
California Acceleration Project Webinar

New Insights into Math Instruction that Promotes Equity

Friday, September 29, 2023, from 1:30-3:00



Presenters

Annalinda Arroyo
Faculty
Cuyamaca College

Mina Dadgar
Executive Director
Education Equity Solutions

Bri Hays
Interim Vice
President of Student Services
Cuyamaca College

Linda Hintzman
Faculty
Pasadena City College

Michelle Hodara
Senior Leader
Education Northwest

Tammi Marshall
Interim Dean of Math, Science
& Engineering
Cuyamaca College

Sam Riggs
Senior Researcher
Education Northwest



Agenda

1. Authors share findings from study:
 - Contribution of different factors including faculty on transfer-level math course success
 - The role of instructional practices in supporting student success, especially Black and Latino students
2. Faculty discuss what the evidence-based practices look like in their classroom
3. Faculty and administrators discuss ways to institutionalize effective practices

Counting on Math Faculty

Examining the Role of
Faculty and Instructional Practices
in Students' Gateway Math Success

Mina Dadgar | Sam Riggs | Michelle Hodara | Dina Buck

Technical Report
September 2023

Education
Equity
Solutions

Instructional practice matters

- Higher education research on student success has focused on student characteristics and prior achievement with less attention to instructional practice.
- But we know that:
 1. “The nature of classroom mathematics teaching significantly affects the nature and level of students’ learning.” (Hiebert & Grouws, 2007)
 2. Having an effective teacher has a large, positive effect on student outcomes (e.g., Rockoff, 2004).
- What makes mathematics instruction effective?
 - In this study, we investigate four research-based domains.
 - Producing changes in educator practice requires high-quality professional learning.



Study overview

- Study examined the **role math instructors and instructional practices** play in **determining student success** in transfer-level math courses
- **22,827 students**, enrolled in **704 math courses**, taught by **159 faculty** at four California community colleges between winter 2020 and spring 2022
- **3,695 students** enrolled in **185 math courses** in spring 2022 matched with **course syllabi** and **faculty surveys** to examine specific instructional practices associated with student outcomes.

