
Opportunities and Challenges in Policy



CBMS Forum
May 7, 2019



The University of Texas at Austin
Charles A. Dana Center



Achieve

“Improving teacher practice is always valuable and important. If we want change at scale, too, then we need to address structure.”

-P. Uri Treisman

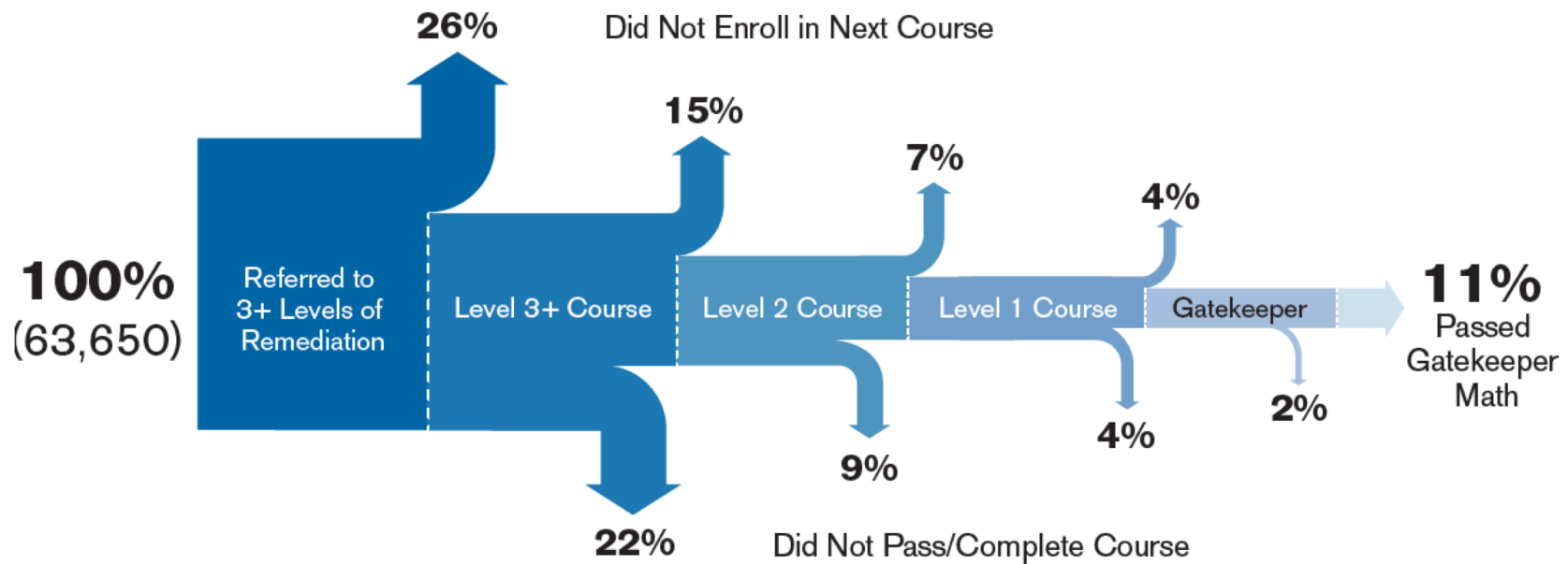
Multiple Higher Education Math Pathways



Student Supports

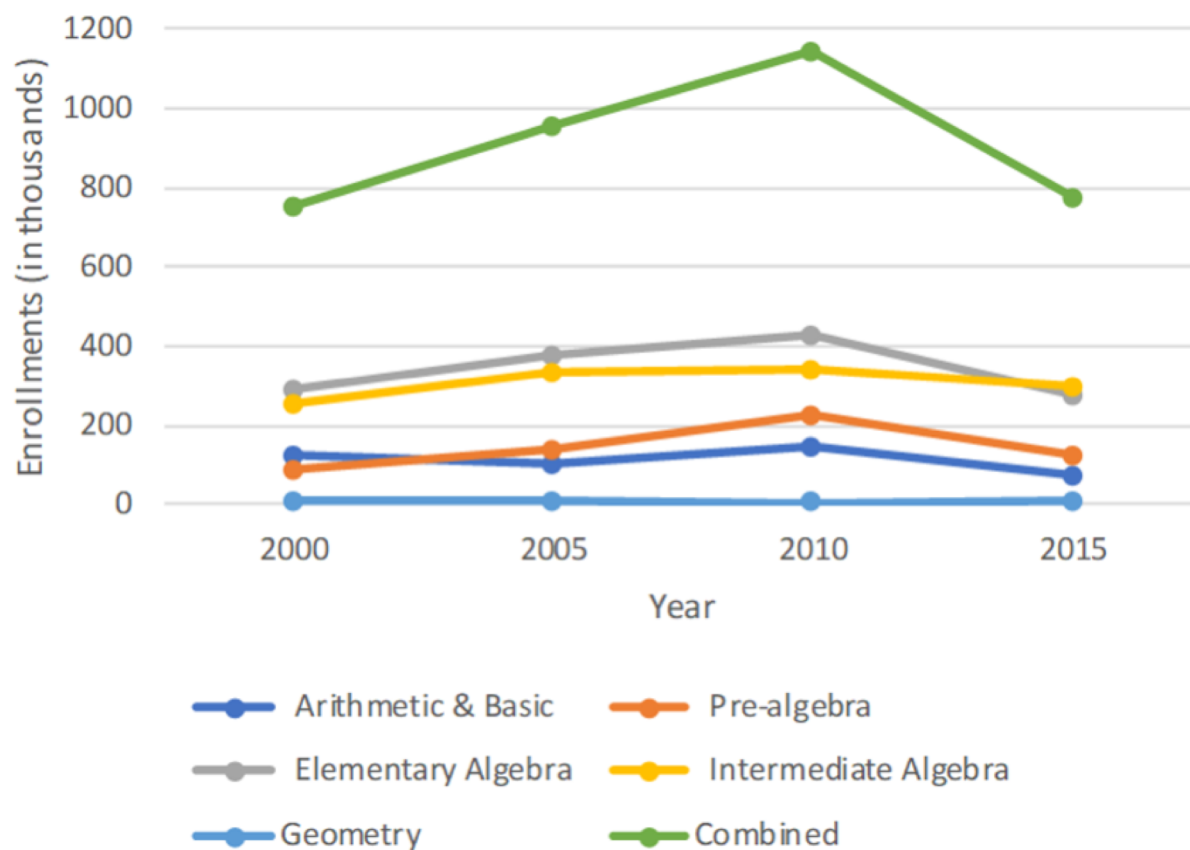
National Research Council. (2013). The mathematical sciences in 2025. *National Academies Press*. p. 10, Available at <https://www.nap.edu/catalog/15269/the-mathematical-sciences-in-2025>.

Teachers College, Columbia University (2014)



CBMS 2015 Survey

Two-year pre-college level course enrollments



Two-year pre-college level enrollments (in thousands, not including Dual Enrollment), in mathematics programs based on Table TYE.3 in the Fall 2015 CBMS Survey.

