

There's Something Happening Here

Lessons on Transformative Mathematics Education
from Colorado's Equity in Excellence Project

James Gray
Chair, Mathematics Department
Community College of Aurora



Community College of Aurora
Go Beyond the Book

Alicia Dowd



Estela Bensimon



Navigation icons: Car, Transit, Walking, and a search icon.

Los Angeles International Airport, 1 World Way, L
Omni Los Angeles Hotel, 251 S Olive St, Los Ange

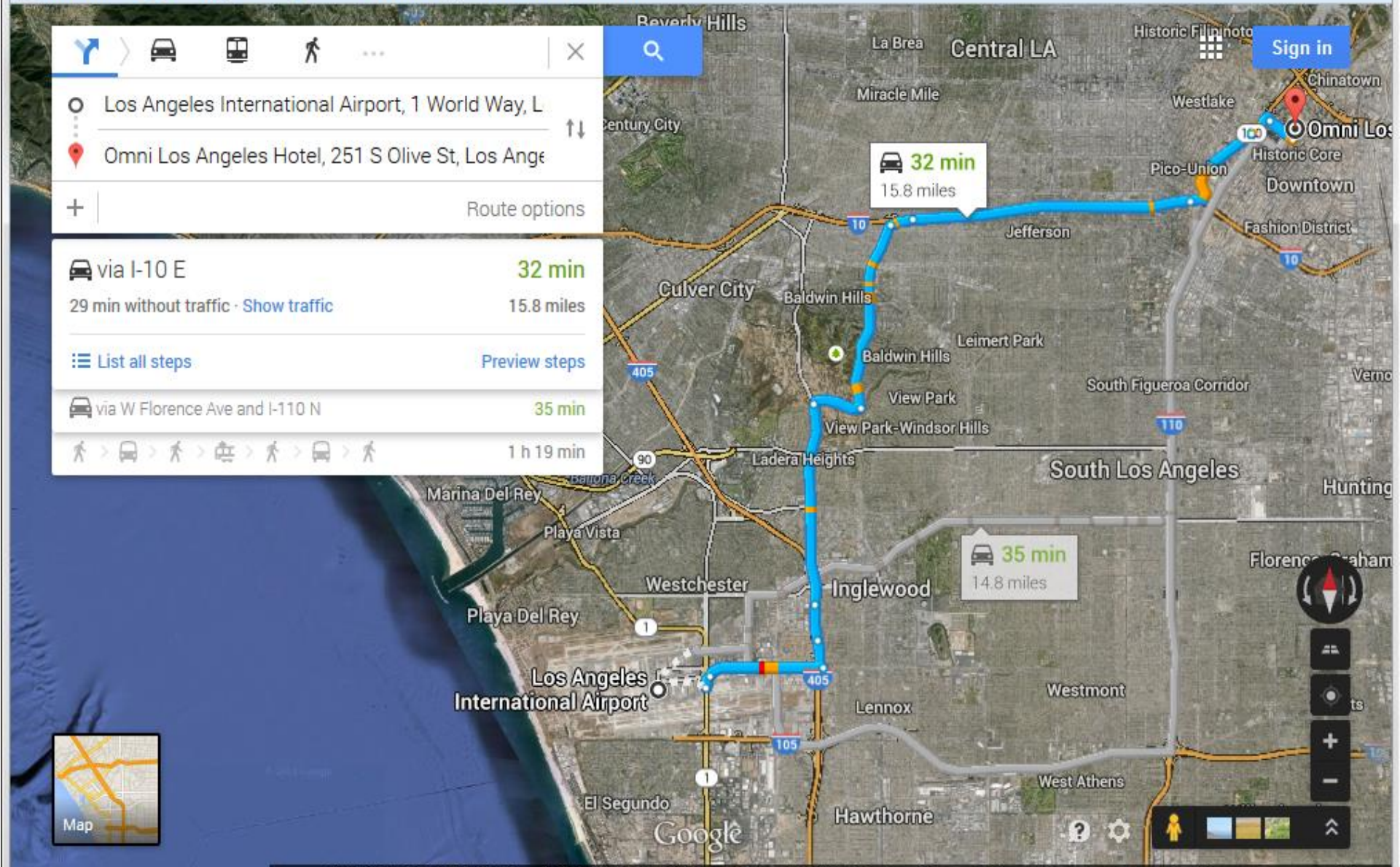
Route options

via I-10 E **32 min**
29 min without traffic · Show traffic 15.8 miles

List all steps Preview steps

via W Florence Ave and I-110 N **35 min**

1 h 19 min



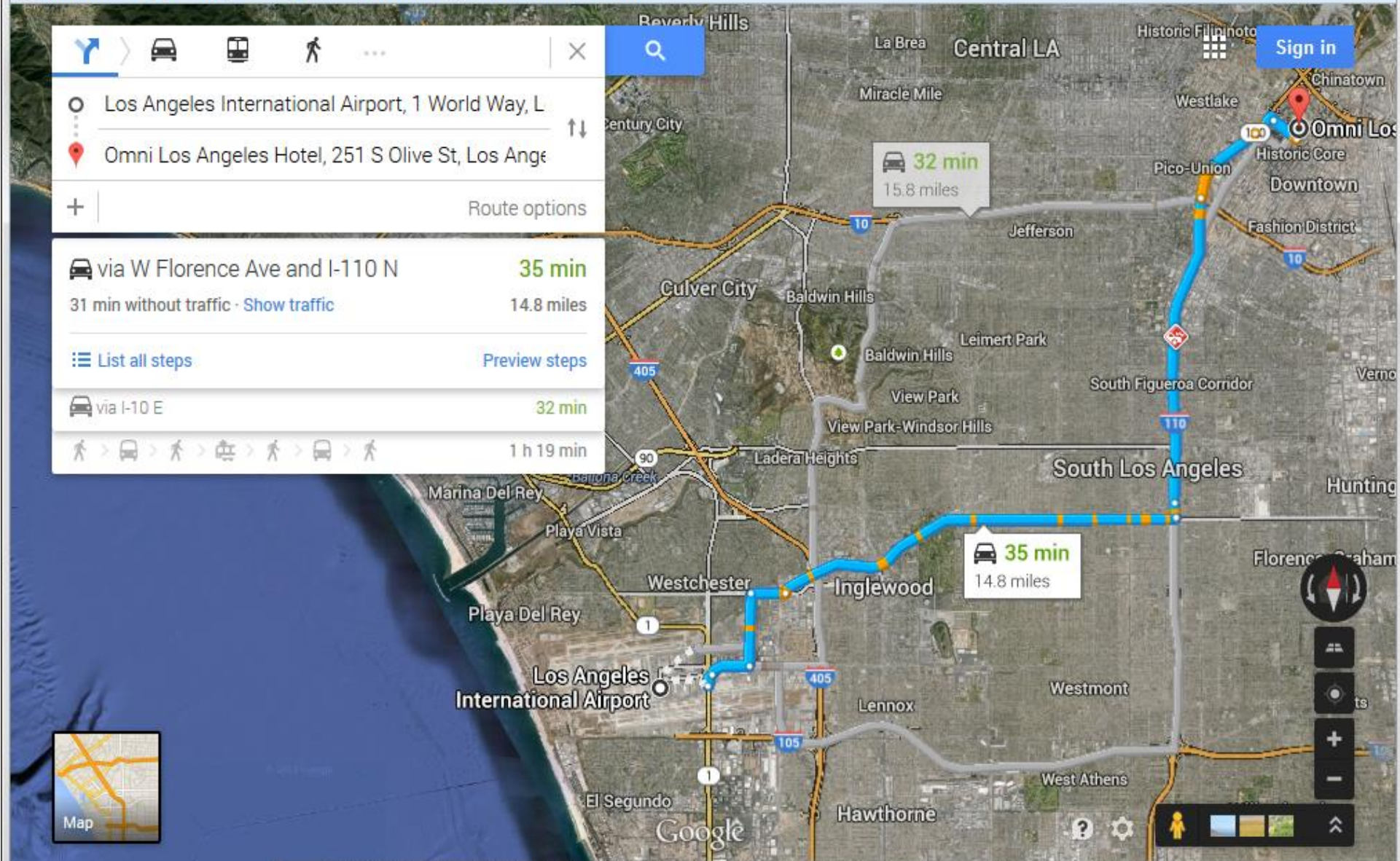
Navigation icons: Car, Transit, Walking, etc.

