EDUCATION COMMISSION OF THE STATES

POLICY BRIEF

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Modernizing Math Pathways to Support Student Transitions

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Ensuring that students are able to successfully navigate between education systems, specifically from high school graduation to postsecondary entry and degree completion, has become paramount to achieving state attainment goals. A large body of evidence identifies traditional postsecondary math policies — such as algebra-intensive admissions, placement and remediation requirements — as the primary academic barrier to degree completion. Research has further shown that students who are Black, Latinx or Native American and from low-income families disproportionately bear the negative impact of these policies.

The COVID-19 pandemic has exacerbated the situation by throwing the American education system into a state of flux. The pandemic has disrupted education unevenly, amplifying existing problems of unequal access to technology and academic supports. In addition, because of the widespread cancellation of traditional placement and admissions exams — such as ACT/SAT, end-of-course exams, Advanced Placement tests and placement instruments — students caught in the pandemic year have also had limited opportunities to demonstrate the math skills that they have learned.

As a result, postsecondary institutions are considering how to adjust placement and admissions policies for math to ensure equitable, evidence-based and scalable reforms. While many challenges were present before the pandemic and will persist into the future, state policymakers can use the current disruption as an opportunity to eliminate long-standing barriers to access and success in math education, providing students from underserved populations greater opportunity to benefit from modern math pathways.

EQUITABLE TRANSITIONS THROUGH PANDEMIC DISRUPTIONS

This Policy Brief is one of six dedicated to various facets of the transition from secondary to postsecondary education, now complicated by the COVID-19 pandemic. It focuses on the populations already underserved in our nation's education system. The series — which builds upon "A State Policymaker's Guide to Equitable Transitions in the COVID-19 Era" — provides actionable steps and examples for state policymakers to consider as they address the transition from high school to college and the workforce. The other Policy Briefs in the series are:

- "Expanding High-Quality Work-Based Learning"
- "Boosting FAFSA Completion to Increase Student Success"
- "Policy Solutions That Foster Competency-Based Learning"
- "Prioritizing Equity in Dual Enrollment"
- "Establishing a State-Level Postsecondary Advising Network"

Math pathways enable students to take different routes through the curriculum, offering content that is relevant to individual academic goals, core civic responsibilities and emerging workforce demands. Specific policy options that states can consider in light of the disruptions caused by the COVID-19 pandemic include:

- Aligning high school math courses with postsecondary admissions policies.
- Establishing postsecondary readiness and placement policies that go beyond standardized test scores.
- Scaling corequisite supports to serve all students who have not met college readiness standards.

These policy actions can help students more easily navigate the complex and unpredictable process of postsecondary transition in an increasingly uncertain and complicated world.

State Policy Options

Student learning experiences in math classrooms are shaped, in part, by math education policy at the state level. The Dana Center Mathematics Pathways initiative has worked with more than 30 states and systems of postsecondary education to support systemic changes in math education policy and practice that improve student experiences and outcomes. The DCMP, which is based on four core principles that guide a coherent approach to systemic policy change, is grounded in core commitments to equitable student outcomes, evidence-based policy and continuous improvement.

Many traditional math policies originated during the Cold War. At the time, the space race with the Soviet Union created a demand for scientists with an intensive focus on algebra and calculus. While those math topics remain as important as ever for students intending to pursue postsecondary degrees in many STEM (science, technology, engineering and math) fields, the majority of students today have more quantitative tools at their disposal and face distinctly different challenges than these 80-year-old policies were designed to address.

Fortunately, a growing movement of states and systems have tackled these challenges head on and, as documented in rigorous and compelling research, have found that structural change to math education policy can drive substantial improvements in equitable student outcomes. In addition, it is important to consider math education from the perspective of students transitioning within and between educational systems. Specifically, policies between K-12 and postsecondary education sectors must align so that math education supports seamless student transitions to and through postsecondary opportunities.

The following three interrelated issues focus on the unique opportunities that state policymakers have in reforming math education in light of the COVID-19 pandemic.

Aligning high school math courses with postsecondary admissions policies

Postsecondary credential and degree completion are widely recognized as the keys to upward social and economic mobility in the United States. Yet disconnects between high school graduation requirements and postsecondary admissions policies limit students' ability to access postsecondary programs.

Many colleges and universities use math as an admissions gatekeeper. Public postsecondary admissions requirements often include completion of algebra II. Yet according to a recent 50-state policy scan from Achieve, 29 states recommend, but do not require, algebra II for high school graduation. Similarly, a national policy scan from The Center For American Progress finds that fewer than half of states have explicit alignment between the math course types and units that are required for a high school diploma and those that are sufficient for public university admissions.