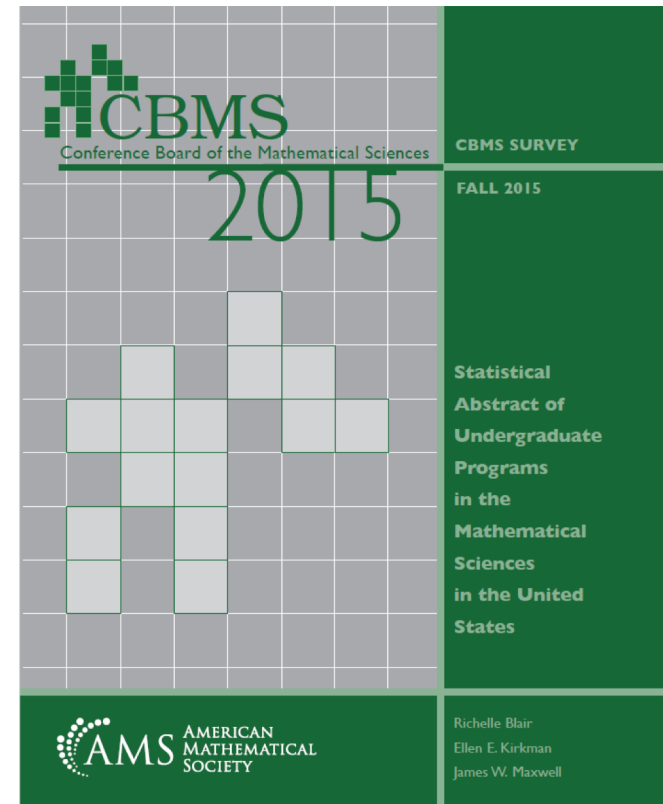


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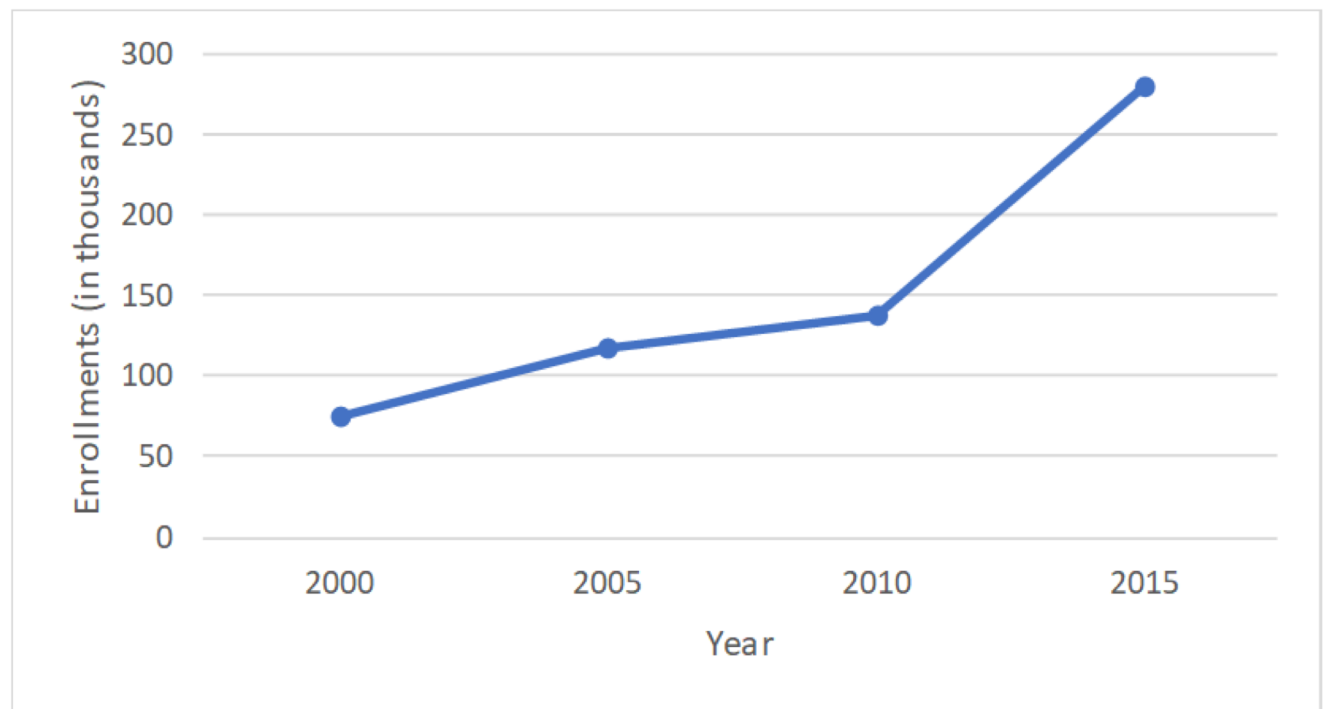
CBMS 2015 Survey

In fall 2015, 58% of two year colleges reported having implemented a pathways sequence



CBMS 2015 Survey

Two-year college
Statistics and
Probability
enrollments.



Based on Table TYE.4 in the Fall 2015 CBMS Survey.



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The Mathematical Sciences in 2025 (The National Research Council, 2013)

“The need to create a truly compelling menu of creatively taught lower-division courses in the mathematical sciences tailored to the needs of twenty-first century students is pressing...”

“Most mathematics departments still tend to use calculus as the gateway to higher-level coursework, and that is not appropriate for many students.”

A Common Vision (MAA, 2015)

“The current attention to big data and the demand for college graduates with data skills should prompt changes in our entry-level courses ...Thus, there is a call to provide mathematically substantive options for students who are not headed to calculus. These entry courses should focus on problem solving, modeling, statistics, and applications.”