Start: Los Angeles International Airport, 1 World Way, L

End: Omni Los Angeles Hotel, 251 S Olive St, Los Ange

Route options

- via W Florence Ave and I-110 N **35 min**
31 min without traffic · Show traffic 14.8 miles
- List all steps Preview steps
- via I-10 E **32 min**
- 1 h 19 min



Los Angeles International Airport, 1 World Way, L
 Omni Los Angeles Hotel, 251 S Olive St, Los Ange

Route options

> 3 > > **1 h 19 min**

Metro Green Line (803) > >

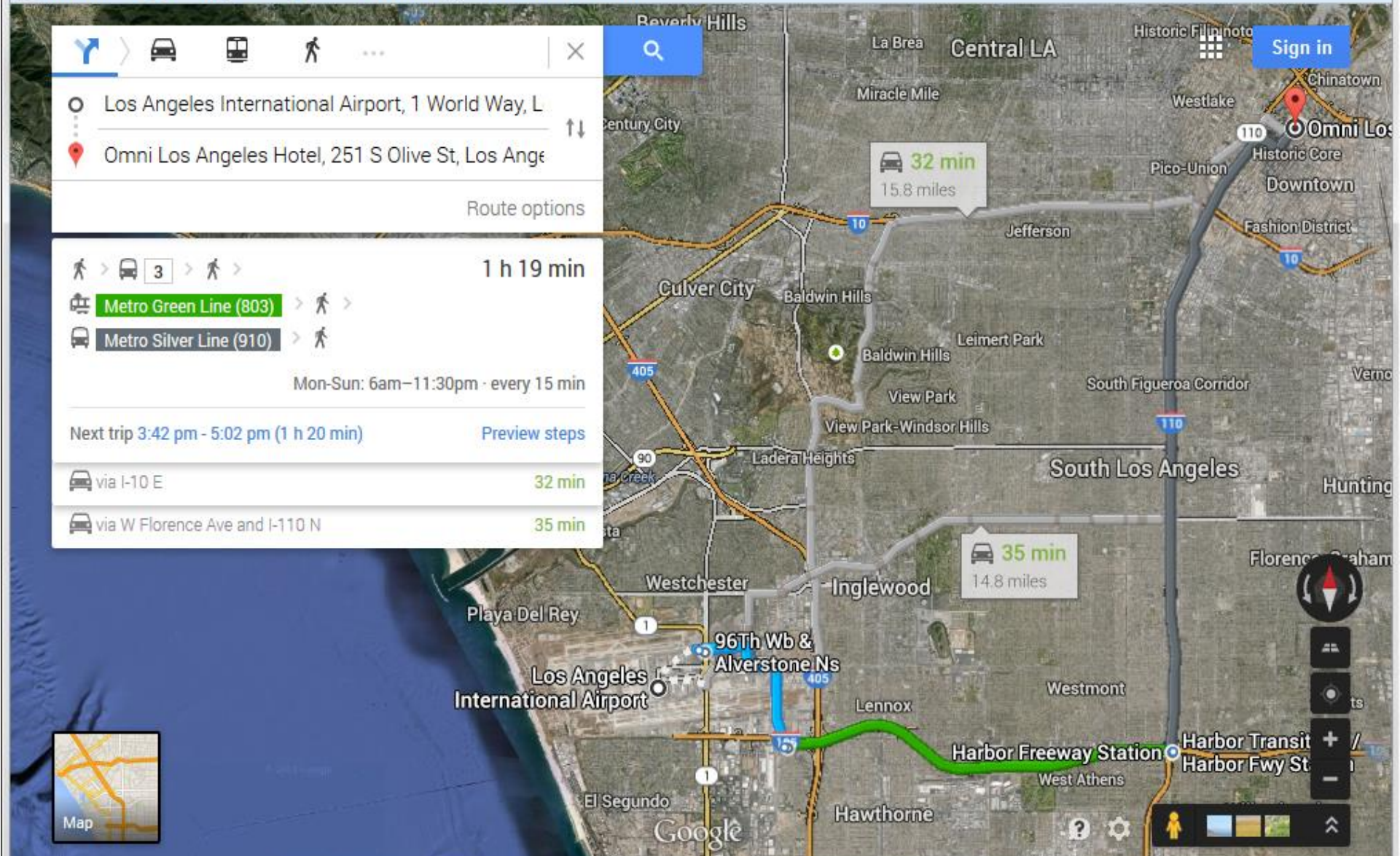
Metro Silver Line (910) >

Mon-Sun: 6am-11:30pm · every 15 min

Next trip 3:42 pm - 5:02 pm (1 h 20 min) [Preview steps](#)

via I-10 E **32 min**

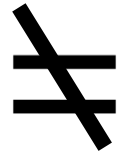
via W Florence Ave and I-110 N **35 min**



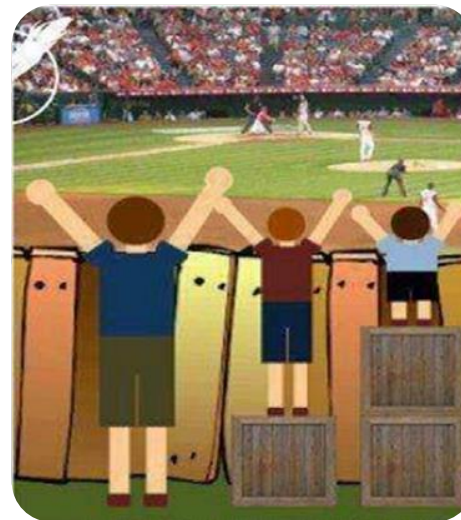
Equity is not...

Equity is an abstract concept that holds different meanings for different people. One of the most common misperceptions is that equity is a concept synonymous with equality or with diversity.