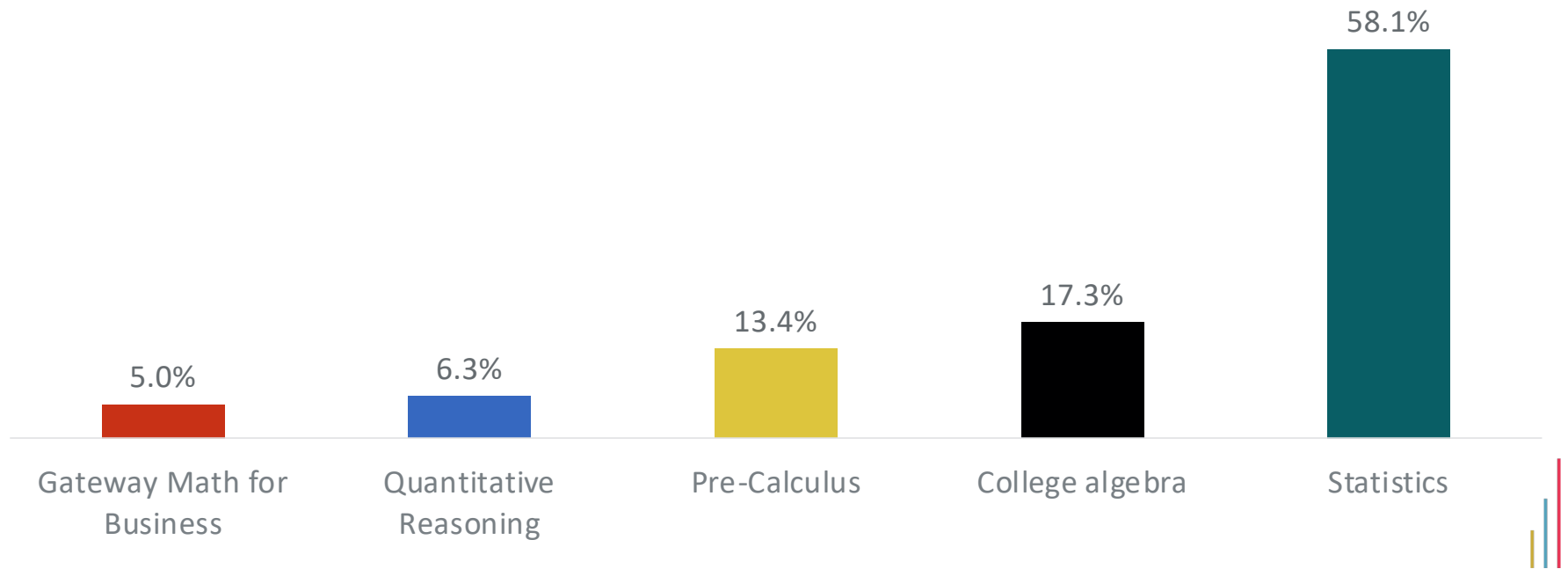


Key findings

1. Math faculty are the most important factor in determining a student's successful completion of a transfer-level math course.
2. Specific instructional practices can reduce racial disparities in transfer-level math course outcomes.

