

# What We Know About Developmental Education Outcomes

## What Is Developmental Education?

Many recent high school graduates who enter community college are required to take remedial or developmental education courses before enrolling in college-level courses. Developmental courses essentially reteach high school– and junior high school–level content in reading, writing, and math. In some cases, students are referred to two or even three courses of developmental education in a single subject area. The annual cost of providing remediation to all college students nationwide has been estimated at approximately \$7 billion.<sup>1</sup>

This overview is part of CCRC’s practitioner packet on developmental education. For more information on the effectiveness of community college assessment and placement tests, accelerated approaches to developmental education, and overcoming challenges inherent in the developmental education reform process, please see our complete packet, [Designing Meaningful Developmental Reform](#).

## How Many Students Need Developmental Education?

While there is no way to gauge with perfect accuracy how many students actually *need* developmental education, recent federal data indicate that 68 percent of community college students and 40 percent of students at public four-year colleges *take* at least one remedial course.<sup>2</sup> Research suggests that many more students are referred to developmental courses but never enroll in them.<sup>3</sup>

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## What Do We Know About the Effects of Developmental Education?

Only 28 percent of community college students who take a developmental education course go on to earn a degree within eight years,<sup>4</sup> and many students assigned to developmental courses drop out before completing their sequence and enrolling in college-level courses.<sup>5</sup> A number of rigorous studies have been undertaken to assess the extent to which the traditional system of developmental education helps students into and through college-level coursework. These studies are discussed below.

# What the Research Tells Us

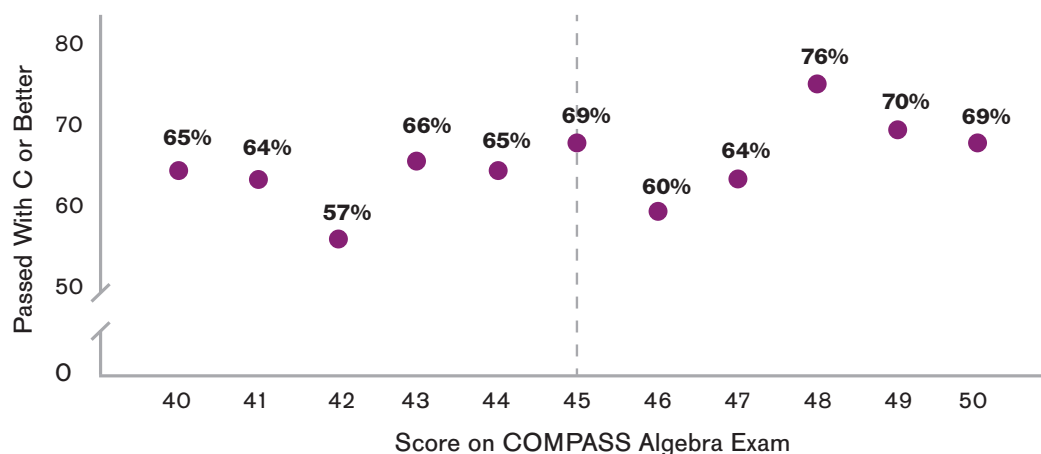
## About the Methodology

In order to understand the impact of developmental education, it is necessary to compare students who are academically similar, some of whom are assigned to remedial education and some of whom are not. An important methodological strategy that can accurately make this comparison is the regression discontinuity (RD) approach. This approach compares students who scored just below the cutoff for assignment to college-level courses with those who scored at or just above the cutoff. For example, if a cutoff score were 45, an RD analysis with a bandwidth of  $\pm 5$  points would compare students who scored from 40 to 44 (assigned to remediation) with students who scored from 45 to 49 (assigned to college-level courses).

Within such a narrow range, where differences in assessment scores are insignificant in terms of predicting success in college-level courses (as shown in the figure below), the assignment of students to remedial or college-level courses is effectively random. Thus, if remedial courses help students who scored near the cutoff succeed in college, then the just-below-the-cutoff students who were assigned to remediation should have better outcomes than the just-above-the-cutoff students, who are virtually identical but who were assigned to enroll directly in college-level courses.