Diversity



Equity

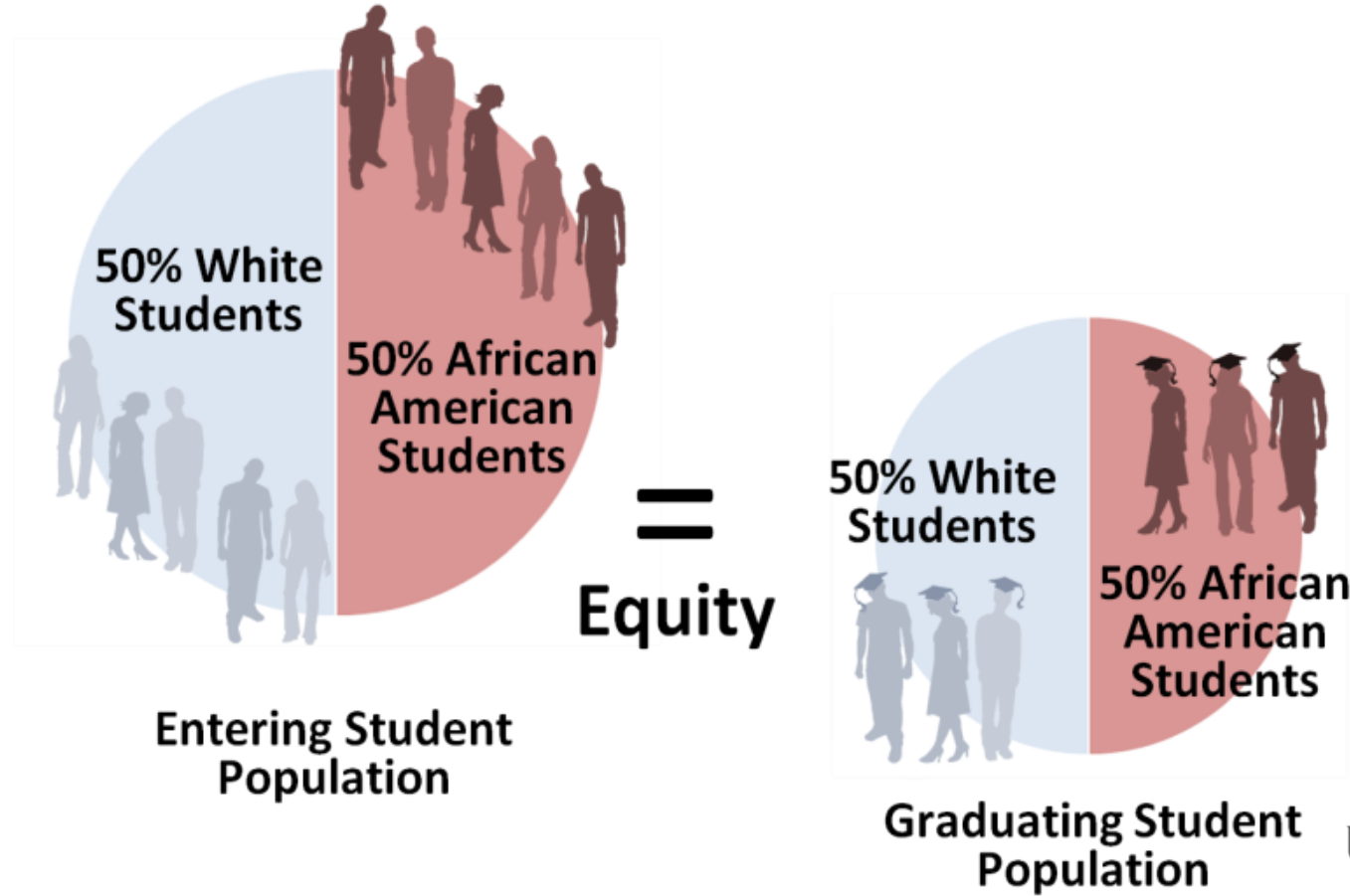


Equality

Equity

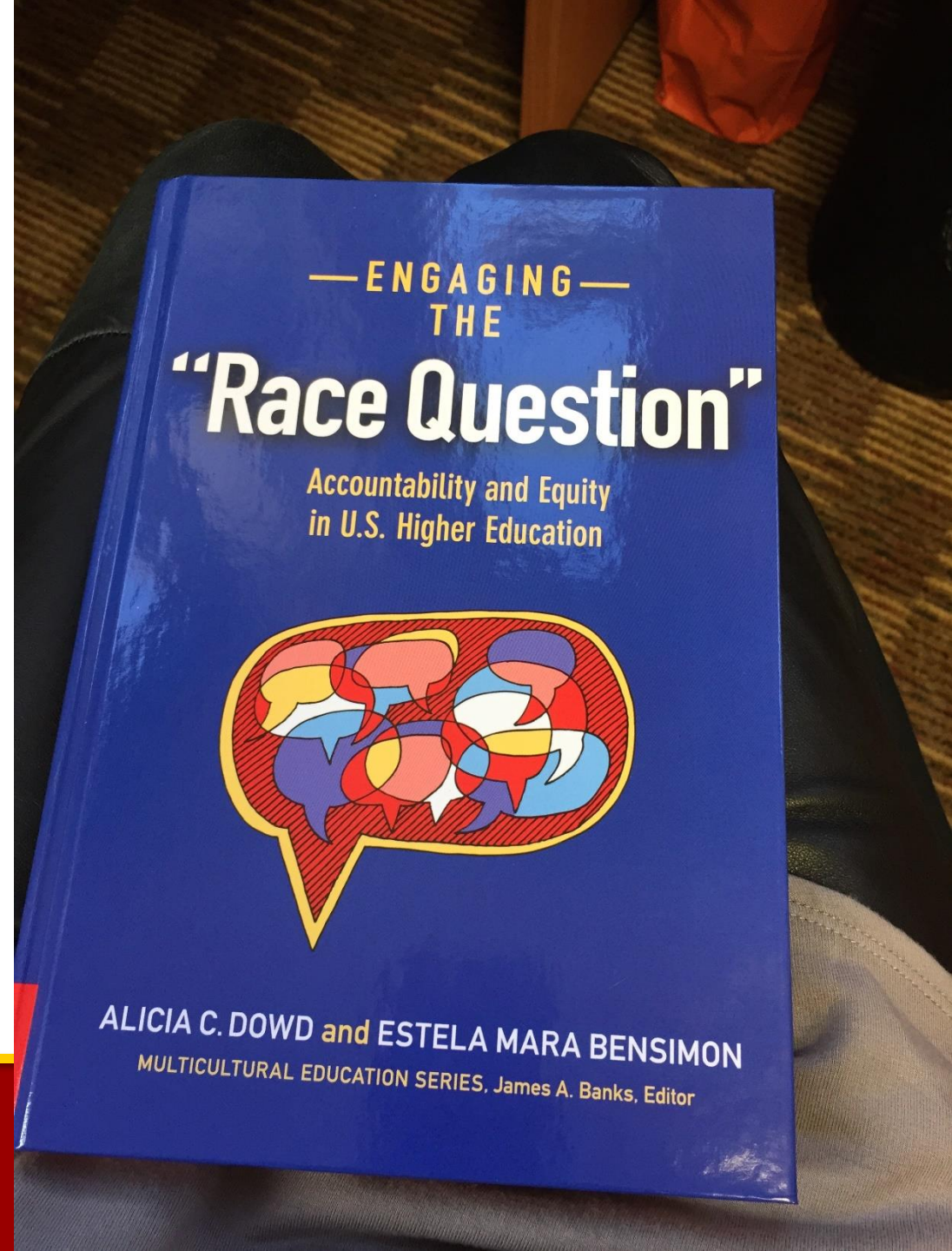
Equity is...

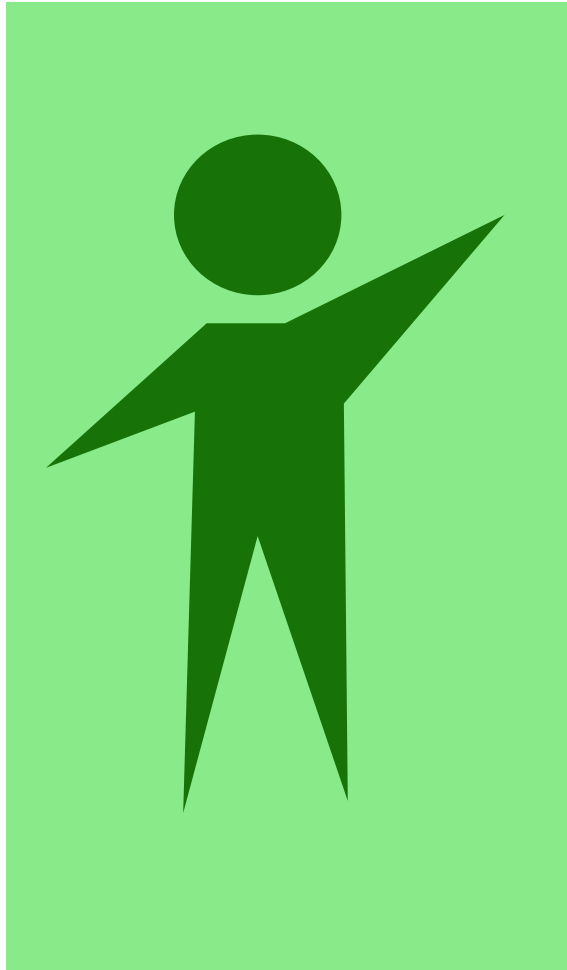
Representational Equity: The proportional participation of historically underrepresented student populations at all levels of an institution.



