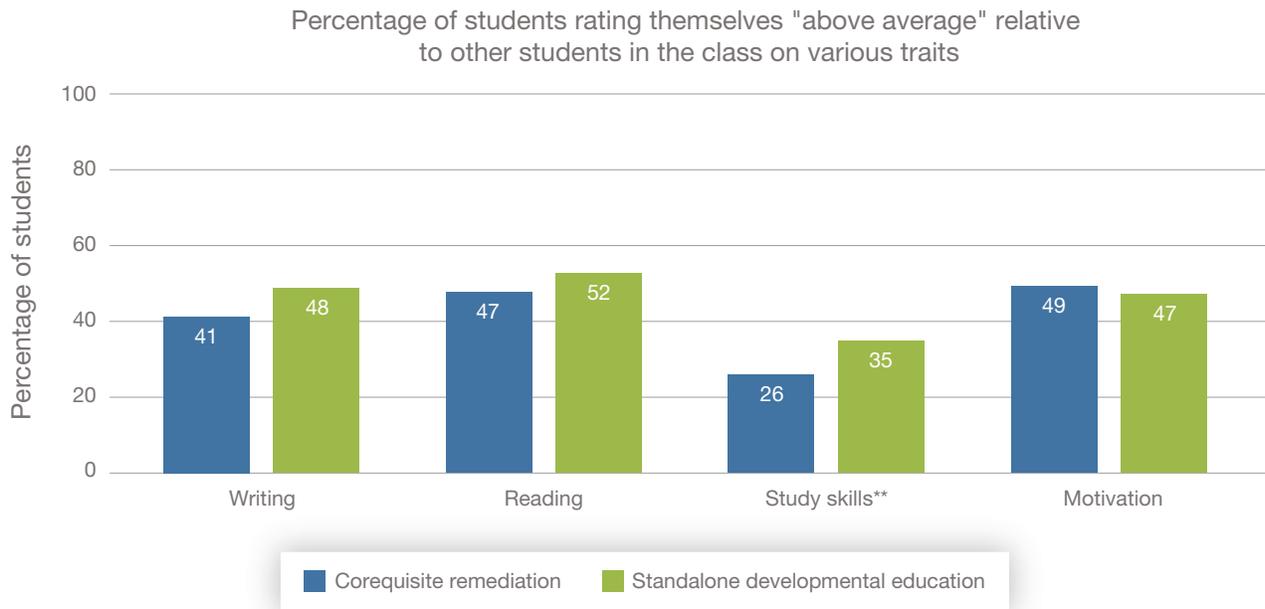
**Percentage of students rating themselves "above average" relative
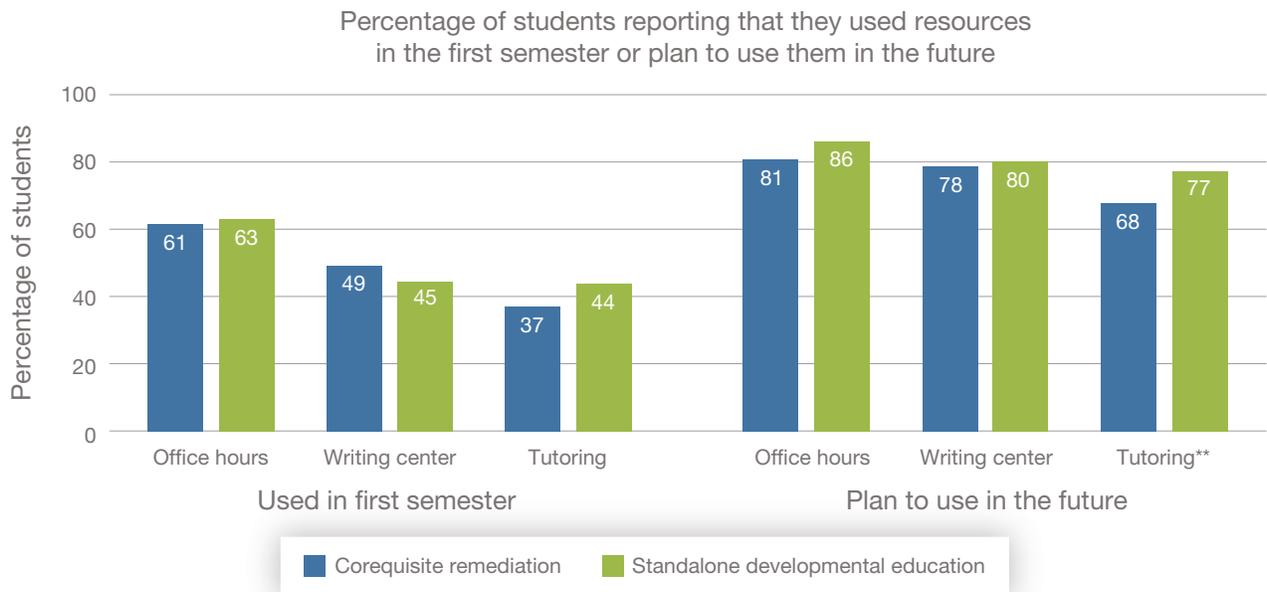to other students in the class on various traits**

SOURCE: Data are drawn from the student follow-up survey.

