

The Curious Case of Algebra II

Algebra II has become the proxy math for both college- and career-readiness, but that trend may be reversing. How should school leaders decide which math all students need?

Not too long ago, few Americans thought that high schools should prepare every student for college. That was before technology, a globalized marketplace, and the vagaries of the present economy changed the rules for preparing for life after high school. Two-thirds of jobs for new graduates will require at least some postsecondary education and training.

For a millennial worried about getting a job, college also is a good hedge against unemployment and lower wages. But even if new graduates choose not to continue their education right away, their chances for landing a good job with decent pay and benefits are greatly improved if they have high-level knowledge and skills, especially in math and science.

For these reasons, business leaders, educators, and policymakers have pushed a college- and career-ready agenda that opens courses previously reserved for the college-bound to all students. And of all high school courses, high-level math seems to have the most powerful relationship to future success in college and the job market, as the Center for Public Education (CPE) shows in our 2009 report.

Over the last decade, Algebra II has become the proxy math for both college- and career-readiness. By 2012, Algebra II was a graduation requirement in 19 states. The more than 40 states that have adopted the Common Core State Standards also have bought into an expectation that all students will learn substantial Algebra II content alongside other major math strands.

But the Algebra II trend is showing signs of reversing. Texas and Florida both recently walked back their requirement that students pass this course in order to earn a standard diploma.

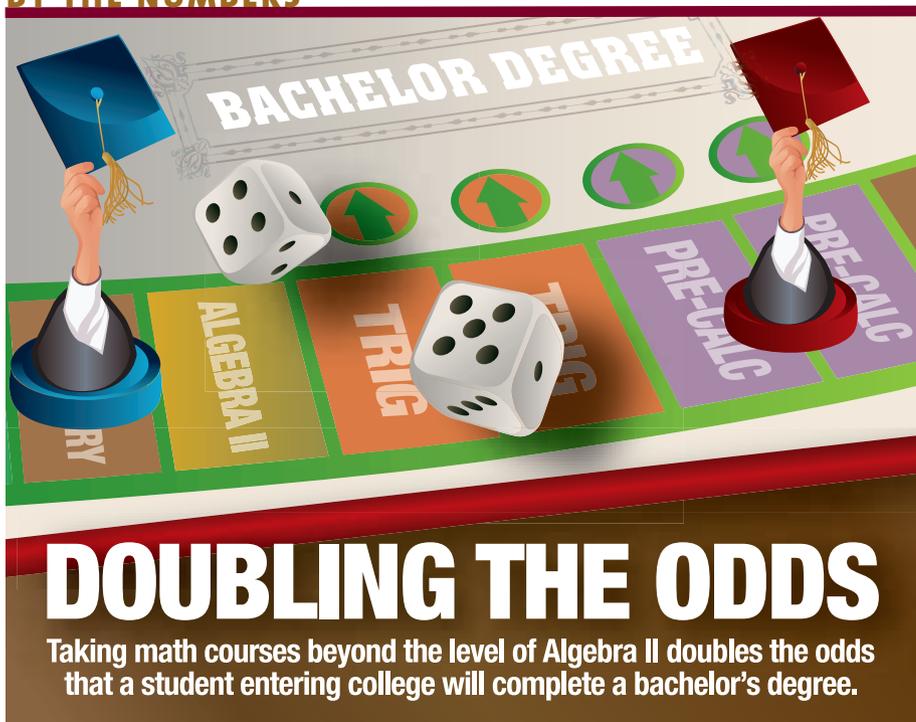
Given these developments, this is a good time for school leaders to reconsider what they want a standard diploma to mean for their graduates and the role high-level math, in particular Algebra II, should play.

College- and career-readiness

The idea that college- and career-ready math should be the same got a real boost by two studies that found significant overlap in the skills needed for college admissions and entry to high-performance jobs.

The American Diploma Project (an initiative that I was part of) arrived at its 2004 findings through surveys of business leaders and higher education faculty as well as through analyses of admissions and placement exams. ACT in 2005 was able to conduct a “crosswalk” between its college admissions tests and its WorkKeys

BY THE NUMBERS



SOURCE: Center for Public Education

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assessments for various occupations. Both studies found a strong similarity in math skills and argued for a single core curriculum for all high school students.