The Equity Scorecard: Principles of Change

1. Doing the Good
2. Participatory Process
3. Remediating Practices
4. Inquiry as a Change Strategy
5. Racial Inequity as a Problem of Practice





Inquiry helps identify:

- institutional practices that *are supporting* African American, Latino, and Native American students;
- practices that are *inadvertently contributing to* or *failing to address* inequities; and
- how *practices could be modified, reconsidered, or replaced* to close the equity gap.

WHAT EXPLAINS THE DIFFERENCES IN SUCCESS RATES?

Comparison of Two Teacher's Success Rates

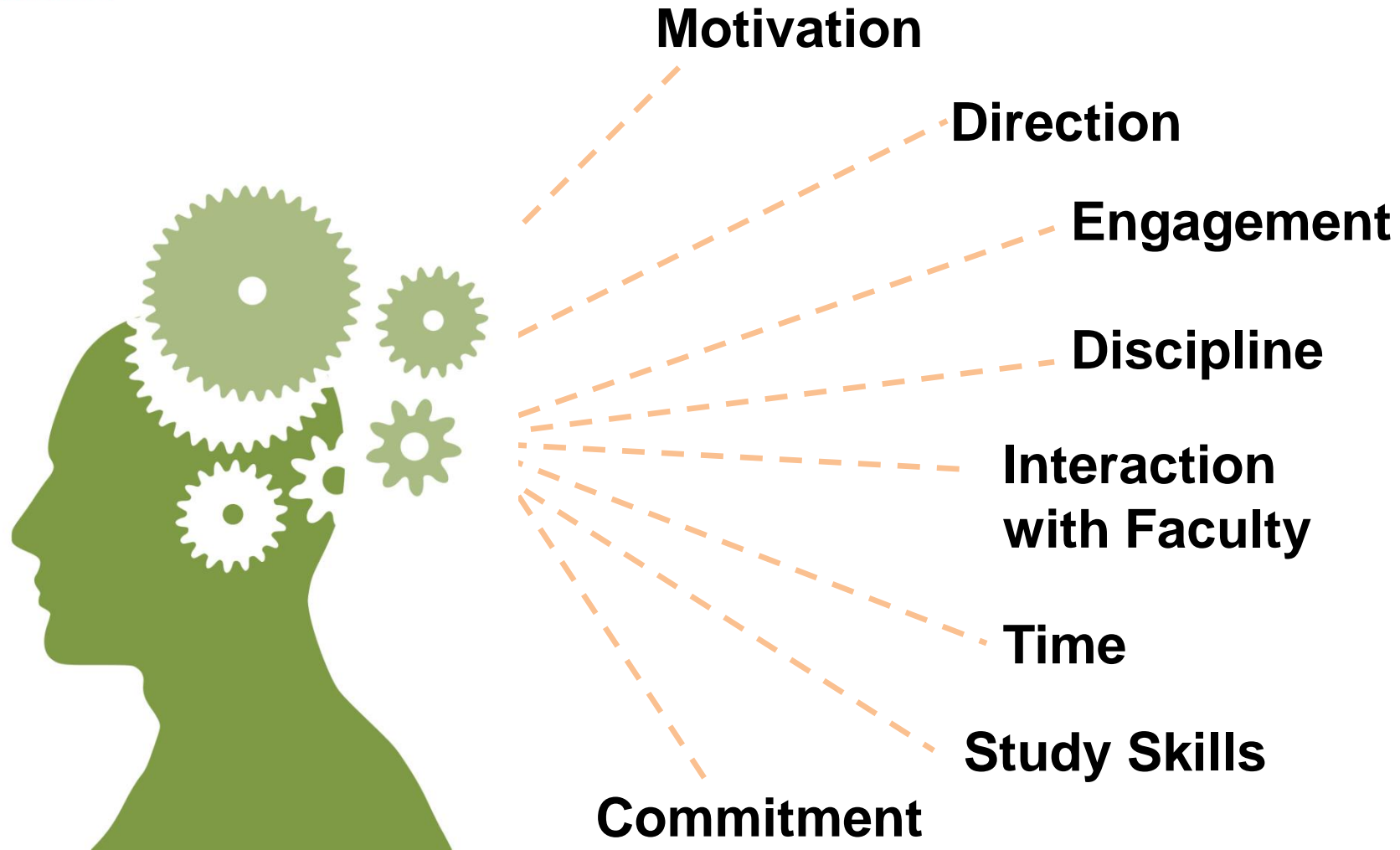
	Teacher A	Teacher B	Difference
Total	66.3%	76.7%	-10.4%

WHAT EXPLAINS THE DIFFERENCES IN SUCCESS RATES?

Comparison of Two Teacher's Success Rates

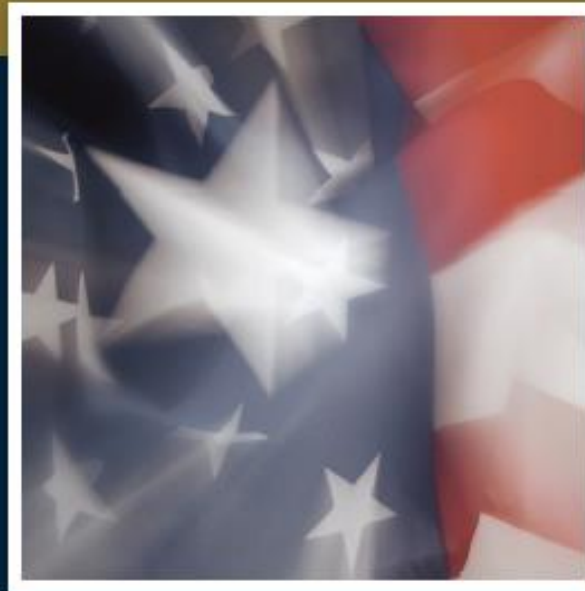
Ethnicity	Teacher A	Teacher B	Difference
Asian	75.9%	82.9%	-7.0%
Black Non-Hispanic	55.3%	70.1%	-14.8%
Hispanic	62.5%	79.6%	-17.1%
White Non-Hispanic	70.6%	74.6%	-4.0%
Total	66.3%	76.7%	-10.4%

Culturally Acquired Knowledge about Student Success



FIVE PRINCIPLES FOR CREATING EQUITY BY DESIGN

AMERICA'S UNMET PROMISE:
The Imperative for Equity in Higher Education



BY Keith Witham, Lindsey E. Malcom-Piqueux,
Alicia C. Dowd, & Estela Mara Bensimon

1

CLARITY IN LANGUAGE, GOALS, AND MEASURES IS VITAL TO EFFECTIVE EQUITABLE PRACTICES.



1

CLARITY IN LANGUAGE, GOALS, AND MEASURES IS VITAL TO EFFECTIVE EQUITABLE PRACTICES.

National Community College Benchmark Project

Fall 2010 Developmental Math Success Rates (Includes Withdraws)

CCA	National Median	Percentile Rank Nationally
69.9%	68.8%	55 th percentile

1

CLARITY IN LANGUAGE, GOALS, AND MEASURES IS VITAL TO EFFECTIVE EQUITABLE PRACTICES.

Data

- 65.5% Success Rate for those testing at the lowest two levels.
- Only 24.1% ultimately completed a college math prereq.