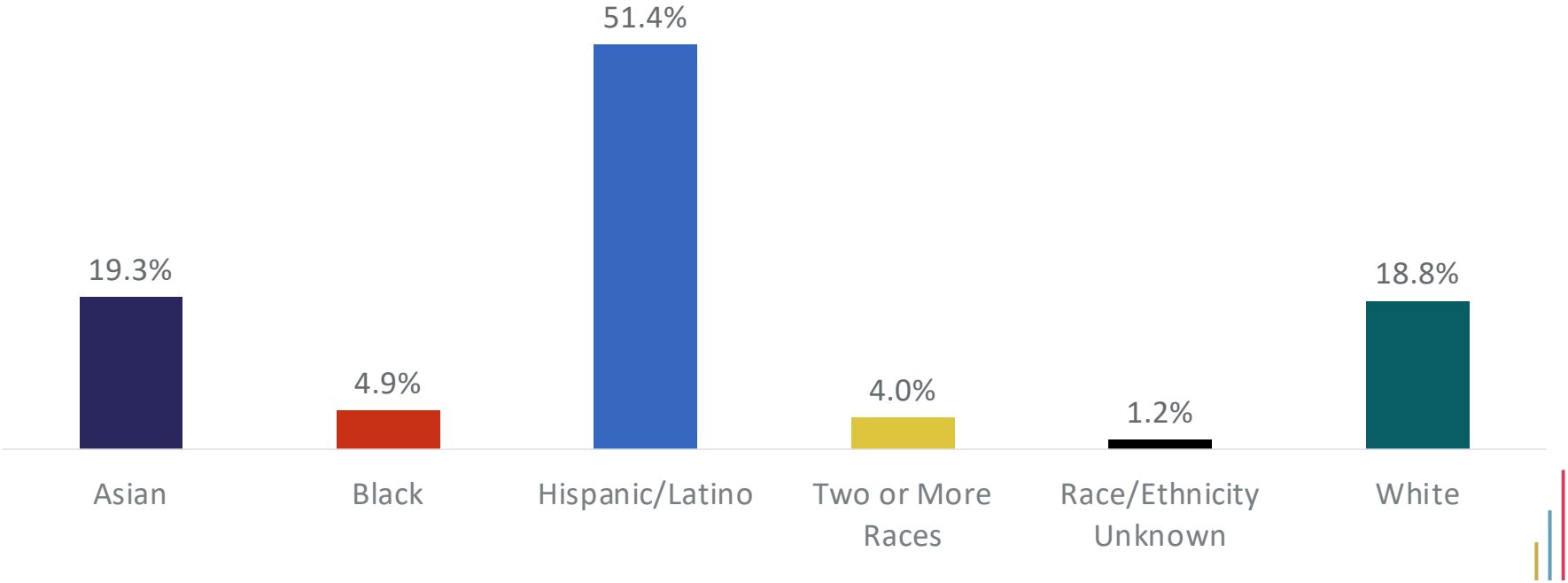


Most gateway transfer-level math courses in our sample were in **Statistics**



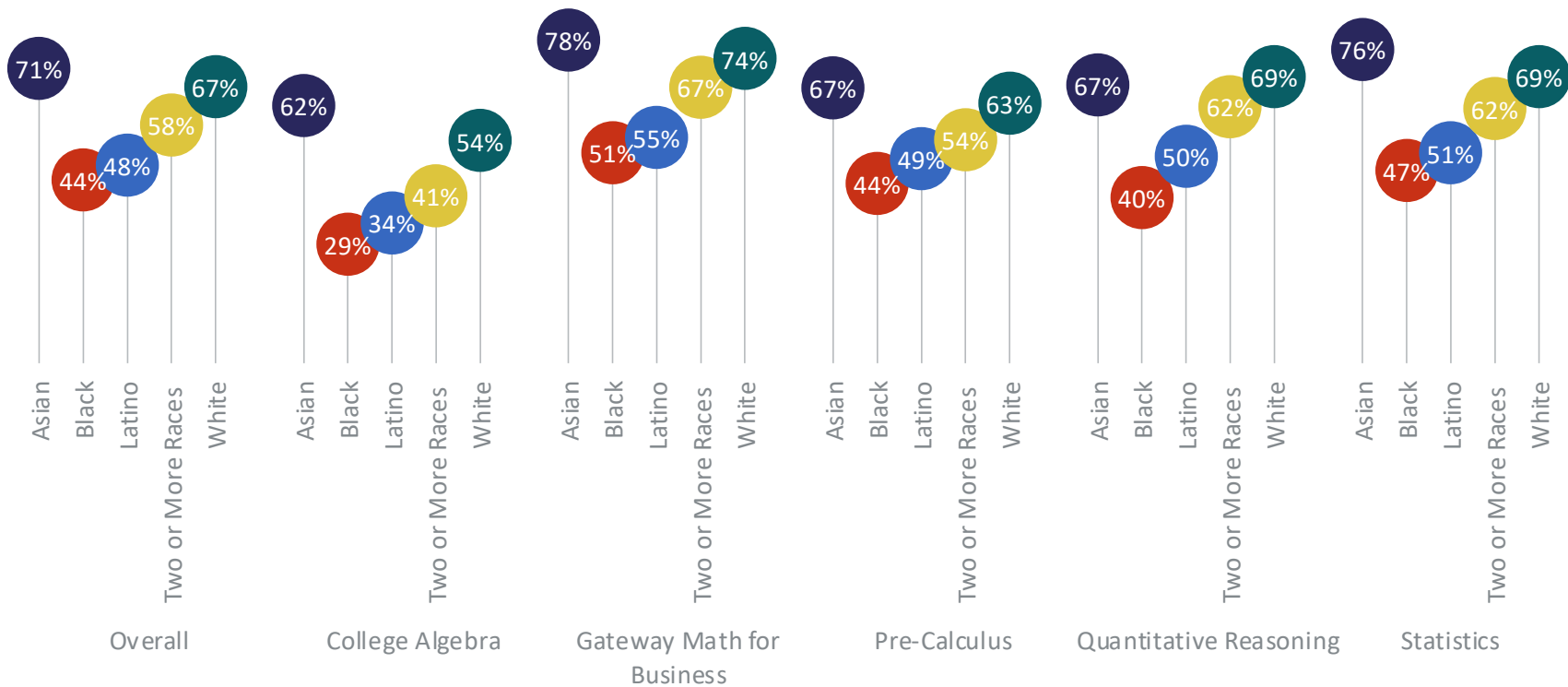
Source: Authors' analysis of colleges' data.

The majority of students enrolled in transfer-level math in our sample identify as **Hispanic/Latino**



Source: Authors' analysis of colleges' data.

Black and Latino students had the lowest pass rates across all transfer-level math courses



Source: Authors' analysis of colleges' data.



The role of instructors in supporting student success



Methods overview

- Estimate a series of multi-level regression models
- Primary outcome is whether student passes transfer-level math course with a C or higher
- Explanatory variables include student demographics, prior academic preparation, high school student attended, course attributes, student's instructor
- Focus on adjusted R-squared to examine relative importance of each set of factors.