**Within a narrow range around the cutoff score, assignment to remediation is effectively random.**

## Success Rates by Assessment Score Among Students Enrolling Directly in College-Level Math



Note. In the sample from which the above data are drawn, the actual cutoff score used was 30; thus, none of the students represented in the figure underwent remediation. The vertical line represents a hypothetical cutoff score of 45, which is a more typical college-level cutoff.<sup>6</sup>

## Findings on Developmental Education Student Outcomes

In the tables below, we summarize findings from eight studies, all but one of which used an RD approach<sup>7</sup> to evaluate the effectiveness of community college remedial courses across a large college system or state. It is important to note that the colleges examined in these studies used a wide range of cutoff scores to determine college readiness and that some of these studies compared students above and below the cutoff scores not just for developmental versus college-level courses but also for higher versus lower level remedial courses.<sup>8</sup>

## Overview of Findings on Outcomes for Developmental Students<sup>9</sup>

■ Positive ■ Negative □ Null

### DEVELOPMENTAL MATH STUDENTS

Short-Term Impacts					Medium- & Long-Term Impacts		
Study	Level	Persistence	Passed College-Level Math	Grade in College-Level Math	Persistence	College-Level Credits Earned	Credential and/or Transfer
TENNESSEE <sup>10</sup>	UPPER	NEG		NULL (conditional)	NULL	NULL (conditional)	NEG (credential)
TEXAS <sup>11</sup>	UPPER	NULL					NULL
OHIO <sup>12</sup>	UPPER				NULL		POS (transfer)
LUCCS <sup>13</sup>	UPPER		NEG	NEG	NULL	NULL	NULL
FLORIDA <sup>14</sup>	UPPER	NULL	NULL			NULL	NULL
VIRGINIA <sup>15</sup>	LOWER vs. MIDDLE		NULL				NEG (credential)
TENNESSEE	LOWER vs. MIDDLE	NULL		NULL (conditional)	NULL	NULL (conditional)	POS (credential)

### DEVELOPMENTAL READING STUDENTS

Short-Term Impacts					Medium- & Long-Term Impacts		
Study	Level	Persistence	Passed College-Level English	Grade in College-Level English	Persistence	College-Level Credits Earned	Credential and/or Transfer
TENNESSEE	UPPER	POS		NULL (conditional)	NULL	NULL (conditional)	NULL (credential)
TEXAS	UPPER	NULL					NULL
OHIO	UPPER				NULL		NULL
LUCCS	UPPER		NEG	NEG	NEG	NEG	NEG (credential)
FLORIDA	UPPER	NULL	NEG			NULL	NULL
VIRGINIA <sup>216</sup>	UPPER	NULL	NULL (conditional)			NULL	NEG
VIRGINIA 2	LOWER vs. UPPER	NEG	NULL (conditional)			NEG	NEG
TENNESSEE	LOWER vs. MIDDLE	NULL		NULL (conditional)	POS	POS (conditional)	NULL (credential)

### DEVELOPMENTAL WRITING STUDENTS

Short-Term Impacts					Medium- & Long-Term Impacts		
Study	Level	Persistence	Passed College-Level English	Grade in College-Level English	Persistence	College-Level Credits Earned	Credential and/or Transfer
TENNESSEE	UPPER	NEG		NULL (conditional)	NULL	NEG (conditional)	NEG (credential)
VIRGINIA 2	UPPER	NULL	NULL (conditional)			NULL	NULL
LUCCS	Writing & Reading vs. Reading Only		NULL	NULL	NULL	NULL	NULL
VIRGINIA 2	LOWER vs. UPPER	NEG	NULL (conditional)			NEG	NULL
TENNESSEE	LOWER vs. UPPER	POS		POS (conditional)	NULL	NULL (conditional)	NULL (credential)

Note. "Conditional" signifies that only outcomes for students who enrolled in college-level courses, or persisted in college, were compared. LUCCS stands for large urban community college system.

The RD analyses show that, with a few notable exceptions, developmental education has mostly null and sometimes negative effects on student outcomes for students near the cutoffs. A null result indicates that no statistically significant effect was found in the analysis, suggesting that students spent time and tuition on courses that may have made no discernable difference in their ability to succeed in college.<sup>17</sup>

## Differential Effects of Remediation on Subgroups

The research suggests that the impact of remediation may vary depending on student demographics and level of academic preparation. Combining the results from all the studies, students who scored near the college-level cutoffs and were placed in developmental courses appear to have experienced substantially more negative or null than positive effects (two positive vs. 15 negative and 32 null). On the other hand, students who scored near the cutoffs between upper- and lower-level (or middle- and lower-level) developmental courses and were placed into the lower course experienced a higher proportion of positive effects (five positive vs. six negative and 19 null).

