THE MATHEMATICS OF OPPORTUNITY

November 5, 2018
The David Brower Center

Just Equations
a project of the Opportunity Institute
We advance economic and social upward mobility, focusing primarily on the use of cradle-to-career education as a tool to help eradicate poverty and racial inequality.
Re-conceptualizing the role of math in ensuring educational equity
Our Values

Evidence
Equity
Rigor
Alignment
Our Strategies

• **Sense-making** through analyzing evidence and synthesizing research

• **Agenda-setting and raising awareness** through strategic communications

• **Bridge-building** through convening, dialogue, and partnerships

• **Strategic advice** on math opportunity issues
Our Core Partners

OPPORTUNITY
INSTITUTE

The Campaign for
College Opportunity

The Education Trust–West

LearningWorks
linking knowledge, policy and practice

PACE
Policy Analysis for California Education
Other Partners

The James Irvine Foundation

COLLEGE FUTURES FOUNDATION

• Advisors & Collaborators

• YOU!
Goal for today

Advance the role of math in fostering, not limiting, equity by:

• Deepening thinking about role of math in educational equity, and the goal of equity in math education

• Building a common conversation across educational segments about strategies to advance math equity

• Highlighting ways that policy and evidence can help improve the effectiveness of math education in promoting educational equity
Why Mathematics?
It’s the “After Math”

“Who is putting the math books in the horror section?”
Purpose of Math

• Expand professional opportunity

• Understand and critique the world

• Experience wonder, joy, and beauty
Equity in Mathematics?

“the inability to predict mathematics achievement and participation based solely on student characteristics such as race, class, ethnicity, sex, beliefs, and proficiency in the dominant language”

-Rochelle Gutierrez
Architecture of Math Opportunity

- Misconceptions about Math
- Existing Educational Inequities
- Mathematics as Pedigree
- Math Opportunity

- Architecture of Math Opportunity
  - Inequity
  - Lack of Good Teachers
  - Income Inequality
  - Stereotypes
  - Poorly Resourced Schools

MISCONCEPTIONS
Misconceptions about Math Skill
Misconceptions about Math Skill

• **Math ability is innate**: Only some people are good at math.

• **There is a right way to do math**: It lacks creativity or expression.

• **Speed and acceleration matter**: Process and depth are secondary.
Existing Educational Inequities

- Poorly-resourced schools
- Differential access to strong curriculum, good teachers
- Income inequality
- Insufficient support for students’ needs
- Existing bias and stereotype threat
- Psychic effects on students of the above
Math as Pedigree
Math as Pedigree

**Pedigree** preserves the position of individuals and groups that already enjoy privilege.

**Preparation** is intended to provide individuals the foundation they need to succeed at the next level.
Math Opportunity Impacts

- Course-taking,
- Earning high school diploma
- Earning acceptance to college, esp. selective college
- Taking non-remedial math courses upon college entry
- Entering desired programs, and ultimately
- Earning college degree that confers access to career & opportunities
NAVIGATING MATH JOURNEYS

Jessie Ryan, Campaign for College Opportunity
Javier Cabral, Journalist
Reflecting on your Math Journeys

Please pair up with a partner and share:

• What were critical points on your mathematics journey?
• How has math education helped or hindered you in your life and career?
• What are you doing/would you like to be doing to ensure more students have a positive experience of math?

(If preferred, feel free to do this exercise with a student or family member in mind)
BREAK

Please be back at 10:20
MATH EDUCATION IDEALS & REALITIES: An Equity & Policy Dialogue

Christopher Edley, Jr., Opportunity Institute, UC-Berkeley
Michael W. Kirst, California State Board of Education, Stanford University
Alexandra W. Logue, City University of New York
Eloy Ortiz Oakley, California Community Colleges, UC Board of Regents
REFLECTIONS BEFORE LUNCH

Improving the Role of Math in Fostering Equity:

*Please use the YELLOW notecard in your folder*

- Please write down the most important idea you heard or that occurred to you during this morning’s conversation.