More recent studies are calling the strength of the connection into question, however. The National Assessment Governing Board in 2012 convened panels of experts to determine NAEP scores that represent the minimal level for entry into credit-bearing college courses and job training programs in five occupations.

The panels were not able to support the conclusion that minimal academic performance was the same for both purposes.

Pearson researchers looked specifically at Algebra II and its relationship to career outcomes. Like other studies, including those by CPE, they found that Algebra II in high school matters a lot for college-going and completion rates.

This held true whether students attended community colleges, technical colleges, or four-year institutions. But they did not see a similar impact on outcomes for graduates who immediately entered the workforce, according to results released this year.

The National Center on Education and the Economy (NCEE) analyzed the content of entry-level, credit-bearing math courses at seven community colleges to determine the prerequisite knowledge and skills students needed in order to pass them. The authors concluded this year that, “[b]ased on our data, one cannot make the case that high school graduates must be proficient in Algebra II to be ready for college and careers.”

What is so remarkable about this statement is that the authors and advisers included key participants in the development of the Common Core math standards, which give prominence to Algebra II content. At the same time, they found that the seven community colleges emphasized topics that aren’t typically taught in traditional high school math courses, including mathematical modeling, statistics and probability, and applied geometry.

NCEE recommends developing various math pathways that students would enter at ninth grade. Each pathway would emphasize different mathematics strands for different career choices.

The findings across these studies could suggest that the math required for success in college and careers is at the same high level but differs in content. If the purpose of high school were solely to prepare new graduates for their immediate next step, districts might want to think about distinct, career-centered math pathways. But of course, educators, parents, and communities view the purpose of schooling as much more than career prep. That leads to another major consideration in defining the math all students need.

Equity and opportunity

As my colleague at Change the Equation, Claus von Zastrow, put it on CPE’s blog: “If you had had to choose your career path when you were 14, what might you have become? Would you have had the foresight and guidance to choose wisely?”

Some students know what they want. Some have the benefit of families who stress college and know how to get there. But many, many others don’t. And it’s for these students that communities look to their public schools to put them on the same footing as their more advantaged classmates.

One of the untold success stories in public education is the great strides we have made in improving access to high-level high school courses. Two decades ago, slightly more than half of all students were taking Algebra II, with white students far more likely to be enrolled than their black and Latino peers. Today, three-quarters of our students are taking this course, and the gap between students has nearly disappeared. Over this same period, high school graduation rates have gone up for all groups.

Interestingly enough, this includes the classes of Texas students who had to pass Algebra II to earn their diploma. More students also are going to college. If these stu-

dents had chosen a different pathway at age 14, would they even have seen themselves as college material? Would they have been able to change their mind later?

One thing we can be sure of is that we cannot be sure of the future. The occupations young people enter today may not even exist in 10 years. I would argue that we have a responsibility to take the long view with young people’s futures and make sure that they have an academic foundation that enables them to tap back into the education pipeline when they need it. The significance of high-level math and Algebra II content to keeping these options open cannot be understated.

Finally, all of our young people deserve the opportunity to learn math for math’s sake. Why do we teach the arts? Literature? Few educators argue for teaching these subjects because they lead to college- and career-readiness, or because they necessarily have practical applications (although they can). Yet few would want to deny these opportunities to students because these subjects hold such great capacity to inspire.

Math can have that same effect. The philosopher Bertrand Russell famously wrote, “Mathematics, rightly viewed, possesses not only truth, but supreme beauty.” Mathematicians sometimes refer to mathematical “elegance” when the elements and patterns all cohere into that “aha!” moment.

Not all students will be inspired by the beauty of pure mathematics. But if they don’t have that exposure—if math instruction is entirely practical and expedient—they and we will never know. And we all could be missing out on the next Steve Jobs or Neil deGrasse Tyson.

Researchers still have a lot of work to do to uncover why Algebra II has such predictive power. But none has convincingly shown that it hurts students. For school leaders, perhaps that’s the best lesson to take away. ■

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