Modernizing Mathematics Pathways (Dana Center)

“For students majoring in programs such as social or behavioral sciences, the most important mathematics is statistics, not algebra. For liberal arts students, who typically need to take one core math course to graduate in their majors, quantitative reasoning is likely to be more relevant to their future lives and careers.”

Recent shifts:

AMATYC (2014)

The equivalent content in **intermediate algebra** courses is not required to master the content for most college-level mathematics courses that do not lead to calculus;

Recent shifts:

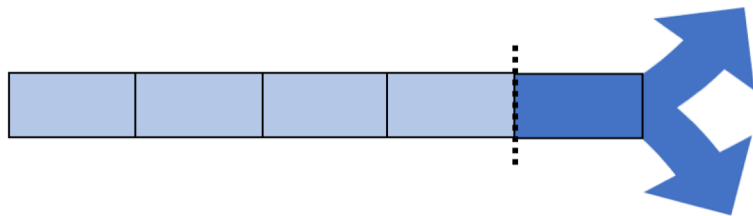
- Ohio (2015) removed language requiring Intermediate Algebra as the threshold course. They now have Quantitative Reasoning, Statistics and STEM transfer pathways.
- Michigan State (2016) dropped the college algebra requirement.
- California State University (2017) dropped intermediate algebra as a universal prerequisite.

Recent shifts *through legislation*:

- CA (2017): AB705 - Colleges cannot require remedial courses unless “placement research” shows that students will be highly unlikely to succeed.
- TX (2017): HB2223 – Co-requisite models are required.
- TX (2015): HB5 – Endorsements and Transition Courses
- WA (2019): Pathways to graduation and Transition Courses

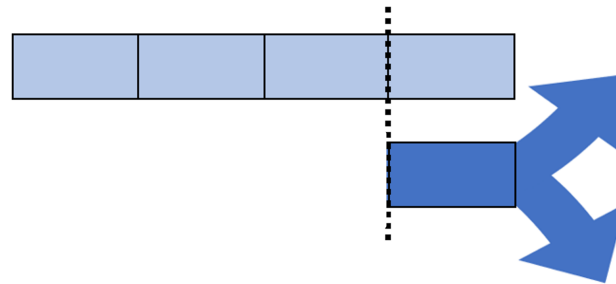


An oversimplified, yet illustrative picture:

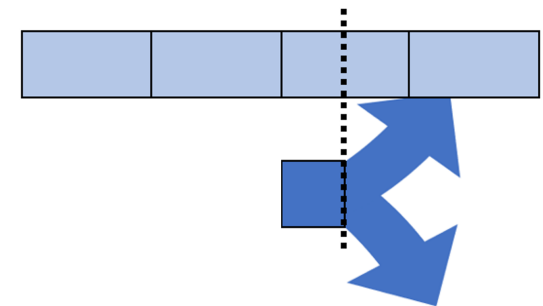


K12 and college systems are structured for a clean line between high school and college. After four years of high school mathematics a student is ready for college.

Really, though, colleges teach much of the same mathematics as high schools, and the “college ready” bar (content-wise) often overlaps with HS.



With college pathways the “college ready” line becomes even more ambiguous.



MD's Kirwan Commission (2019)

“A college and career readiness (CCR) standard will be established that certifies that the student has, by the end of tenth grade, the requisite literacy in English and mathematics needed to succeed in first-year, credit-bearing courses in open enrollment postsecondary institutions in the State.”

Degrees of Freedom (PACE/ LearningWorks)

“Interestingly, both sides of the debate on alternatives are grounded in a concern about eliminating barriers for students: While proponents of alternative pathways view algebra-intensive curricula as a potential barrier to students’ success, critics fear that an education without advanced algebra itself constitutes a barrier.”

Stanford Admissions

Recommended High School Curriculum

We respect the responsibility that high schools, principals and teachers have in the development of courses and curricula for their students. For that reason, **we do not have a set of required courses for admission to Stanford.** We have found, though, that a curriculum emphasizing **depth and breadth across the core academic subjects** is the best preparation for the academic rigors at Stanford. Our experience has suggested that students who excel in a curriculum like the one below are well-suited for the demands of college academics:

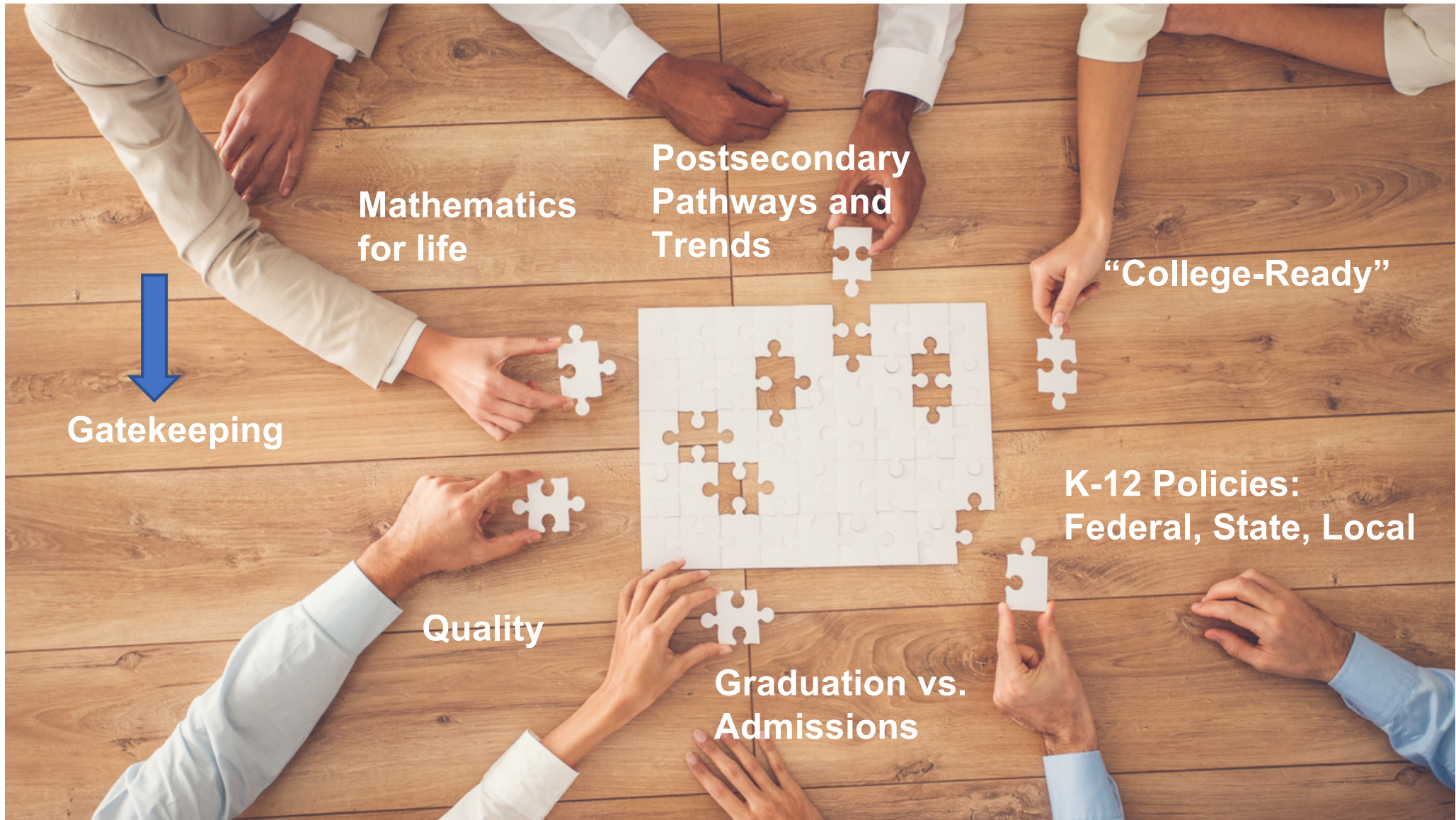
Mathematics: four years, with significant emphasis on fundamental mathematical skills (algebra; trigonometry; plane, solid and analytic geometry).

Connecting K-12 and Post-Secondary Education

- Regional work within three different states
- Consider and implement and transition courses for students not quite ready yet.
- Redefine Algebra 2 and follow-on courses. Algebra 2 Equivalent Pathways

Quality

What does a mathematically rigorous experience require and how can intersegmental trust help?



Mathematics
for life

Postsecondary
Pathways and
Trends

“College-Ready”

Gatekeeping

K-12 Policies:
Federal, State, Local

Quality

Graduation vs.
Admissions

Based on your Problem...

- How does this landscape inform your sense of challenges and opportunities?