These disparities do not affect all schools and student groups equally. According to federal data, about 10% of the nation's high schools do not offer algebra I, 20% do not offer algebra II and 50% do not offer calculus I. This disproportionately impacts students who are Black, Latinx or Native American. Research has found that, as a result, students from low-income communities and from minoritized racial communities cannot compete on an even playing field for admissions to public universities.

Using any course, such as algebra II, as a gatekeeper to college admission should be based on evidence that the content is essential to students' success in college or careers. Unfortunately, there is little evidence that growing enrollments in algebra II have improved students' math performance, in part because of the underlying inequities in access to high-quality math instruction. There is, however, strong evidence that students who are assessed as not having algebra II proficiencies can succeed in rigorous college-level math courses.

POLICY CONSIDERATIONS

- Establish policies that predictably align high school graduation requirements with public postsecondary admissions requirements. The pandemic has propelled a growing number of test optional policies, no longer requiring students to submit ACT/SAT scores. This policy change has the potential to increase equitable access to postsecondary education. However, policymakers may also want to consider the underlying inequities in courses that are often used as admissions gatekeepers, such as algebra II and calculus I.
- Encourage public postsecondary admissions policies that place equal value on all math pathways. Specifically, states can identify math courses — including data science, statistics and quantitative reasoning — that are equivalent to algebra II for admissions purposes.
- Regularly collect and report on disaggregated student data to evaluate the impact of policy changes on equitable student outcomes.
- Ensure that all high schools students have access to college-level coursework through dual-credit partnerships with colleges and universities. Access to dual credit is already inequitably distributed between student groups; the pandemic risks magnifying these disparities because of students' limited access to facilities, technology and support services. Attention can be focused on providing scalable, sustainable and high-quality dual-credit offerings for all students.

STATE EXAMPLE

The University of California system recently adopted several policy changes. Along with the high-profile announcement that the UC system will suspend the use of ACT/SAT in admissions,

it has also determined that Introduction to Data Science will be equivalent to algebra II for admissions purposes. The flexibility offered by these changes in admissions policies are creating opportunities for school districts to develop innovative math pathways that are relevant to student interests. A recent report offers examples of several district-designed curricular models that offer students multiple math pathways to high school graduation, all aligned to postsecondary expectations.

Establishing postsecondary readiness and placement policies that go beyond standardized test scores

According to a 2019 study from the Center for the Analysis of Postsecondary Readiness (CAPR), 99% of two-year institutions and 94% of four-year institutions use some form of standardized test to determine a student's math course placement. Despite their prevalence, standardized placement assessments consistently underestimate students' potential for success, especially when compared with students' high school performance.

Studies have shown that relying solely on test scores all too often results in improper "under-placement," forcing students into developmental math courses when they are capable of college-level work. Further, a large body of empirical research has found that standardized exams, when used for placement and admissions purposes, disproportionately harm students of color and low-income students by limiting their access not only to credit-bearing coursework, but also to programs of study that provide a pathway to social and economic mobility.

In light of this growing body of evidence, institutions have increasingly turned to multiple measures to make admissions and placement decisions. According to CAPR, the number of public colleges using measures beyond standardized tests for math placement increased from 27% for both two- and four-year institutions in 2011 to 57% and 63%, respectively, in 2016. In 2020, pandemic-related testing shutdowns have required state agencies and postsecondary systems of education to consider course-placement alternatives.

Luckily, nearly every student entering postsecondary education already possesses a highly accurate and reliable measure of college readiness: their high school GPA. While placement tests are often narrowly focused and occur at a single moment in time, high school GPA captures information about student performance across teachers and subjects over multiple years, making it a far more appropriate measure of readiness. According to a 2017 report by the Community College Research Center, basing placement on high school GPA alone puts more students into appropriate courses than placement based on standardized test scores.

POLICY CONSIDERATIONS

- Define college readiness to align with multiple math pathways. Specifically, placement mechanisms that assess algebra II (or the college-level equivalent intermediate algebra) proficiencies should not be used to prevent students from directly accessing a variety of entry-level math courses.
- Base developmental math placement policies on multiple measures of student success, prioritizing high school GPA. Student performance on standardized placement tests and strict cut score policies should not be used to bar students from accessing entry-level math courses. If standardized tests are used, they can inform the supports needed to succeed in entry-level coursework rather than placement.