Goal Setting

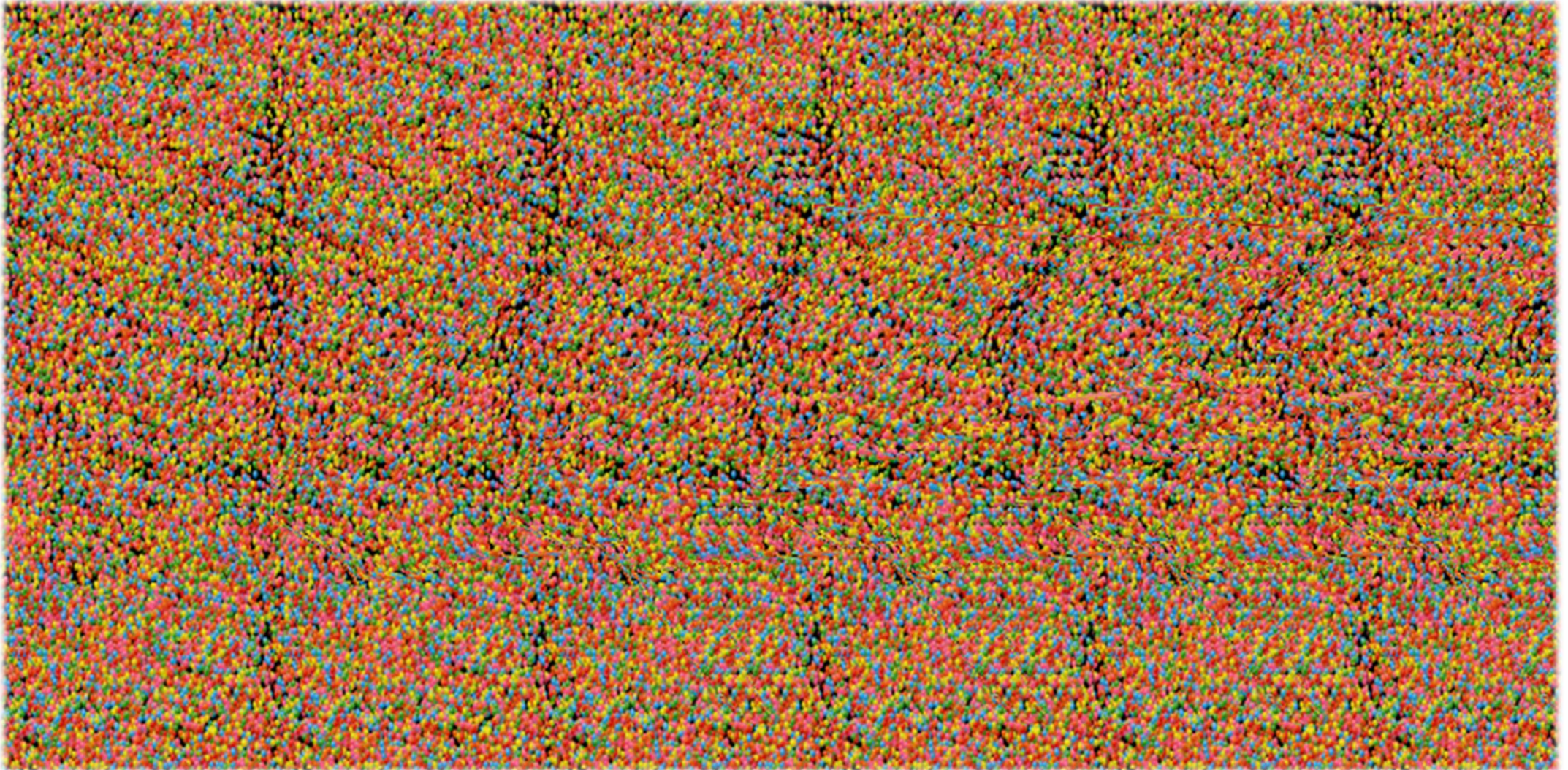
- Greater numbers of students completing college math prereq by using a strategy of a more focused dev math, embedded study skills, and a strategy of acceleration.

Results

- 45.2% of these students passed the course (21.1% increase).

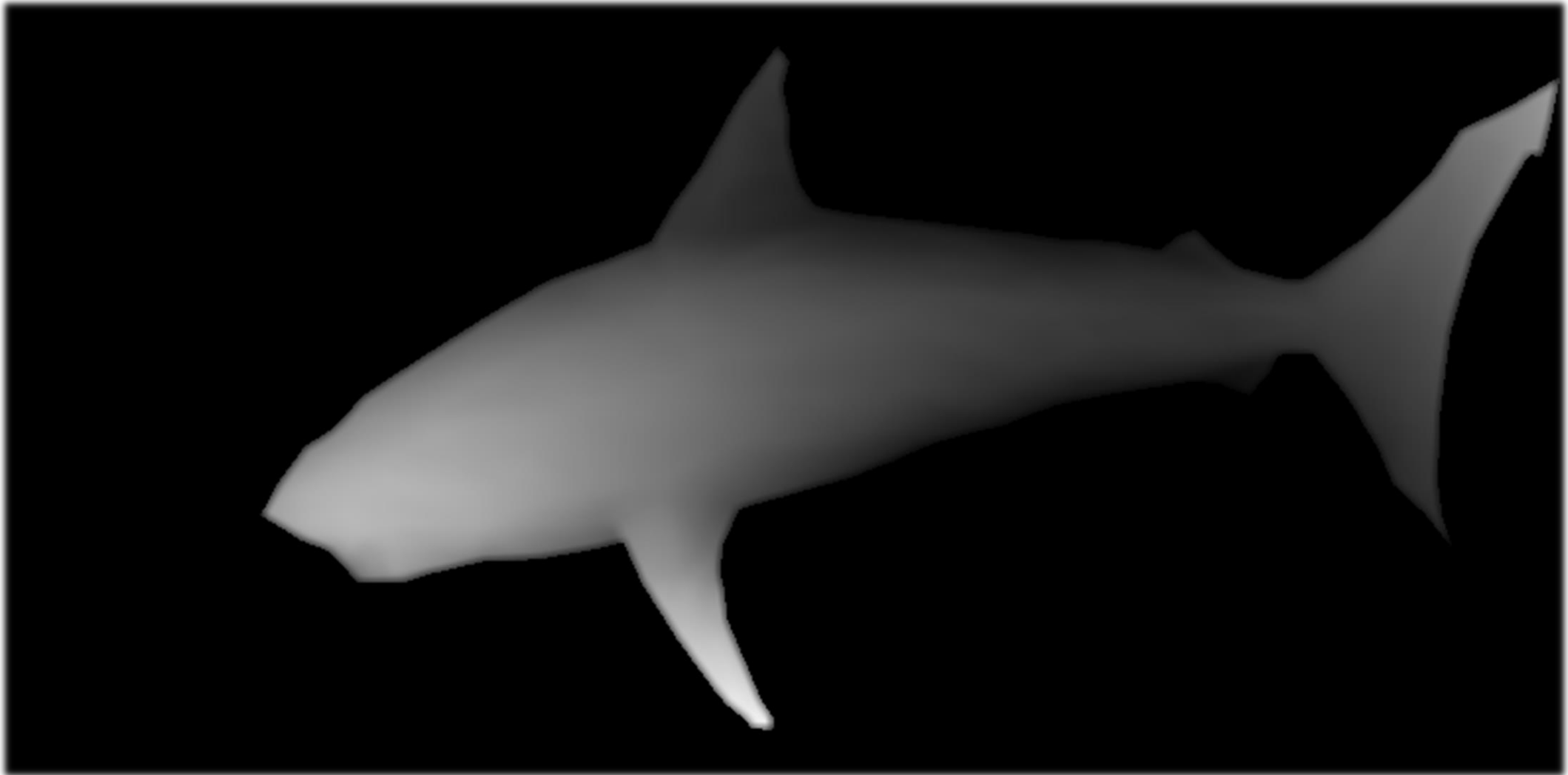
1

CLARITY IN LANGUAGE, GOALS, AND MEASURES
IS VITAL TO EFFECTIVE EQUITABLE PRACTICES.