NOTES: Results represent weighted average responses for students assigned to corequisite remediation (treatment) or standalone developmental education (control). ** represents statistically significant differences between the treatment and control groups at the $p < 0.05$ level.

FIGURE 7

Student Perceptions of Support in Building Success Skills

**Percentage of students reporting that their instructor provided study skill
and social and emotional support half, most, or all of the time**

SOURCE: Data are drawn from the student follow-up survey.

NOTES: Results represent weighted average responses for students assigned to corequisite remediation (treatment) or standalone developmental education (control). ** represents statistically significant differences between the treatment and control groups at the $p < 0.05$ level.

FIGURE 8

Self-Reported Student Use of and Plans to Use Academic Support Outside the Classroom

**Percentage of students reporting that they used resources
in the first semester or plan to use them in the future**

SOURCE: Data are drawn from the student follow-up survey.

NOTES: Results represent weighted average responses for students assigned to corequisite remediation (treatment) or standalone developmental education (control). ** represents statistically significant differences at the $p < 0.05$ level.

Exposure to Stigma

We used three measures from the student survey to assess potential exposure to stigma: (1) whether students felt that developmental education slowed student progress; (2) whether students knew they had been enrolled in a developmental education course; and (3) whether students felt embarrassed by the course in which they were enrolled.

We found no differences between student groups on the first measure and found evidence favoring corequisite remediation on the other two measures.

The literature raises concerns that developmental education carries a stigma and may cause students to feel negatively about their prospects for success in

college (e.g., Basic Skills Agency, 1997; Boroch et al., 2007; Majer, 2009). Some administrators and instructors that we interviewed at our five colleges reported that instructors, advisers, and other school staff had made explicit efforts to eliminate negative messaging around developmental education; they believed that stigma was largely a thing of the past. However, given the strong emphasis on stigma in the literature and concerns among some of our interviewees that stigma persisted, it was important to determine how the shift to corequisites might have affected the degree to which students experienced stigma.

Students assigned to corequisite remediation were no more or less likely than students assigned to traditional developmental education to report that developmental education was an impediment to progress (Figure 9). However, students assigned to corequisite remediation were less likely to report that they had been enrolled in a developmental education course or report feeling embarrassed by the course in which they had been enrolled. This evidence

FIGURE 9
Student Participation in and Perceptions of Developmental Education
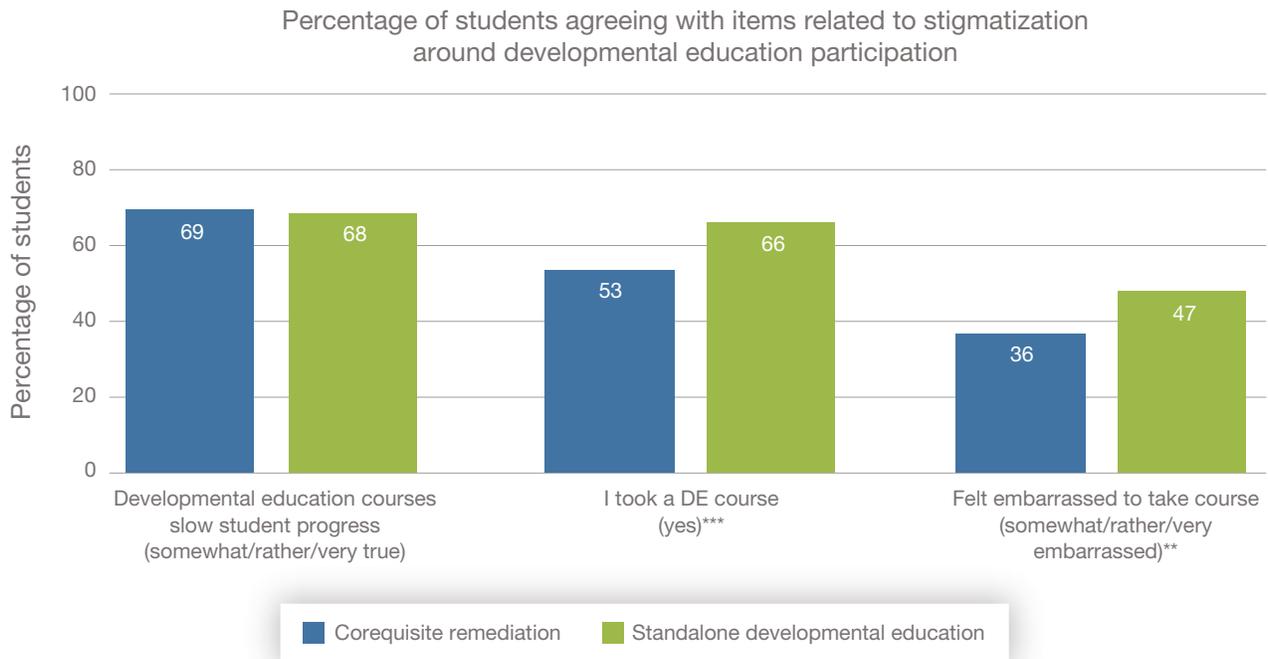
Percentage of students agreeing with items related to stigmatization
around developmental education participation

