

Solving for Equity in Practice: New Insights on Advancing College Opportunity and Success

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Initiatives to modernize mathematics pathways through high school and college have opened up new opportunities for students to deepen their quantitative literacy skills in ways that are relevant to their educational and career interests. New pathways in areas such as statistics, data science, and quantitative reasoning—together with postsecondary reforms to ensure access to college-level¹ courses—can contribute to equitable math outcomes, but only if they are implemented in ways that focus on equity. In particular, they need to be designed intentionally: rather than reinforcing traditional patterns of tracking, they need to attract historically excluded groups into STEM and other lucrative majors, such as business and economics, that require calculus.

*Solving for Equity in Practice*² examines implementation of new math policies in California colleges and universities to delve more deeply into understanding how college

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¹Unlike in some states, California community colleges offer some college-level courses that do not transfer to universities. Because this report is for a national audience, we use the term “college-level courses” to refer to transfer-level courses. When the term “transfer-level” appears in a quotation from a college professional or a student, we leave it as is.

²See <https://justequations.org/resource/solving-for-equity-in-practice-report-main/>.

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and university professionals think about and address the equity implications of redesigned math pathways. The goal is to ensure that students have access to college-level math courses, including those that prepare them to enter STEM fields. Based on conversations with 27 college professionals and 50 students at six institutions, this report is organized by four strategies, identified in earlier Just Equations research, *Solving for Equity*:

- Using **inclusive notions of rigor and relevance** in the design of math pathways.
- **Replacing prerequisite remedial courses** with corequisite courses and other forms of embedded support.
- Institutionalizing practices that **foster students’ math identity** and sense of belonging.
- **Actively recruiting and providing support** for Black, Latinx, and other historically excluded students to enroll and succeed in STEM pathways.

Starting Point: An Equity Mindset

As California college and university professionals described their efforts to improve math opportunity and success, the following four principles illustrated their equity mindset:

1. The college is committed to **proactively understanding and meeting each student’s needs**, both academic and nonacademic, to ensure student success.
2. The college assumes responsibility for **creating and sustaining a college culture** that is student centered and equity driven.
3. The college **prioritizes equitable practices in the classroom**.

4. The college uses **data and feedback** from students to design reforms, assess reform effectiveness, and inform future efforts.

Equity in Context

Under the new California policies, Assembly Bill 705 and Executive Order 1110, both the California community colleges and California state university campuses were reducing or eliminating all remedial math sections, placing most or all students into college-level math courses. Along with new placement practices, the institutions were adopting concurrent supports, including corequisite courses, to ensure that students have the best chance of successfully completing quantitative-reasoning requirements early in their college career. These strategies, together with a de-emphasis on algebra-centric prerequisites for students pursuing non-STEM majors, have been tied to stunning improvements in outcomes in both systems early in their implementation [1, 2].

Equity in Practice

Interviews with college professionals illustrate progress as well as challenges in implementing the four *Solving for Equity* strategies. College professionals had the most to say about the second strategy, **replacing prerequisite remedial courses with corequisite courses and other forms of concurrent support**, which is also most directly tied to the new state policies.

Using inclusive notions of rigor and relevance to design math pathways

College professionals were aware of the importance of having several math pathway options so that irrelevant math requirements wouldn't serve as an obstacle to students' educational progress. They adopted such practices as tailoring math course recommendations to students' majors and using corequisite sections to ensure that the math courses students enrolled in align with their academic objectives. Many institutions designed visuals to help students navigate their options. Counselors and advisors work closely with the math department to remain current on institutional policies and practices and how best to support student needs.

Replacing prerequisite remedial courses with corequisite courses and other types of concurrent support

College professionals were enthusiastic about how corequisite strategies could support more equitable math outcomes for students who previously would have placed into remedial courses. Many pointed to the removal of remedial-level courses in and of itself to illustrate their commitment to equity. To fulfill that commitment, colleges created momentum, built capacity, and made a convincing case for the new approaches, using research and data to demonstrate that students can succeed in college-level courses.

They embarked on collegewide efforts to design their new placement processes, as well as the structure and scheduling of new supports, such as corequisite classes. Nevertheless, students had varying responses to corequisites. While some welcomed the additional support, others seemed confused about the purpose of the additional class.