1

CLARITY IN LANGUAGE, GOALS, AND MEASURES
IS VITAL TO EFFECTIVE EQUITABLE PRACTICES.



1

CLARITY IN LANGUAGE, GOALS, AND MEASURES IS VITAL TO EFFECTIVE EQUITABLE PRACTICES.

	Completed Two Levels of Dev Math	Completed Redesigned Course
Female	25.2%	50%
Male	22.4%	36.2%
Black	17.2%	29.6%
Hispanic	27.9%	42.2%
White	27.9%	67.4%

1

CLARITY IN LANGUAGE, GOALS, AND MEASURES IS VITAL TO EFFECTIVE EQUITABLE PRACTICES.

Success Rates Over a Two Year Period

Ethnicity	Teacher A	Average	Difference
Asian	55.6%	79.5%	-23.9%
Black Non-Hispanic	43.5%	55.8%	-12.3%
Hispanic	78.9%	69.9%	9.0%
Native American	25.0%	63.8%	-38.8%
White Non-Hispanic	65.9%	72.7%	-6.8%
Unknown / Not Reported	33.3%	34.2%	-0.9%
Total	56.4%	65.7%	-9.3%

1

CLARITY IN LANGUAGE, GOALS, AND MEASURES IS VITAL TO EFFECTIVE EQUITABLE PRACTICES.

Data

- Data disaggregated by race/ethnicity.
- Data disaggregated by individual faculty.

Goal Setting

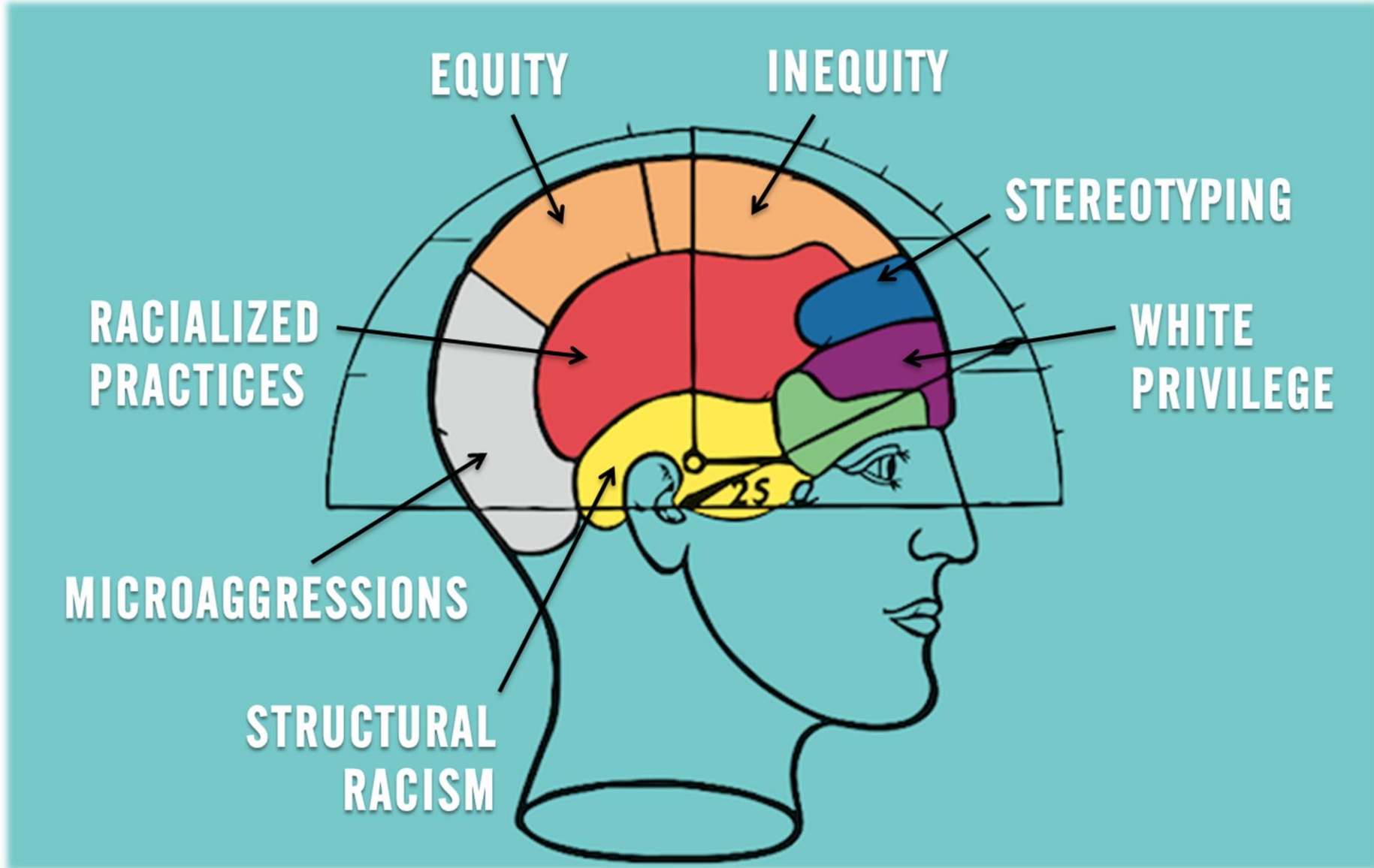
- Equity mentoring for full-time faculty using the Equity Scorecard structure/tools.
- Number specific goals; an increase of 2 additional Black students per class.
- Required learning lab for all students – and faculty – at this level.

Results

- Stay Tuned...

2

'EQUITY-MINDEDNESS' SHOULD BE THE GUIDING PARADIGM FOR LANGUAGE & ACTION.



2

'EQUITY-MINDEDNESS' SHOULD BE THE GUIDING PARADIGM FOR LANGUAGE & ACTION.

Statements from Syllabus

“The 2 to 1 rule - The scope of the MAT 050 class will cover the equivalent of three years of math in a traditional pre-college classroom. For every hour spent in class, you should expect to spend an average of 2 hours outside of class preparing, studying and completing assignments...If this is not possible, you should consider making changes to your schedule.”

“Students who are struggling should seek help.”

2

'EQUITY-MINDEDNESS' SHOULD BE THE GUIDING PARADIGM FOR LANGUAGE & ACTION.

Statement from Syllabus

“Attendance is Mandatory! There is no such thing as an excused absence. Up to 90% of your grade in the course will be based on your participation in activities that take place in class.”

Observation of First Day of Class

- Students coming in late
- Texting in class
- One student leaving to answer a phone

2

'EQUITY-MINDEDNESS' SHOULD BE THE GUIDING PARADIGM FOR LANGUAGE & ACTION.