SOURCE: Data are drawn from the student follow-up survey.

NOTES: Results represent weighted average responses for students assigned to corequisite remediation (treatment) or standalone developmental education (control). ** represents statistically significant differences at the $p < 0.05$ level. *** represents statistically significant differences at the $p < 0.01$ level.

suggests that despite efforts of the institutions to eliminate stigma around developmental education, some stigma remained, and enrollment in corequisite remediation helped to reduce exposure to this stigma.

Corequisite remediation might have affected the exposure of students to stigma in several ways. Advisers and instructors might have provided different messaging to students about the value of corequisite remediation relative to standalone developmental education. Furthermore, students enrolled in corequisite remediation might have been less likely to realize that they were in developmental education. This might have been particularly true for corequisite models that did not structure the academic support portion as group instruction in the classroom or integrate the academic support portion seamlessly into the college-level course. On the other hand, several instructors raised concerns that corequisite students might be stigmatized when they were mixed with college-ready students and realized that the require-

ments to engage in additional instructional support were not universal across students in the section. These instructors reported explicit efforts to eliminate any potential for stigma, such as making sure to release all students for a ten-minute break between the college course and the academic support portion to reduce the visibility of those students who were required to stay for the second portion of the corequisite model.

Discussion and Conclusions

Corequisite remediation is being widely adopted as the primary approach to serving students who enter college with test scores that indicate that they could benefit from additional academic support. Although studies indicate that corequisite remediation can improve early course outcomes relative to standalone developmental education courses (Cho et al., 2012; Logue, Douglas, and Watanabe-Rose, 2019;

Miller et al., 2020; Ran and Lin, 2019), relatively little is known about students' experiences in corequisite remediation. We examined experiences for students randomized to corequisite remediation and stand-alone developmental education at five community colleges in Texas. This experimental data allowed us to ensure that we compared otherwise similar groups of students. We drew from a rich set of data sources, allowing us to draw on quantitative and qualitative findings to identify and describe contrasts in student experiences.

We found that students in corequisite remediation did benefit from early opportunities to complete college coursework and gain momentum. We also found that assignment to corequisite remediation benefited students in other ways. Students assigned to corequisite remediation received slightly more weekly hours of instruction on average, and this additional, concentrated instructional time spent on reading and writing each week in their first semester of enrollment might have helped support student learning. Corequisite students were less likely to perceive standalone developmental education as too easy, boring, or repetitive, suggesting that the coursework that they encountered might have been more rigorous and engaging. Our qualitative data also suggested that corequisite remediation offered a greater degree of overlap in coursework and opportunities for daily, real-time instructional alignment and scaffolding around the college coursework. Students assigned to corequisite remediation were also less likely to feel embarrassed to be enrolled in their course, suggesting that they might have experienced less stigma related to participation in developmental education.

We found evidence that corequisite models increased opportunities for peer learning; colleges made efforts to mix students by ability and ensure that students enrolled as learning communities in four of the five corequisite models. However, our qualitative data and student survey responses did not suggest major differences in the degree to which students and instructors perceived corequisites as enhancing peer learning. College staff might want to explore whether these efforts to create peer groups are critical to building a successful corequisite model. Alternatively, the peer effects offered by mixed-ability grouping might have been difficult to capture

through a student survey if students were unable to perceive the learning that they were receiving from their peers.

In several other areas, findings were mixed or less favorable for corequisite remediation. Colleges designed corequisite models with reduced class sizes to facilitate more opportunities for personalized attention, but corequisite students were no more likely to perceive that they had received frequent individual attention. Corequisite remediation and standalone developmental education courses were equally likely to build in student-centered learning activities that were peer-based, but standalone developmental education courses offered more time for individual desk work, and this individual desk work may have provided opportunities for student-centered learning and one-on-one instructional support. Although students in both corequisite remediation and standalone developmental education received high levels of support around success-building skills, it appears that students assigned to standalone developmental education were more likely to perceive their instructors as believing in their potential to succeed and were more likely to plan to use academic support services in the future.