One RD study that looked at the effects of remediation on particular subgroups of students found large differences in how student populations were impacted. For instance, assignment to remediation tended to have significant and large negative impacts on students who attended colleges with a high proportion of remedial students, on female students, on students who were younger than 25, and on Black students. Conversely, assignment to remediation had nonsignificant effects on students who attended colleges with a low proportion of remedial students, on male students, on students who were 25 or older, and on White students.<sup>18</sup>

Another study found positive effects on persistence and college-level credit accumulation for English language learners who were required to take both reading and writing developmental education instead of just reading remediation. Native English speakers, on the other hand, experienced no benefits from placement into both courses versus placement into just reading remediation.<sup>19</sup>

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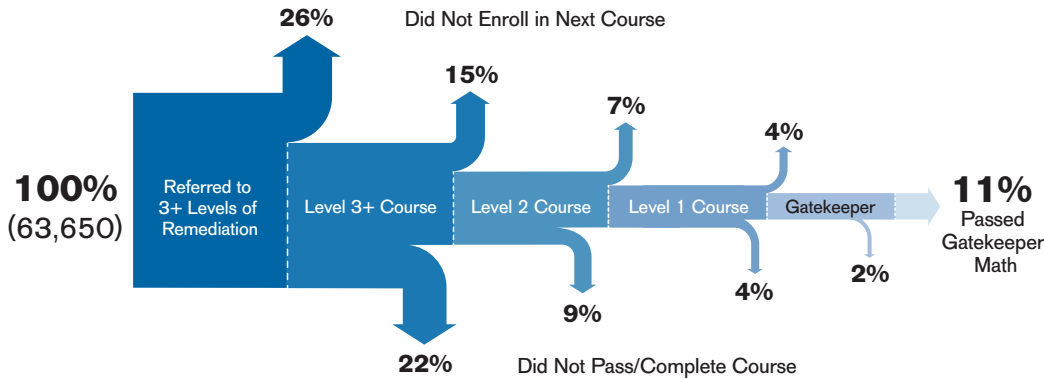
**Research suggests the impact of remediation varies depending on student demographics and level of academic preparation.**

## Student Progression Through the Remedial Sequence

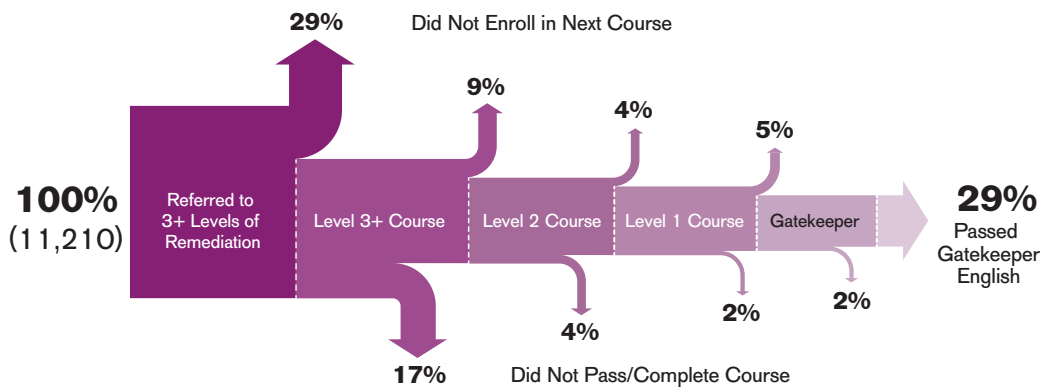
One reason why developmental education may not be very effective is because of high attrition from the remedial sequence. A CCRC analysis involving data from 57 community colleges found that lengthy remedial sequences are extremely “leaky.” The necessity of completing several courses before enrolling in college-level courses creates multiple points at which students can exit the sequence, thus forgoing any chance of completing the first college-level (or “gatekeeper”) course in the same subject area.<sup>20</sup>

For instance, among the 63,650 students in the study who were assigned to three levels of developmental math, only 11 percent ever successfully completed college-level introductory algebra. More than one fourth never enrolled in their first remedial course. And even among the students who had the tenacity to complete all three levels of remedial math, 2,500 (4 percent of the original cohort, or almost one fourth of those who completed all three developmental courses) failed to enroll in the gatekeeper math course.

### Student Progression Through the Developmental Math Sequence<sup>21</sup>



### Student Progression Through the Developmental Reading Sequence<sup>22</sup>



## Inaccurate Placement Into Developmental Courses

The negative and null effects of developmental education may also be explained in part by inaccurate placement into developmental courses. Research indicates that some students who do not need it are placed into developmental courses.<sup>23</sup> Underplaced students may experience negative effects from developmental courses that overshadow potential positive effects experienced by accurately placed students.<sup>24</sup>

## Conclusion

Research evidence suggests that, for the most part, the traditional system of developmental education is not achieving its intended purpose: to improve outcomes for underprepared students. These findings do not mean that developmental education should be discarded; large numbers of community college students need support to succeed academically. The findings do suggest, however, that the system could benefit from thoughtful reform. In part two of this practitioner packet, *Designing Meaningful Developmental Reform*, we lay out some of the challenges to reforming developmental education, review relevant reform research, and describe case studies of colleges that successfully resolved tensions that are often obstacles in the developmental reform process.