Themes from Conversations

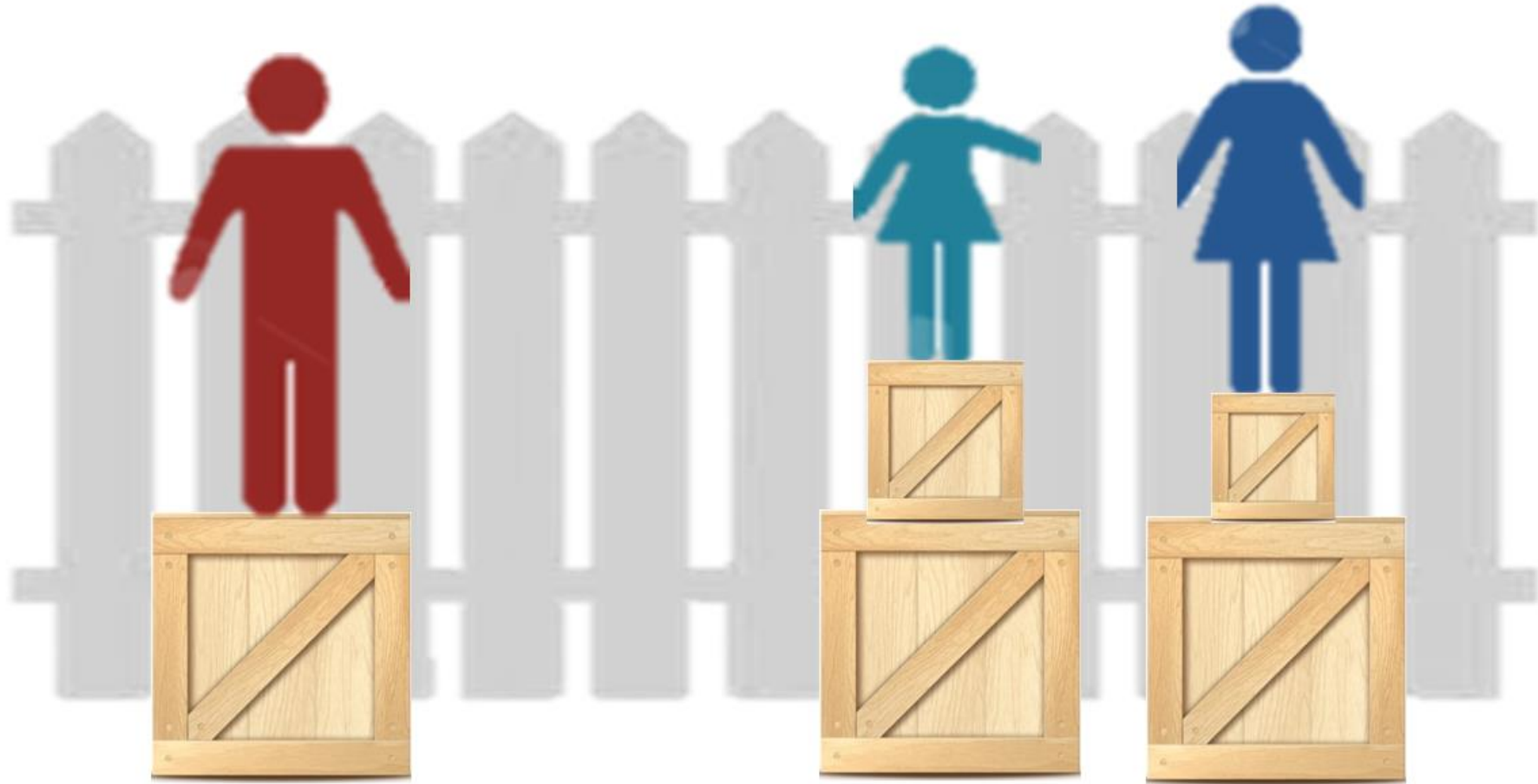
It's not the students who have the skill level who are struggling in the class. It's the students who never learned this the first time around who are struggling.

If I take this step for this one student, isn't that enabling (or lowering standards)? Aren't I really creating harm for their future?

I teach adults, not school children. I can't make them come to class on time

3

EQUITABLE PRACTICES AND POLICIES ARE DESIGNED TO ACCOMMODATE DIFFERENCE IN THE CONTEXTS OF STUDENTS' LEARNING--NOT TO TREAT ALL STUDENTS THE SAME.



3

EQUITABLE PRACTICES AND POLICIES ARE DESIGNED TO ACCOMMODATE DIFFERENCE IN THE CONTEXTS OF STUDENTS' LEARNING--NOT TO TREAT ALL STUDENTS THE SAME.

A man drives from Austin to Denver. If he leaves at 6 am (local time) and drives an average of 50 mph, what distance has he driven by 3 pm (local time)?

- A) 30 miles
- B) 450 miles
- C) 500 miles

3

EQUITABLE PRACTICES AND POLICIES ARE DESIGNED TO ACCOMMODATE DIFFERENCE IN THE CONTEXTS OF STUDENTS' LEARNING--NOT TO TREAT ALL STUDENTS THE SAME.

A man drives from Austin to Denver. If he leaves at 6 am (local time) and drives an average of 50 mph, what distance has he driven by 3 pm (local time)?

A) 30 miles

B) 450 miles

C) 500 miles

D) Where's Austin?

3

EQUITABLE PRACTICES AND POLICIES ARE DESIGNED TO ACCOMMODATE DIFFERENCE IN THE CONTEXTS OF STUDENTS' LEARNING--NOT TO TREAT ALL STUDENTS THE SAME.

The Denver Broncos scored 3 touchdowns, two field goals, and a safety. The Oakland Raiders scored 4 touchdowns. Who won the game?

- A) Denver Broncos
- B) Oakland Raiders

3

EQUITABLE PRACTICES AND POLICIES ARE DESIGNED TO ACCOMMODATE DIFFERENCE IN THE CONTEXTS OF STUDENTS' LEARNING--NOT TO TREAT ALL STUDENTS THE SAME.

The Denver Broncos scored 3 touchdowns, two field goals, and a safety. The Oakland Raiders scored 4 touchdowns. Who won the game?

A) Denver Broncos

B) Oakland Raiders

C) I thought you said the game was almost over!

3

EQUITABLE PRACTICES AND POLICIES ARE DESIGNED TO ACCOMMODATE DIFFERENCE IN THE CONTEXTS OF STUDENTS' LEARNING--NOT TO TREAT ALL STUDENTS THE SAME.

$$0.5 \times 0.5 = ?$$

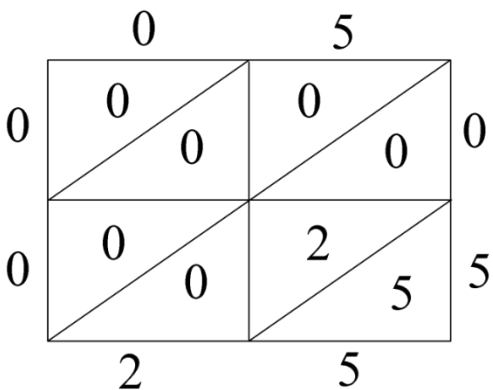
3

EQUITABLE PRACTICES AND POLICIES ARE DESIGNED TO ACCOMMODATE DIFFERENCE IN THE CONTEXTS OF STUDENTS' LEARNING--NOT TO TREAT ALL STUDENTS THE SAME.

$$0.5 \times 0.5 = ?$$

A) Half of a Half is a quarter $\rightarrow 0.25$

B)
$$\frac{5}{25} \times 5 \rightarrow \underline{25} \rightarrow 0.25$$

C)  $\rightarrow 0.25$

3

EQUITABLE PRACTICES AND POLICIES ARE DESIGNED TO ACCOMMODATE DIFFERENCE IN THE CONTEXTS OF STUDENTS' LEARNING--NOT TO TREAT ALL STUDENTS THE SAME.

A Direct Quote from Mid-Year Self-Evaluation

“In the past, I had thought of my students as adults, free to choose their own path – I gave every student equal opportunity to pass or fail, but the decision to attend class, complete assignments, study for tests, take advantage of office hours and tutoring was up to them. Who was I to tell them what to do?”

3

EQUITABLE PRACTICES AND POLICIES ARE DESIGNED TO ACCOMMODATE DIFFERENCE IN THE CONTEXTS OF STUDENTS' LEARNING--NOT TO TREAT ALL STUDENTS THE SAME.