There are several takeaways from these findings. First, we often examine contrasts between treatment and control students to understand how an intervention worked. Students assigned to corequisite remediation in our study had higher rates of passing gateway English and the follow-on English course relative to students assigned to standalone developmental education and they earned more credits overall, although we have not found differences in persistence rates (Miller et al., 2020). The areas in which we observed contrasts in student experiences are the likely mechanisms through which corequisite remediation achieved this success. Going forward, it might be more important for colleges to focus on the areas where we observed contrasts—such as facilitating early opportunities for credit, ensuring rigor, and closely aligning the course and the academic support—than on reducing class sizes and designing complex corequisite models that mix students by ability. It is also worth noting that we might not have fully captured all of the contrasts in student experiences between these models; our measures covered a limited

number of areas and had limitations that might have hindered their ability to detect differences.

On the other hand, theory from the literature suggests that student-centered learning and efforts to build success skills are essential to student success in early coursework, and these are areas where we saw less of a contrast and even some favorable evidence for standalone developmental education. The lack of contrast does not necessarily mean that these aspects of corequisite models were unimportant. Corequisite models might not have been as effective if class sizes were larger, and students in corequisite remediation might have struggled if they had not received equivalent levels of support around study skills to what they had received in developmental education. In addition, it might be useful for practitioners to consider whether and how their corequisite models foster student-centered learning and support success skills and to consider strategies in these areas as a potential topic for instructor professional development.

If it is true that each of the eight areas that we examined are important to the success of students in corequisite remediation, regardless of whether we detected significant contrasts, our evidence-based framework for evaluating student contrasts might also be thought of as a type of checklist for institutions to consider as they develop and refine corequisite models. Discussions around how to design effective corequisite models often focus exclusively on design features (i.e., mixing of students by ability, use of same instructor for both classes), while faculty professional development often focuses exclusively on instructional strategies (i.e., effective scaffolding practices). This type of framework offers a way to consider how both the design and delivery of corequisite models can be used to leverage some of the factors that support student learning. In addition, by shifting focus from the specific approaches used in a corequisite model (e.g., using the same instructor, shared planning sessions for different instructors) to what the institution aims to achieve with their corequisite model (e.g., alignment), practitioners can build a broader range of effective corequisite models. Furthermore, this evidence may provide valuable insight into how best to support students throughout college, outside corequisite models.

Although this report provides some initial evidence from a rigorous experimental study about how corequisite remediation changed student experiences, more research is needed to fully unpack how corequisite remediation is affecting student experiences. We aggregated results across several different models, but because we had small sample sizes, we were not able to unpack how different corequisite models led to different types of experiences. In light of the limitations of our measures discussed earlier, it would be useful to assess contrasts with validated, multi-item measures of constructs, such as student-centered learning and alignment. Finally, additional research is needed to understand more about the corequisite practices and underlying mechanisms that are most important to ensuring that students see improved academic outcomes. Future research should connect data on student characteristics, instructional practices and other aspects of educational environments, student experiences, and academic outcomes to explore how these different factors are related to each other.

Notes

[1] We rely on these statewide survey findings only as background for this report (i.e., they are not used to determine the findings on contrasts in student experiences). Additional detail is provided on these interviews in the technical appendix and in Daugherty et al., 2018.

[2] Colleges were required to enroll 25 percent of their developmental education students in corequisites by fall 2018 and 50 percent by fall 2019. Some students were not included in these threshold counts, such as students who tested at reading and writing levels equivalent to grade level expectations for a ninth-grade student.

References

Accelerated Learning Program, "Features of ALP Responsible for Its Success," webpage, undated. As of October 4, 2020: http://alp-deved.org/features-of-alp-success

ALP—*See* Accelerated Learning Program.

Anastasi, Jeffrey S., "Methods and Techniques: Full-Semester and Abbreviated Summer Courses: An Evaluation of Student Performance," *Teaching of Psychology*, Vol. 34, No. 1, 2007, pp. 19–22.

Anderson, Timothy I., and Randy J. Anderson, "Time Compressed Delivery for Quantitative College Courses: The Key to Student Success," *Academy of Educational Leadership Journal*, Vol. 16, 2012, pp. 55–62.

Andrade, Maureen S., "Learning Communities: Examining Positive Outcomes," *Journal of College Student Retention: Research, Theory and Practice*, Vol. 9, No. 1, May 1, 2007–2008, pp. 1–20.

Austin, Adrian M., and Leland Gustafson, "Impact of Course Length on Student Learning," *Journal of Economics and Finance Education*, Vol. 5, No. 1, Summer 2006, pp. 26–37.

Bailey, Thomas R., and Mariana Alfonso, *Paths to Persistence: An Analysis of Research on Program Effectiveness at Community College*s, Indianapolis, Ind.: Lumina Foundation for Education, New Agenda Series, Vol. 6, No. 1, 2005. As of October 4, 2020: https://files.eric.ed.gov/fulltext/ED484239.pdf

Bailey, Thomas R., Dong Wook Jeong, and Sung-Woo Cho, "Referral, Enrollment, and Completion in Developmental Education Sequences in Community Colleges," *Economics of Education Review*, Vol. 29, No. 2, April 2010, pp. 255–270.

