



CHANGING EQUATIONS

How Community Colleges Are Re-thinking College Readiness in Math

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executive
summary

EXECUTIVE SUMMARY

BECAUSE OF their high enrollment and generally low completion rates, community colleges have been identified as central to efforts to improve higher education outcomes. But that improvement won't be realized unless more students succeed in math. Together, the high proportion of community college students requiring math remediation, and the relatively low proportion who succeed in required remedial sequences, make placement in developmental math one of the single greatest barriers to college completion. Only 20 percent of students who place into remedial (also known as developmental) math courses ultimately complete the remedial sequence and pass a college-level math course - such as college algebra or statistics - that is required to graduate or transfer.

An increasing number of colleges in California and nationally are involved in experiments aimed at improving, reforming, or even eliminating math remediation in community colleges. This includes a new movement to construct alternative pathways for the majority of community college students, those whose educational goals may not require a second year of algebra. Through LearningWorks' efforts to strengthen student achievement in the California Community Colleges, it has become clear that practitioners involved in such experiments are eager to learn about parallel efforts, and those not yet involved are curious about the work underway, whether in California or elsewhere in the nation. LearningWorks commissioned this report, *Changing Equations*, to address those needs.

Critics argue that intermediate algebra unnecessarily hinders some students pursuing degrees in fields such as English, history, art, and political science from ever graduating. The new pathways for non-STEM (science, technology, engineering and math) students are course sequences including both remedial-level courses as well as credit-bearing gatekeeper math courses. Many of these new sequences stress skills in statistics or quantitative reasoning, which proponents say serve most students better in their lives and careers than does high-level algebra. While the de-emphasis on intermediate algebra remains controversial, the math pathways movement resonates with other initiatives to focus community college students' education around structured

pathways leading toward careers.

These experiments are informed by findings emerging from both research and practice that are starting to shift the understanding of math readiness. At the heart of that evolution are four key insights:

- 1) ***Math is a hurdle for the majority of community college students.*** Roughly 60 percent of community college students are placed in developmental math courses.
- 2) ***Most students deemed "unready" in math will never graduate.*** Only 20 percent of students who place into developmental math complete a required gatekeeper course in math.
- 3) ***The tests used to determine readiness are not terribly accurate.*** Research has estimated that as many as a fifth of students placed into remedial math courses could have earned a B or better in a college-level course without first taking the remedial class.
- 4) ***The math sequence required by most colleges is irrelevant for many students' career aspirations.*** According to research, about 70 percent or more of people with bachelor's degrees do not require intermediate algebra in their careers.

In sum, the reformers argue that, on the basis of a weakly predictive test, large numbers of students are being prevented from completing college unless they pass a challenging course that may be irrelevant to their futures. Nevertheless, until recently there have been very few experiments with alternatives, leaving intermediate algebra as an effective proxy for determining whether students are "college material." Various national policy and disciplinary organizations, aware of the gravity of the remedial math dilemma, are urging colleges to re-think this approach and try out alternatives. These include the Developmental Math Committee of the American Mathematical Association of Two-Year Colleges, Complete College America, and the National Center on Education and the Economy.

The pathways reforms are one column on a menu of approaches for improving students' math preparation in college. Though the pathways efforts may involve the most extensive and divisive changes, they often occur together with instructional reforms as well as changes in how colleges place students into math courses.

MATH READINESS REFORM MENU

Colleges and practitioners effectively choose approaches within at least one category or column, but some are pursuing all three:

<p>Instructional Reforms</p> <p><i>Modifications to instruction or course sequences within the standard curriculum:</i></p> <ul style="list-style-type: none"> • Compressed courses • Modularized courses • Contextualized courses • Non-academic supports 	<p>Placement Reforms</p> <p><i>Modifications to placement exams or placement policies:</i></p> <ul style="list-style-type: none"> • New placement tests • New placement policies 	<p>Pathways Reforms</p> <p><i>Modifications to standard curricular sequences that tailor requirements to students' fields of study:</i></p> <ul style="list-style-type: none"> • Statistics-based pathways • Quantitative literacy-based pathways
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Some of the experiments with alternative pathways are beginning to show impressive, if preliminary, results:

- The Carnegie Foundation for the Advancement of Teaching has been experimenting with programs called Statway and Quantway, which involve 43 colleges in 11 states. The Foundation's first report showed that 51 percent of students in Statway completed a college-level math course in their first year of college, compared to only 6 percent of students pursuing the standard pathway.
- At Los Medanos College, 82 percent of students enrolling in the alternative course, Path2Stats, completed the college-level statistics class within one year, whereas only 33 percent of those in the traditional pathway completed college-level math within three years.

Even as the understanding of math readiness is evolving at the community college level, the new experiments are colliding against more traditional approaches at the K-12 and university levels. For example, the Common Core State Standards being implemented in 45 states emphasize a single standard of math readiness, with the two-year algebra sequence intact. At universities, whose expectations often drive curriculum for K-12 schools and community colleges, there remains an assumption that entering students have passed Algebra 2 in high school – or passed intermediate algebra as a remedial course in college. Some university faculty are reluctant to abandon the expectation that students learn intermediate algebra, even when faced with evidence that students can pass a math course accepted for transfer – statistics – without Algebra 2.

The conversations and questions about math requirements often sound highly technical: For example, what percentage of college graduates will need to factor polynomials in their future careers? But the stakes are very high and very personal from the perspective of the millions of students referred to remedial education each year, many of whom are low-income or students of color. If the current math requirements seemingly holding back those students from progressing in college become indefensible, a change could open doors for many of them, holding out prospects for narrowing achievement gaps and boosting U.S. competitiveness. Furthermore, preliminary research indicates it also might increase the productivity of colleges, which is sure to interest many policymakers.



LearningWorks was founded by the Career Ladders Project for California Community Colleges, the Research and Planning Group for California Community Colleges, and the California Community Colleges Success Network to facilitate, disseminate and fund practitioner-informed recommendations for changes at the community college system and classroom levels, infusing these strategies with statewide and national insights. LearningWorks seeks to strengthen the relationships that offer the greatest potential for accelerating action, including those between policy makers and practitioners, among overlapping initiatives, and across the 112 colleges. LearningWorks is supported by the William and Flora Hewlett Foundation and the Walter S. Johnson Foundation.

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