Institutionalizing practices that foster students' math identity and sense of belonging

Teaching during the COVID-19 pandemic heightened professors' awareness of student needs and reshaped their notions of equity. One result was an emphasis on humanizing interactions, ranging from how professors introduce themselves to the students via a syllabus to how they reach out to students who don't turn in assignments. Because student social networks can contribute to success in mathematics, some colleges have supported students in the creation of peer support systems or recommend that students visit the counseling/advising center. Equity-minded faculty development is also an important way to improve students' math class experiences. Colleges' faculty development efforts often focused on sharing ownership of courses through communities of practice or coordination across multiple sections of the same course in order to enhance equity by limiting variation by section. Collaboration between instructional faculty and counseling professionals—including having counselors present in corequisite courses—also contributes to ensuring students receive the support they need.

Actively recruiting and providing support for students traditionally underrepresented in STEM pathways

Although recruiting Black, Latinx, and other underrepresented students was not explicitly mentioned in interviews as an equity strategy, college professionals shared a fundamental concern about colleges' responsibility to ensure that all students were accessing counselors and advisors effectively.

Students echoed that concern, with some noting that they needed more guidance to understand their math pathway options. In fact, the expansion of modernized math pathways tied to majors and careers has led college professionals to recognize the need to provide more and earlier support for students concerning their majors and career choices. Some suggested incorporating career exploration into math classes. In some community colleges, these moves align with efforts to build "guided pathways" that map programs to career and transfer outcomes to help students stay on track and complete their programs efficiently. Having counselors or advisors dedicated to STEM majors was considered a positive strategy by both college professionals and students. Students, who reported mixed experiences with counselors and advisors, also favored the idea of having a dedicated counselor or advisor, rather than

consulting different professionals each time they needed guidance.

Equity in the Context of COVID-19

Despite the challenges presented by COVID-19 to students and college professionals, both groups noted that **some aspects of remote learning and other responses to the COVID-19 pandemic are worth preserving**. Colleges have become more aware of the hardships their students face and are better equipped to help them. Practices interviewees felt could remain beneficial to students post-pandemic include:

- Instructors' video recordings of lectures.
- Increased responsiveness of instructors, including online office hours at a variety of times.
- Instructors' use of engaging and supportive online tools and resources.
- Continued availability of online scheduling and appointment options to provide easier access to counselors, advisors, and tutors, including outside of regular business hours.
- A focus on addressing students' academic and basic needs, including technology needs.

Equity Work in Progress

Ensuring that math is not a barrier to college success, particularly for students who historically have been excluded from STEM fields, requires an equity-driven culture. To better serve students, colleges need to innovate and take risks.

The institutions that participated in this study exhibited a commitment to eliminating barriers to math success. While they had taken concrete steps toward implementing all four of the *Solving for Equity* strategies, they were much further along in implementing the first two. All had adopted alternatives to the traditional Calculus pathway, allowing students to meet their math requirements with **college-level courses relevant to their program of study**. They had also eliminated some or all prerequisite remedial math courses, providing concurrent support when needed to students in college-level courses.

The colleges all have more work to do, as none have completely eliminated racial/ethnic gaps in gateway math completion. Going forward, the colleges have the most opportunity to deepen their efforts by focusing on strategies three and four. Though professionals supported the idea of **inclusive practices that cultivate students' math identities** and **fostering opportunities for traditionally excluded students to pursue STEM disciplines**, they had fewer accomplishments to share in these two areas.

Recommendations for Colleges

Based on institutions' work to advance equity through math education, as well as their unfinished agendas, colleges should do the following (for a complete list, see the full report):

- Adopt a **clear equity vision** that incorporates race-specific efforts to dismantle structures that impede STEM pathway access and success for Black and Latinx students.
- Foster a **culture of inquiry** that includes:
 - Using disaggregated data to track progress toward improving outcomes for marginalized students.
 - Gathering and using student voices and perspectives to inform redesign.
- Promote **inclusive learning environments** that foster students' math confidence and math identity by offering professional development to support faculty in employing culturally responsive teaching and recognizing and addressing implicit bias.
- Provide **effective guidance for students** through:
 - Frequent and transparent communication about math pathway options, requirements, and placement processes.
 - Readily accessible counseling, including strategies for encouraging or mandating regular check-ins with a counselor.

References

- [1] K. R. Bracco, V. X. Barrat, S. Skjoldhorne, and N. Finkelstein, *Student progress before and after California State University's Executive Order 1110*, WestEd (2021), <https://www.wested.org/resources/student-progress-before-and-after-csu-executive-order-1110/>.
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