Barnes, Randall A., and William E. Piland, "Impact of Learning Communities in Developmental English on Community College Student Retention and Persistence," *Journal of College Student Retention: Research, Theory and Practice*, Vol. 12, No. 1, 2010–2011, pp. 7–24.

Barragan, Melissa, and Maria Scott Cormier, "Enhancing Rigor in Developmental Education," *Inside Out*, Vol. 1, No. 4, July 2013. As of January 5, 2020: https://academiccommons.columbia.edu/doi/10.7916/D8XK8CJ1

Basic Skills Agency, *Staying the Course: The Relationship Between Basic Skills Support, Drop Out, Retention and Achievement in Further Education Colleges*, London, 1997.

Belfield, Clive R., Davis Jenkins, and John Fink, *Early Momentum Metrics: Leading Indicators for Community College Improvement*, New York: Community College Research Center, July 2019. As of October 4, 2020: https://ccrc.tc.columbia.edu/media/k2/attachments/early-momentum-metrics-leading-indicators.pdf

Belfield, Clive, Davis Jenkins, and Hana Lahr, "Momentum: The Academic and Economic Value of a 15-Credit First-Semester Course Load for College Students in Tennessee," Community College Research Center Working Paper No. 88, June 2016. As of October 4, 2020: https://ccrc.tc.columbia.edu/media/k2/attachments/momentum-15-credit-course-load.pdf

Bickerstaff, Susan E., Melissa Barragan, and Zawadi Rucks-Ahidiana, "'I Came in Unsure of Everything': Community College Students' Shifts in Confidence," Community College Research Center Working Paper No. 48, 2012. As of October 4, 2020: https://doi.org/10.7916/D87P96M2

Bloom, Dan, and Colleen Sommo, *Building Learning Communities Early Results from the Opening Doors Demonstration at Kingsborough Community College*, New York: MDRC, June 2005. As of October 4, 2020: https://www.mdrc.org/sites/default/files/full_36.pdf

Booth, Eric A., Mary Margaret Capraro, Robert M. Capraro, Nandita Chaudhuri, James Dyer, and Miner P. Marchbanks, III, "Innovative Developmental Education Programs: A Texas Model," *Journal of Developmental Education*, Vol. 38, No. 1, Fall 2014, pp. 2–18.

Boroch, Deborah, Jim Fillpot, Laura Hope, Robert Johnstone, Pamela Mery, Andreea Serban, Bruce Smith, and Robert S. Gabriner, *Basic Skills as a Foundation for Student Success in California Community Colleges*, Sacramento, Calif.: Center for Student Success, Research and Planning Group for California Community Colleges, and USA Funds, 2007.

Boylan, Hunter R., *What Works: Research-Based Best Practices in Developmental Education*, Boone, N.C.: National Center for Developmental Education, 2002.

Bracco, Kathy Reeves, Kim Austin, Daniel Bugler, and Neal Finkelstein, *Reforming Developmental Education to Better Support Students' Postsecondary Success in the Common Core Era*, San Francisco, Calif.: WestEd, June 2015.

Charles A. Dana Center, Complete College America. Inc., Education Commission of the States, and Jobs for the Future, "Core Principles for Transforming Remedial Education: A Joint Statement," December 2012. As of October 4, 2020: https://www.ecs.org/docs/STATEMENTCorePrinciples.pdf

Chen, Xianglei, and Sean Simone, *Remedial Coursetaking at U.S. Public 2- And 4- Year Institutions: Scope, Experience, and Outcomes*, Washington, D.C.: National Center for Education Statistics, NCES 2016-405, 2016.

Cho, Sung-Woo, and Melinda Mechur Karp, "Student Success Courses in the Community College: Early Enrollment and Educational Outcomes," *Community College Review*, Vol. 41, No. 1, 2013, pp. 86–103.

Cho, Sung-Woo, Elizabeth Kopko, Davis Jenkins, and Shanna Smith Jaggars, "New Evidence of Success for Community College Remedial English Students: Tracking the Outcomes of Students in the Accelerated Learning Program (ALP)," Community College Research Center Working Paper No. 53, December 2012.

Clovis, Meghan Ann, and Mido Chang, "Effects of Academic Momentum on Degree Attainment for Students Beginning College at 2-Year Institutions," *Journal of College Student Retention: Research, Theory and Practice*, January 29, 2019.

Cornick, Jonathan, G. Michael Guy, and Ian Beckford, "Integrating Study Skills and Problem Solving into Remedial Mathematics," *Teaching Mathematics and Its Applications*, Vol. 34, No. 2, June 2015, pp. 83–90.