(Name is optional)
LUNCH
in the Gallery

See you back here at 12:45!
Four Equity Dimensions of Math Education

- Content
- Instruction
- Assessment

Readiness Policies & Structures
Rethinking Content
Math Content

• Rigor, relevance

• Traditional Algebra-to-Calculus pathway

• Diversified math pathways, such as
  • statistics
  • mathematics modeling
  • data science

• Equity & access to STEM fields
Rethinking Postsecondary Math Pathways

Source: WestEd, Just Equations 2018
Rethinking Instruction

performance  learning
speed  depth
symbolic  multi-representational
elite  equitable
ability  effort
test and grades  everyone can learn
formulas  feedback for learning
procedures  thought
answer  creativity
process

See Jo Boaler, Stanford University
Rethinking **Assessment**

- High stakes vs. low stakes
- Timed tests
- Bubble tests vs. performance assessments
- Disparate impact
- Uses: admissions, placement, learning
Rethinking Readiness Policies

• **High school** placement, tracking, acceleration, and graduation policies

• **Postsecondary** admissions, placement, general education, transfer, and graduation policies
# California’s Readiness Policies

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Years Required</th>
<th>Including</th>
<th>New Pathways?</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school graduation</td>
<td>2</td>
<td>Algebra 1</td>
<td></td>
</tr>
<tr>
<td>Common Core</td>
<td>3 (4 recommended)</td>
<td>Algebra 2</td>
<td></td>
</tr>
<tr>
<td>UC/CSU admission</td>
<td>3 (4 recommended)</td>
<td>Algebra 2</td>
<td>Data science can count</td>
</tr>
</tbody>
</table>
| FUTURE: UC/CSU admission         | 4 ??           | Algebra 2??| Data science?  
Computer science?  
Personal finance? |
YOU = **New Architects of Math Opportunity**
Equity Principles - forthcoming
DEEP DIVE SESSIONS

KEY QUESTIONS:

• What research is most needed in this area to support effective policy and practice?

• What is the best role for policy (state and/or system) to advance equity and support effective practice?
DEEP DIVE SESSIONS - A
(Kinzie Room A)

CONTENT - New Math Pathways & College Success

A1. Implementing new math pathways through AB 705 and EO 1100 (1:15-2:30)
   Amy Getz, Charles A. Dana Center - FACILITATOR
   Myra Snell, California Acceleration Project, Los Medanos College
   Sonja Manor, California State University-Humboldt

A2. Emerging high school math pathways (2:45-4:00)
   Phil Daro, SERP Institute - FACILITATOR
   Suyen Machado, Center X, University of California-Los Angeles
   Ho Nguyen, San Francisco Unified School District
DEEP DIVE SESSIONS - B  
(Kinzie Room B)

INSTRUCTION & ASSESSMENT: Increasing Math Equity

B1. Math Assessment to Enhance Learning  (1:15 - 2:30)
   Kimberly Samaniego, Math Diagnostic Testing Project, UCSD - FACILITATOR
   Theresa Morris, California Performance Assessment Collaborative
   Kimberly Seashore, San Francisco State University

B2. Math Pedagogy for Equity (2:45 - 4:00)
   Ravin Pan, Sacramento State University - FACILITATOR
   Karen Mayfield-Ingram, UC Berkeley, Lawrence Hall of Science
   Vanson Nguyen, College of Alameda
C1. Four Years of High School Math: Implications for College Access & Readiness (1:15 – 2:30)
Chris Nellum, Education Trust-West - FACILITATOR
Michal Kurlaender & Minahil Asim, University of California-Davis, PACE
Rick Ford, CSU-Chico, Academic Senate APEP Committee
Christina Espinosa, Sacramento City Unified School District

C2. Readiness & Alignment: Moving Beyond Tests for Placement (2:45 – 4:00)
Linda Collins, Career Ladders Project - FACILITATOR
Tatiana Melguizo, University of Southern California
John Hetts, Educational Research Partnership
Joy Salvetti, Sacramento State University
DESIGNING MATH FOR OPPORTUNITY

System Representatives

Zulmara Cline, California State University
Stephanie Gregson, California Department of Education
Monica Lin, University of California
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THANK YOU FOR BEING ARCHITECTS OF MATH OPPORTUNITY!