STATE EXAMPLES

Arkansas' Higher Education Coordinating Board policy allows for the inclusion of high school performance and "assessment of student motivation to succeed" along with assessment scores in making placement decisions. Board policy 3.08 specifically states that besides the ACT exam, "Other measures can provide equally important data regarding student preparedness and likelihood of success." The policy further states that "schools are encouraged to use more than one measure, especially if the ACT equivalent is below the exam score benchmarks set for each subject … to ensure that students are placed at the appropriate course level." Institutions in the state are also required to "develop placement models that provide appropriate justification for student course placements and allow for follow-up evaluation of placement effectiveness."

Recognizing the severe equity implications related to improperly placing a student in remediation, the California General Assembly passed legislation (A.B. 705) in 2018 that requires community colleges to use a student's high school GPA for the purpose of placement. Specifically, the legislation states, "Research shows that a student's high school performance is a much stronger predictor of success in transfer-level courses than standardized placement tests" and that the "reliance of test scores as the determinant factor for high-stakes placement decisions runs contrary to testing industry norms."

Texas policy has historically required students to demonstrate readiness for college math using a standardized placement test, but the COVID-19 pandemic has required a change in this approach. In light of inequitable and limited access to testing resources, the Texas Higher Education Coordinating Board is encouraging institutions to make placement decisions based on multiple measures, including high school GPA.

Scaling corequisite supports to serve all students who have not met college readiness standards

Virtually all high school students that were enrolled in math courses have experienced at least some disruption in their math learning because of pandemic-related closures that may have consequences for their continued success in the subject. Corequisites are a proven way to smooth the transition for these students by adding support to succeed in college-level courses. Historically, colleges have assigned students who do not meet placement cutoffs to multiple semesters of non-credit bearing prerequisite courses, assuming that more time and practice would prepare them for college-level math. Unfortunately, an overwhelming body of evidence has found that very few students that place into prerequisite developmental math ever complete a college-level course, much less earn a credential or degree.

Over the past decade, a growing number of states and systems have responded to these data by replacing prerequisite math courses with corequisite support structures. Corequisites allow students to directly enroll in college-level math courses with additional just-in-time supports. Innovations in corequisite supports, enabled by structural policy changes at the state level, have been hailed as some of the most significant reforms in postsecondary math. While corequisite math courses serve all students well, they are specifically improving access and completion rates for students who have

historically been excluded from college-level math because of inequitable placement and remediation practices.

POLICY CONSIDERATIONS

- Eliminate the use of prerequisite, non-credit-bearing and multi-semester developmental math sequences.
- Support institutions in scaling corequisite supports for the majority of students who do not meet college readiness standards or placement benchmarks.
- Ensure that students have access to multiple corequisite math courses aligned to their program of study.

STATE EXAMPLES

As part of its comprehensive Momentum Year strategy, the University System of Georgia successfully scaled corequisite math across its 26 universities and colleges. Motivated in part by unprecedented improvements in college-level math completion by their neighbors in Tennessee, USG's corequisite approach has also yielded impressive results. In the prerequisite model, only 13% of students placed into developmental math ever completed a college-level course; in the corequisite model, 63% of students successfully completed college math. Postsecondary institutions in Georgia are simultaneously working to align corequisite supports with multiple math pathways and enrolling larger proportions of students into statistics and quantitative-reasoning courses.

During the 2017 legislative session, lawmakers passed a developmental education reform bill requiring the majority of students to be placed in corequisite supports. H.B. 2223 stipulates that by the 2020-21 school year, 75% of all students who do not meet college readiness standards must enroll in a corequisite course. While all institutions must eventually assign a minimum of 75% of students who are placed into developmental math into corequisites, they were given three years to scale up those practices, beginning with 25% of eligible students in 2018 and 50% of students in 2019.

Final Thoughts

While K-12 and postsecondary education systems will face an unprecedented number of challenges in the months and years ahead, state policymakers can use this opportunity to establish policies that ensure students engage in math education that is relevant to their academic, personal and professional goals throughout their educational journeys.

The state-level policy considerations outlined in this Policy Brief offer a high-level framework for thinking about the improved alignment of math between K-12 and postsecondary education systems. Of course, as with all education policymaking, each of these policy ideas would need to be adapted to fit local contexts. State leaders can support implementation that has integrity to principles of equity and fidelity with evidence-based models.

In addition, structural changes can only occur with understanding, time and support of stakeholders across all levels of an institution and system. Scaling innovations in policy and practice requires not only a coordinated policy environment, but also the support of administrators, leadership of faculty and staff, and a shared commitment to student success.

About the Authors

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