Daniel, Eileen L., "A Review of Time-Shortened Courses Across Disciplines," *College Student Journal*, Vol. 34, No. 2, June 2000, pp. 298–308.

Daugherty, Lindsay, Celia J. Gomez, Diana Gehlhaus, Alexandra Mendoza-Graf, and Trey Miller, *Designing and Implementing Corequisite Models of Developmental Education: Findings from Texas Community Colleges*, Santa Monica, Calif.: RAND Corporation, RR-2337-IES, 2018. As of January 5, 2021: https://www.rand.org/pubs/research_reports/RR2337.html

Driscoll, Anne K., *Beyond Access: How the First Semester Matters for Community College Students' Aspirations and Persistence*, Stanford, Calif.: Policy Analysis for California Education, Policy Brief 07-2, August 2007.

Edwards, Ann R., and Rachel L. Beattie, "Promoting Student Learning and Productive Persistence in Developmental Mathematics: Research Frameworks Informing the Carnegie Pathways," *NADE Digest*, Vol. 9, No. 1, Winter 2016, pp. 30–39.

Goldrick-Rab, Sara, "Promoting Academic Momentum at Community Colleges: Challenges and Opportunities," Community College Research Center Working Paper No. 5, February 2007.

Grubb, W. N., and Rebecca D. Cox, "Pedagogical Alignment and Curricular Consistency: The Challenges for Developmental Education," *New Directions for Community Colleges*, No. 129, Spring 2005, pp. 93–103.

Hall, J. Michael, and Michael K. Ponton, "Mathematics Self-Efficacy of College Freshman," *Journal of Developmental Education*, Vol. 28, No. 3, 2005, pp. 26, 30, 32.

Hanushek, Eric A., John F. Kain, Jacob M. Markman, and Steven G. Rivkin, "Does Peer Ability Affect Student Achievement?" *Journal of Applied Econometrics*, Vol. 18, No. 5, 2003, pp. 527–544.

Hoxby, Caroline, "Peer Effects in the Classroom: Learning from Gender and Race Variation," National Bureau of Economic Research, Working Paper No. 7867, August 2000.

Jaggars, Shanna Smith, Nikki Edgecombe, and Georgia West Stacey, *What We Know About Accelerated Developmental Education*, New York: Columbia University, Teachers College, Community College Research Center, 2014.

Jenkins, Davis, "Redesigning Community Colleges for Completion: Lessons from Research on High-Performance Organizations, Assessment of Evidence Series, Community College Research Center, Columbia University," Community College Research Center Working Paper No. 24, January 2011.

Jenkins, Davis, and Thomas Bailey, "Early Momentum Metrics: Why They Matter for College Improvement," Community College Research Center Research Brief No. 65, February 2017.

Koch, Bevan, John R. Slate, and George Moore, "Perceptions of Students in Developmental Classes," *Community College Enterprise*, Vol. 18, No. 2, Fall 2012, pp. 62–82.

Landis, Blaine D., Joanne D. Altman, and Jennifer D. Cavin, "Underpinnings of Academic Success: Effective Study Skills Use as a Function of Academic Locus of Control and Self-Efficacy," *Psi Chi Journal of Undergraduate Research*, Vol. 12, No. 3, Fall 2007, pp. 126–130.

Logue, A. W., Daniel Douglas, and Mari Watanabe-Rose, "Corequisite Mathematics Remediation: Results over Time and in Different Contexts," *Educational Evaluation and Policy Analysis*, Vol. 41, No. 3, September 2019, pp. 294–315.

MacDonald, R. B., "Evaluation of an Alternative Solution for the Assessment and Retention of High-Risk College Students," presented at the Annual Meeting of the American Educational Research Association, Washington, D.C., ERIC Document Reproduction Service No. ED 316 302, 1987.

Majer, John M., "Self-Efficacy and Academic Success Among Ethnically Diverse First-Generation Community College Students," *Journal of Diversity in Higher Education*, Vol. 2, No. 4, 2009, pp. 243–250.

Massachusetts Community College Executive Office, *100% Math Initiative: Building a Foundation for Student Success in Developmental Mathematics*, Boston, Mass., 2006.

Mayer, Alexander K., Michael J. Weiss, Mary G. Visher, Colleen Sommo, Timothy Rudd, Dan Cullinan, Evan Weissman, and Heather D. Wathington, *Mixed Results from Six Large Randomized Controlled Trials of Learning Communities in Community Colleges*, Evanston, Ill.: Society for Research on Educational Effectiveness, 2013.

McCabe, Robert H. and Philip R. Day, Jr., eds., *Developmental Education: A Twenty-First Century Social and Economic Imperative*, Mission Viejo, Calif.: League for Innovation in the Community College, 1998. As of October 4, 2020: https://files.eric.ed.gov/fulltext/ED421176.pdf

Melguizo, Tatiana, Linda Serra Hagedorn, and Scott Cypers, "Remedial/Developmental Education And The Cost of Community College Transfer: A Los Angeles County Sample," *Review of Higher Education*, Vol. 31, No. 4, Summer 2008, pp. 401–431.