## Endnotes

1. Scott-Clayton, Crosta, & Belfield (2012).
2. Scott-Clayton, personal communication, NCES QuickStats (2013).
3. Bailey (2009).
4. Based on calculations using the National Educational Longitudinal Study (NELS:88). The comparison figure for nonremedial students is 43 percent (Attewell, Lavin, Domina, & Levey, 2006).
5. Bailey, Jeong, & Cho (2010).
6. Fields & Parsad (2012).
7. We include one study (Bettinger & Long, 2005) that is similar to the other seven studies in conceptual approach and rigor but which used an instrumental variable (IV) approach to compare outcomes of students in Ohio, where various colleges differed in how they assigned students to remediation. For further information as to why we include these studies and not others, see Bailey, Jaggars, and Scott-Clayton (2013).
8. Math cutoff scores range from 27–40 out of 100 on the COMPASS Algebra test and from 28–40 out of 100 on the COMPASS Pre-Algebra/Arithmetic tests. Cutoff scores on the COMPASS reading test range from 46–81 out of 100. Cutoff scores on the COMPASS writing test range from 28–59 out of 100.
9. In all tables, nonsignificant findings are shown as NULL; significant findings are significant at or below the 10-percent level.
10. RD IV analyses based on a sample limited to students under the age of 21 who began full-time at a Tennessee two-year public college in the fall of 2000 and whose assignment to remediation was based on a COMPASS math, reading, or writing exam. Students were tracked for eight years. Covariates include gender, race, age, high school GPA, college financial aid, and postsecondary institution attended. College credits completed are those for six years (Boatman & Long, 2013).
11. RD IV analyses based on sample of 255,878 degree-seeking freshman entering Texas public two-year colleges between 1991–1992 and 1999–2000 and tracked until 2004–2005; analysis limited to students who took the Texas Academic Skills Program (TASP) test used for remedial placement at Texas community colleges (Martorell & McFarlin, 2011).
12. IV analyses based on 13,000 first-time, degree-seeking, traditional-age students who took the ACT and enrolled in one of 19 public two-year Ohio colleges in 1998. Students were tracked for five years (Bettinger & Long, 2005).
13. RD analyses based on a sample of 100,250 first-time, degree-seeking students admitted to one of six community colleges in a large urban community college system (LUCCS) between fall 2001 and fall 2007. Students were tracked for at least three years. From 2001–2004, LUCCS used an in-house math exam; after 2004, it used the COMPASS pre-algebra and algebra tests. For reading, it used the COMPASS test, and for writing, it used a customized writing test. Main specification results are shown (Scott-Clayton & Rodríguez, 2012).
14. RD analyses based on a sample of 100,000 students who enrolled in one of 28 Florida community colleges in 1997 and took the Florida College Placement Test (CPT). Students were tracked through 2002. Math results are based on Regression 8: “RD IV full no-retesting sample.” Reading results are based on Regression 10: “RD IV, no retesting and narrow band sample” (Calcagno & Long, 2008).
15. Full sample consists of 24,664 first-time community college students who enrolled in one of 23 Virginia community colleges in summer or fall of 2004. RD IV analyses limited to 5,440 students who took the pre-algebra section of the COMPASS test. Covariates include gender, age, intent, and dual enrollment status. Results are from baseline model (Dadgar, 2012).

16. RD analyses based on sample of 46,000 students who enrolled at one of Virginia's 23 community colleges in 2004–2006 who took a COMPASS reading or writing exam. Students were tracked until 2011. Covariates include gender, race, cohort, financial aid, transfer program, and dual enrollment prior to college (Xu, 2013).
17. Among the 52 null results shown in the three tables, 32 trend in a negative direction, and 17 trend in a positive direction (and in three cases the direction of the null effect was not indicated in the original study). None of these results are statistically significant, so we cannot say with any certainty whether they indicate a real effect or are just due to chance.
18. Xu (2013).
19. Hodara (2012).
20. Bailey et al. (2010).
21. Analysis tracked for three years 63,650 first-time, credential-seeking students at 35 Achieving the Dream community colleges who began their enrollment from fall 2006 to fall 2008 and were referred to at least three levels of developmental education. The figure on student progression through the math developmental sequence is updated from analyses originally presented in Bailey et al. (2010).
22. Analysis tracked for three years 11,210 first-time, credential-seeking students at 16 Achieving the Dream community colleges who began their enrollment from fall 2006 to fall 2008 and were referred to at least three levels of developmental education. The figure on student progression through the reading developmental sequence is updated from analyses originally presented in Bailey et al. (2010).
23. See part two of this practitioner packet, [Designing Meaningful Developmental Reform](#).
24. Scott-Clayton & Rodríguez (2012).

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