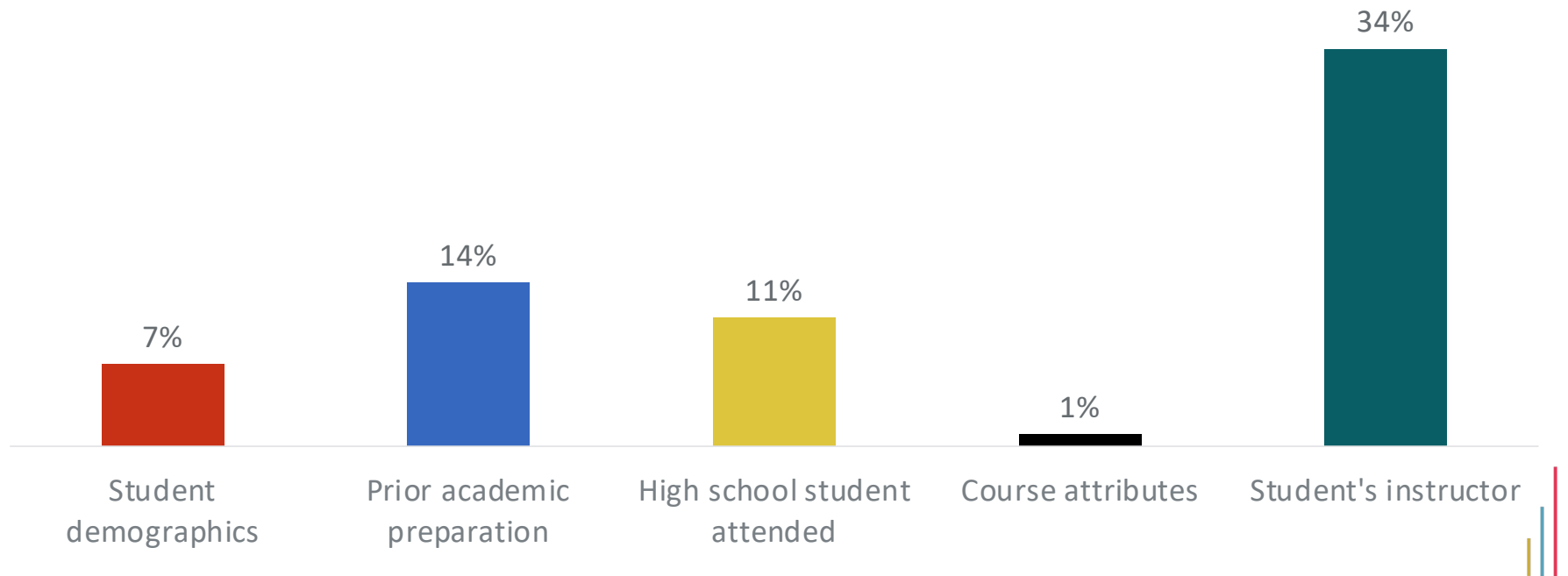


Explanatory variables

- **Student demographics** age, disability status, eligibility for California College Promise Grant, gender, race/ethnicity, and veteran status
- **Student's prior academic preparation** high school GPA, and whether the student enrolled in a gateway math course in a previous term.
- **High school student attended**
- **Course attributes** course length in weeks, class size, course type
- **Student's instructor**



Faculty are the most important predictors of student success in transfer-level math courses



Source: Authors' analysis of colleges' data.

The role of instructional practices in supporting student success



Findings are consistent across different time periods, student samples, and outcomes

- All terms (winter 2020 – spring 2022) vs. latest term (spring 2022)
- By student racial/ethnic groups
- Whether or not students with missing high school GPA are excluded from the sample or missing GPAs are imputed
- Across different outcomes:
 - Student passed with a B or higher
 - Student grade in course
 - Student withdrew from course



Identifying Practices to Examine

- Through literature review and input from advisory, developed a list of domains and subdomains of evidence-based practices.
- Use the domains/sub-domains to create faculty survey and syllabi analysis rubric
- Domains:
 - Assessment & Grading
 - Classroom Culture/Messaging
 - Pedagogy
 - Commitment to reducing racial equity gaps



Method for Identifying Effective Instructional Practices

- Linked results from survey and syllabi analysis with student, course, and faculty data from spring 2022
 - 3,695 students
 - 185 math courses
 - 104 instructors
- 75% survey response rate
- Matched 81% of courses to syllabi



Instructional Practices that Support Student Success

Encouraging student to seek help/communicating support

Benefits Black students

Fostering belonging

Benefits Black students

Offering accommodations equitably

Benefits Black & Latino students

Taking responsibility for addressing racial equity

Benefits Black students

Implementing growth-oriented and transparent assessment and grading practices

Benefits Black, Latino & Asian Students



Examples of effective
instructional practices &
ways to institutionalize them



CAP Professional Development Opportunities and Resources

accelerationproject.org

Publications:

- > This presentation's recording and slides available October 6
- > Check In So Students Don't Check Out

Events:

- > CAP Webinar 2 (October 5 @ 3:00):
Building Cultures of Growth in Our Classrooms
- > CAP Webinar 3 (October 27 @ 1:00):
Learning from Our Students' Experiences to Create Classroom Cultures that Promote Equity