Miller, Trey, Lindsay Daugherty, Paco Martorell, Russell Gerber, Christina LiCalsi, Courtney Tanenbaum, and Rebecca Medway, *Assessing the Effect of Corequisite English Instruction Using a Randomized Controlled Trial*, Washington, D.C.: American Institutes for Research, April 2020.

Minkler, James E., "ERIC Review: Learning Communities at the Community College," *Community College Review*, Vol. 30, No. 3, 2002, pp. 46–63.

Nakajima, Mikiko A., Myron H. Dembo, and Ron Mossler, "Student Persistence in Community Colleges," *Community College Journal of Research and Practice*, Vol. 36, No. 8, 2012, pp. 591–613.

Pedelty, M. H., "Stigma," in Jeanne L. Higbee, Dana Britt Lundell, and Irene M. Duranzyk, eds., *2001: A Developmental Odyssey*, Warrensburg, Mo.: National Association for Developmental Education, 2001, pp. 53–70.

Perin, Dolores, "The Location of Developmental Education in Community Colleges: A Discussion of the Merits of Mainstreaming vs. Centralization," *Community College Review*, Vol. 30, No. 1, 2002, pp. 27–44.

Proctor, Briley E., Frances F. Prevatt, Katharine Adams, Abigail Hurst, and Yaacov Petscher, "Study Skills Profiles of Normal-Achieving and Academically-Struggling College Students," *Journal of College Student Development*, Vol. 47, No. 1, January–February 2006, pp. 37–51.

Ran, Florence Xiaotao, and Yuxin Lin, "The Effects of Corequisite Remediation: Evidence from a Statewide Reform in Tennessee," Community College Research Center Working Paper No. 115, November 2019.

Rosen, L. S., William C. Howell, and L. Todd Johnson, "An Evaluation of the Compressed-Course Format for Instruction in Accounting," *Accounting Review*, Vol. 57, No. 2, April 1982, pp. 403–413.

Roueche, John E., and Suanne D. Roueche, *Between a Rock and a Hard Place: The At-Risk Student in the Open-Door College*, Washington, D.C.: Community College Press, 1993.

Roueche, John E., and Suanne D. Roueche, *High Stakes, High Performance: Making Remedial Education Work*, Washington, D.C.: American Association of Community Colleges, 1999.

Rutschow, Elizabeth Zachry, Maria Scott Cormier, Dominique Dukes, and Diana E. Cruz Zamora, *The Changing Landscape of Developmental Education Practices: Findings from a National Survey and Interviews with Postsecondary Institutions*, New York: Center for the Analysis of Postsecondary Readiness, 2019.

Rutschow, Elizabeth Zachry, and Emily Schneider, *Unlocking the Gate: What We Know About Improving Developmental Education*, New York: MDRC, June 2011. As of October 4, 2020: https://www.mdrc.org/sites/default/files/full_595.pdf

Schmitt, Joshua G., Mark A. Bellcourt, Khong Meng Xiong, Amanda M. Wigfield, Inge L. B. Peterson, Sedrick D. Halbert, Leah A. Woodstrom, Elizabeth Mai Tong Vang, and Jeanne L. Higbee, "Sharing Our Experiences: General College Students Give Voice To Their Perceptions of General College," in Dana B. Lundell, Jeanne L. Higbee, Irene M. Duranczyk, and Emily Goff, eds., *Student Standpoints About Access Programs in Higher Education*, Minneapolis, Minn.: University of Minnesota, 2007, pp. 47–57.

Schwartz, Wendy, and Davis Jenkins, *Promising Practices for Community College Developmental Education: A Discussion Resource for the Connecticut Community College System*, New York: Community College Research Center, Teachers College, Columbia University, September 2007.

Scott-Clayton, Judith, and Olga Rodriguez, "Development, Discouragement, or Diversion? New Evidence on the Effects of College Remediation Policy," *Education Finance and Policy*, Vol. 10, No. 1, Winter 2015, pp. 4–45.

Sheldon, Caroline Q., and Nathan R. Durdella, "Success Rates for Students Taking Compressed and Regular Length Developmental Courses in the Community College," *Community College Journal of Research and Practice*, Vol. 34, Nos. 1–2, 2009, pp. 39–54.

Sperling, Charmian B., *The Massachusetts Community Colleges Developmental Education Best Policy and Practice Audit*, Boston, Mass.: Massachusetts Community Colleges Executive Office, June 30, 2009. As of October 4, 2020: https://files.eric.ed.gov/fulltext/ED506649.pdf

Spitzer, Tam M., "Predictors of College Success: A Comparison of Traditional and Nontraditional Age Students," *NASPA Journal*, Vol. 38, No. 1, Fall 2000, pp. 82–98.