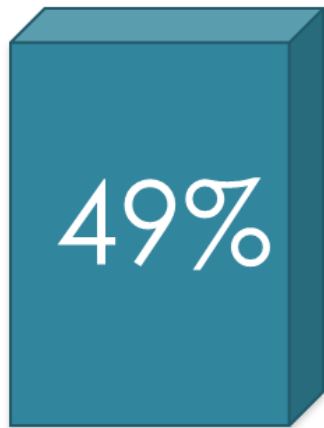
A Direct Quote from Mid-Year Self-Evaluation

“I came to see that many of my behaviors were white middle-class woman behaviors. While another person who looked like me might be able to understand that my suggestions voiced to the class as a whole were really individual mandates, those black and Hispanic males from 18-25 were hearing that it was fine with me if they chose to fail. Much like T-shirts – one size does not fit all.”

4

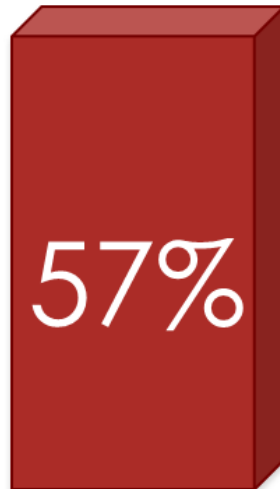
ENACTING EQUITY REQUIRES A CONTINUAL PROCESS OF LEARNING, DISAGGREGATING DATA, AND QUESTIONING ASSUMPTIONS ABOUT RELEVANCE AND EFFECTIVENESS.

AGGREGATE

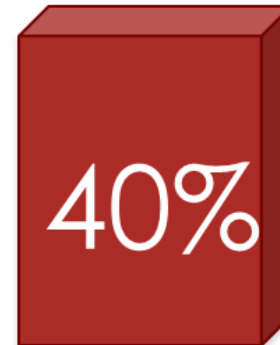


All Students

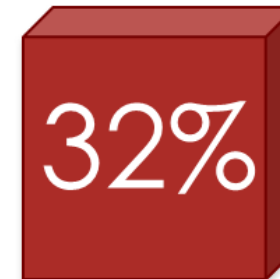
DISAGGREGATE



White Students



Asian Students



Latino/a Students



African Am. Students

4

ENACTING EQUITY REQUIRES A CONTINUAL PROCESS OF LEARNING, DISAGGREGATING DATA, AND QUESTIONING ASSUMPTIONS ABOUT RELEVANCE AND EFFECTIVENESS.

A Direct Quote from Mid-Year Self-Evaluation

“So I tried something different. I got in the faces of these huge boys and told them that they were too smart to fail my class and I was not going to put up with it...”

4

ENACTING EQUITY REQUIRES A CONTINUAL PROCESS OF LEARNING, DISAGGREGATING DATA, AND QUESTIONING ASSUMPTIONS ABOUT RELEVANCE AND EFFECTIVENESS.

A Direct Quote from Mid-Year Self-Evaluation

“....Then the weirdest thing happened... They kept showing up. I would arrive at school to find them camped outside my office door, waiting for help. They moved to seats in the front of the room and started to volunteer to present problems and answer questions. They went to the tutoring center to do their homework after class.”

4

ENACTING EQUITY REQUIRES A CONTINUAL PROCESS OF LEARNING, DISAGGREGATING DATA, AND QUESTIONING ASSUMPTIONS ABOUT RELEVANCE AND EFFECTIVENESS.

A Direct Quote from Mid-Year Self-Evaluation

“...When the student I’d caught cheating on his first test and then sentenced to weekly meetings in the tutoring center and mandatory meetings with me for quiz and test corrections came to me at the end of the semester to thank me for being the first teacher who ever believed in him, I burst into tears.”

4

ENACTING EQUITY REQUIRES A CONTINUAL PROCESS OF LEARNING, DISAGGREGATING DATA, AND QUESTIONING ASSUMPTIONS ABOUT RELEVANCE AND EFFECTIVENESS.

Teacher A's Success Rates Over a Two Year Period

Ethnicity	Teacher A	Overall Average	Difference
Asian	55.6%	79.5%	-23.9%
Black Non-Hispanic	43.5%	55.8%	-12.3%
Hispanic	78.9%	69.9%	9.0%
Native American	25.0%	63.8%	-38.8%
White Non-Hispanic	65.9%	72.7%	-6.8%
Unknown / Not Reported	33.3%	34.2%	-0.9%
Total	56.4%	65.7%	-9.3%

4

ENACTING EQUITY REQUIRES A CONTINUAL PROCESS OF LEARNING, DISAGGREGATING DATA, AND QUESTIONING ASSUMPTIONS ABOUT RELEVANCE AND EFFECTIVENESS.

Teacher A's Success Rates – Fall 2014

Ethnicity	Teacher A	Overall Average	Difference
Asian	N/A	77.8%	N/A
Black Non-Hispanic	66.7%	50.0%	16.7%
Hispanic	83.3%	69.6%	13.7%
Native American	100.0%	83.3%	16.7%
White Non-Hispanic	77.8%	75.3%	2.5%
Unknown / Not Reported	0.0%	14.8%	-14.8%
Total	70.8%	64.7%	6.1%

4

ENACTING EQUITY REQUIRES A CONTINUAL PROCESS OF LEARNING, DISAGGREGATING DATA, AND QUESTIONING ASSUMPTIONS ABOUT RELEVANCE AND EFFECTIVENESS.

	Completed Two Levels of Dev Math		Completed Redesigned Course – Spring 2014		Completed Redesigned Course – Fall 2014
Female	25.2%	➔	50%	➔	59.1%
Male	22.4%	➔	36.2%	➔	54.5%
Black	17.2%	➔	29.6%	➔	42.6%
Hispanic	27.9%	➔	42.2%	➔	60.9%
White	27.9%	➔	67.4%	➔	69.4%

5

EQUITY MUST BE ENACTED AS A PERVASIVE INSTITUTION-
AND SYSTEM-WIDE PRINCIPLE.



5

EQUITY MUST BE ENACTED AS A PERVASIVE INSTITUTION- AND SYSTEM-WIDE PRINCIPLE.

Faculty Status

92.3% Part-Time

7.7% Full-Time

Educational Background

42.3% Masters in
math ed.

30.8% Masters in
math

26.9% Masters in
related field

Mode of Delivery

57.7% F2F at CCA

46.2% in high
school

7.7% Online

5

EQUITY MUST BE ENACTED AS A PERVASIVE INSTITUTION- AND SYSTEM-WIDE PRINCIPLE.

Gender	
65.4% Male	34.6% Female

Race/Ethnicity	
84.6 % White	7.7% Asian
3.8% Hispanic or Latino	3.8% Middle Eastern

5

EQUITY MUST BE ENACTED AS A PERVASIVE INSTITUTION- AND SYSTEM-WIDE PRINCIPLE.

Data

- Success rates in subsequent courses broken down by faculty
- Other college level courses with math prerequisites; e.g. Economics.
- College level and Dev English completion rates.

Goal Setting

- Full-time math faculty providing equity mentoring for part-time math faculty.
- Hiring practices changed.

Results

- Several math faculty have gotten their highest success rates ever.
- Immediate impacts on who is math at CCA.

5

EQUITY MUST BE ENACTED AS A PERVASIVE INSTITUTION-
AND SYSTEM-WIDE PRINCIPLE.

A Direct Quote from Mid-Year Self-Evaluation

“She firmly believed that her practice of treating every student the same was the only fair way to teach and that the success/failure of different groups was due to the individual behaviors/skills of the students – all conditions over which she had no control or influence. I was unable to get her to see this view as a paradigm rather than a truth.”

Contact Information

**Center for Urban Education
University of Southern California
Rossier School of Education**

<http://cue.usc.edu>

Alicia C. Dowd

Associate Professor of Higher Education
and Co-Director of CUE

E-Mail: alicia.dowd@usc.edu

Phone: (213) 740-5202

Estela Bensimon

Professor of Higher Education and Co-
Director of CUE

E-Mail: bensimon@usc.edu

Phone: (213) 740-5202