Sund, Krister, "Estimating Peer Effects in Swedish High School Using School, Teacher, and Student Fixed Effects," *Economics of Education Review*, Vol. 28, No. 3, June 2009, pp. 329–336.

Tatum, B. Charles, "Accelerated Education: Learning on the Fast Track," *Journal of Research in Innovative Teaching*, Vol. 3, No. 1, March 2010, pp. 35–51.

Texas House of Representatives, Relating to Developmental Coursework Offered by Public Institutions of Higher Education Under the Texas Success Initiative, Bill 2223, June 15, 2017. As of January 9, 2020: https://legiscan.com/TX/bill/HB2223/2017

Texas Senate, Relating to Developing a Developmental Education Plan for Students Entering Public Institutions of Higher Education, Bill 162, June 17, 2011. As of January 9, 2021: https://legiscan.com/TX/text/SB162/id/241199

Valeri-Gold, M., C. A. Callahan, M. R. Deming, M. T. Mangram, and M. Errico, "Reflections: Experience Commentaries by Urban Developmental Students. Developmental Education: Enhancing Student Retention," in J. L. Higbee and P. L. Dwinell, eds., *Developmental Education: Enhancing Student Retention*, Carol Stream, Ill.: National Association for Developmental Education, 1997, pp. 3–18.

Visher, Mary G., Emily Schneider, Heather Wathington, and Herbert Collado, *Scaling Up Learning Communities: The Experience of Six Community Colleges*, New York: National Center for Postsecondary Research, Teachers College, Columbia University, 2010.

Visher, Mary G., Michael J. Weiss, Evan Weissman, Timothy Rudd, and Heather Wathington, *The Effects of Learning Communities for Students in Developmental Education: A Synthesis of Findings from Six Community Colleges*, New York: National Center for Postsecondary Research, Teachers College, Columbia University, July 2012.

Vuong, Mui, Sharon Brown-Welty, and Susan Tracz, "The Effects of Self-Efficacy on Academic Success of First-Generation College Sophomore Students," *Journal of College Student Development*, Vol. 51, No. 1, January 2010, pp. 50–64.

Weiss, Michael J., Alexander K. Mayer, Dan Cullinan, Alyssa Ratledge, Colleen Sommo, and John Diamond, "A Random Assignment Evaluation of Learning Communities at Kingsborough Community College—Seven Years Later," *Journal of Research on Educational Effectiveness*, Vol. 8, No. 2, 2015, pp. 189–217.

Weiss, Michael J., Mary G. Visher, Evan Weissman, and Heather Wathington, "The Impact of Learning Communities for Students in Developmental Education: A Synthesis of Findings from Randomized Trials at Six Community Colleges," *Educational Evaluation and Policy Analysis*, Vol. 37, No. 4, 2015, pp. 520–541.

Whinnery, Erin, and Sarah Pompelia, "Governors' Top Education Priorities in 2018 State of the State Addresses," Washington, D.C.: Education Commission of the States, 2018.

Wlodkowski, Raymond J., "Accelerated Learning in Colleges and Universities," *New Directions for Adult and Continuing Education*, Vol. 2003, No. 97, Spring 2003, pp. 5–16.

Xu, Di, and Florence Xiaotao Ran, "Noncredit Education in Community College: Students, Course Enrollments, and Academic Outcomes," *Community College Review*, Vol. 48, No. 1, January 1, 2020, pp. 77–101.

Zajacova, Anna, Scott M. Lynch, and Thomas J. Espenshade, "Self-Efficacy, Stress, and Academic Success in College," *Research in Higher Education*, Vol. 46, No. 6, September 2005, pp. 677–706.

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About This Report

Corequisite remediation is widely being adopted as an approach to supporting student readiness for college coursework, and research has shown positive impacts on academic outcomes relative to the traditional approach of requiring students to take developmental education courses prior to entering college-level coursework. However, little is known about how student experiences are different in corequisite remediation relative to traditional developmental education.

Evidence on student experiences in corequisite remediation might be used to identify the factors that could be driving improvements in academic success as colleges adopt these reforms. In addition, this evidence could also help inform the design of more effective corequisite models.

Using data from a randomized control trial of English corequisites in five community colleges in Texas, we examined contrasts in student experiences between first-time college students who were assigned to corequisite remediation and to standalone developmental education courses.

Across the five colleges, some of the key findings from survey and administrative data suggest that students assigned to corequisite remediation (1) were able to make immediate progress in earning college credit, (2) were less likely to perceive the coursework as being too easy or boring, (3) were less likely to report being embarrassed to be enrolled in the course, (4) were less likely to report spending time on individual deskwork, and (5) were less likely to plan to use tutoring in the future.

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