Making Practice Visible:
The Emerging Scholars Program and IBL

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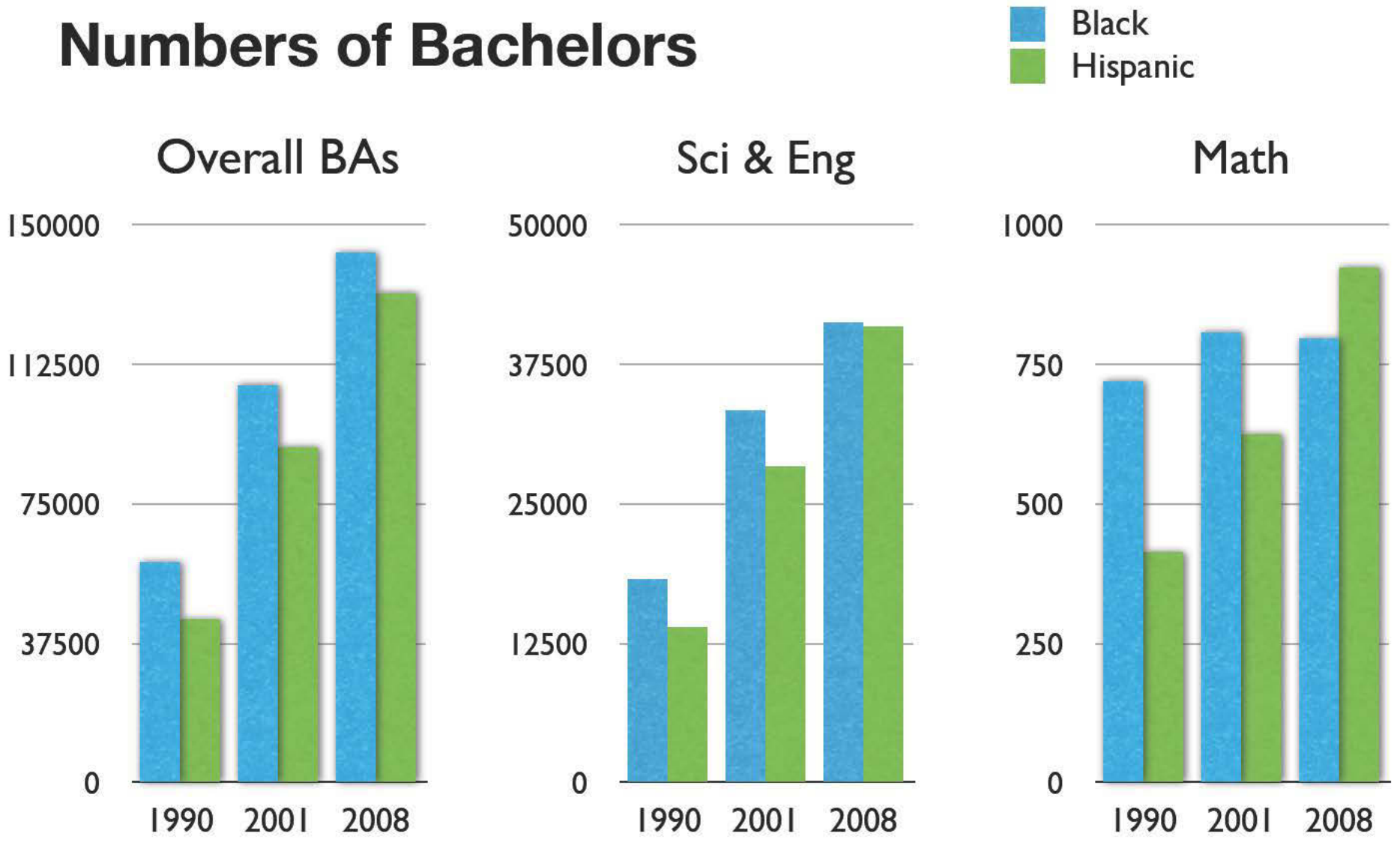
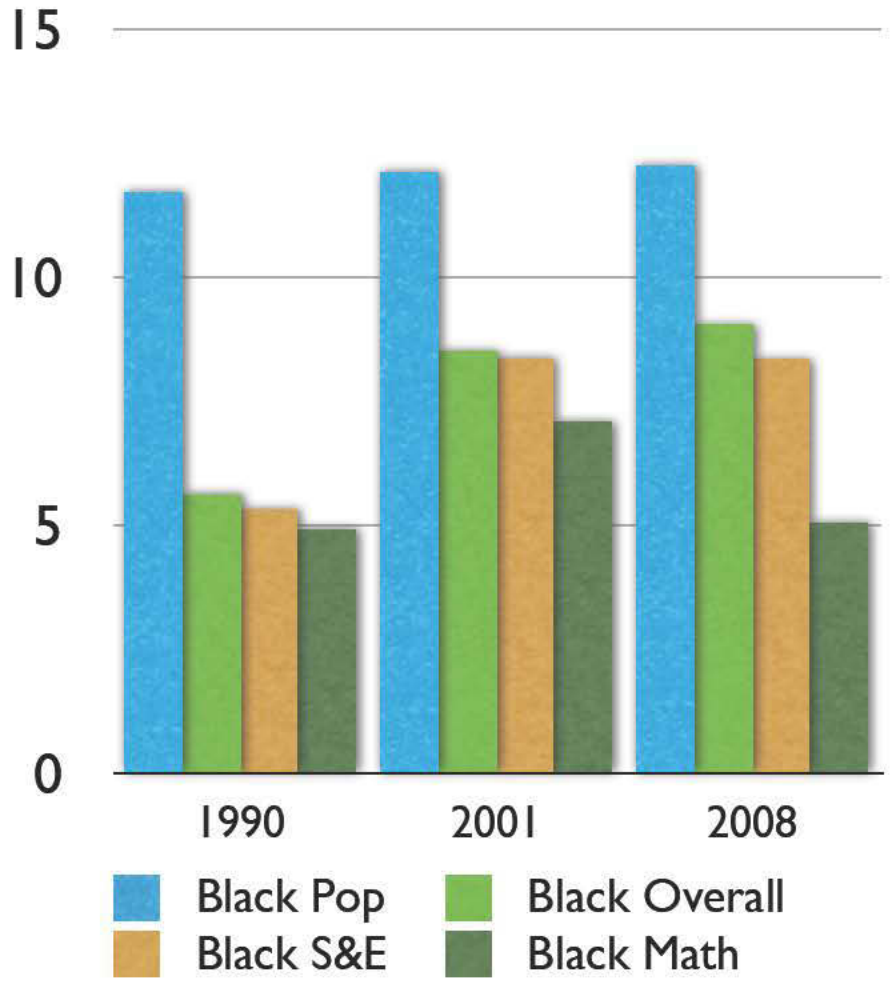
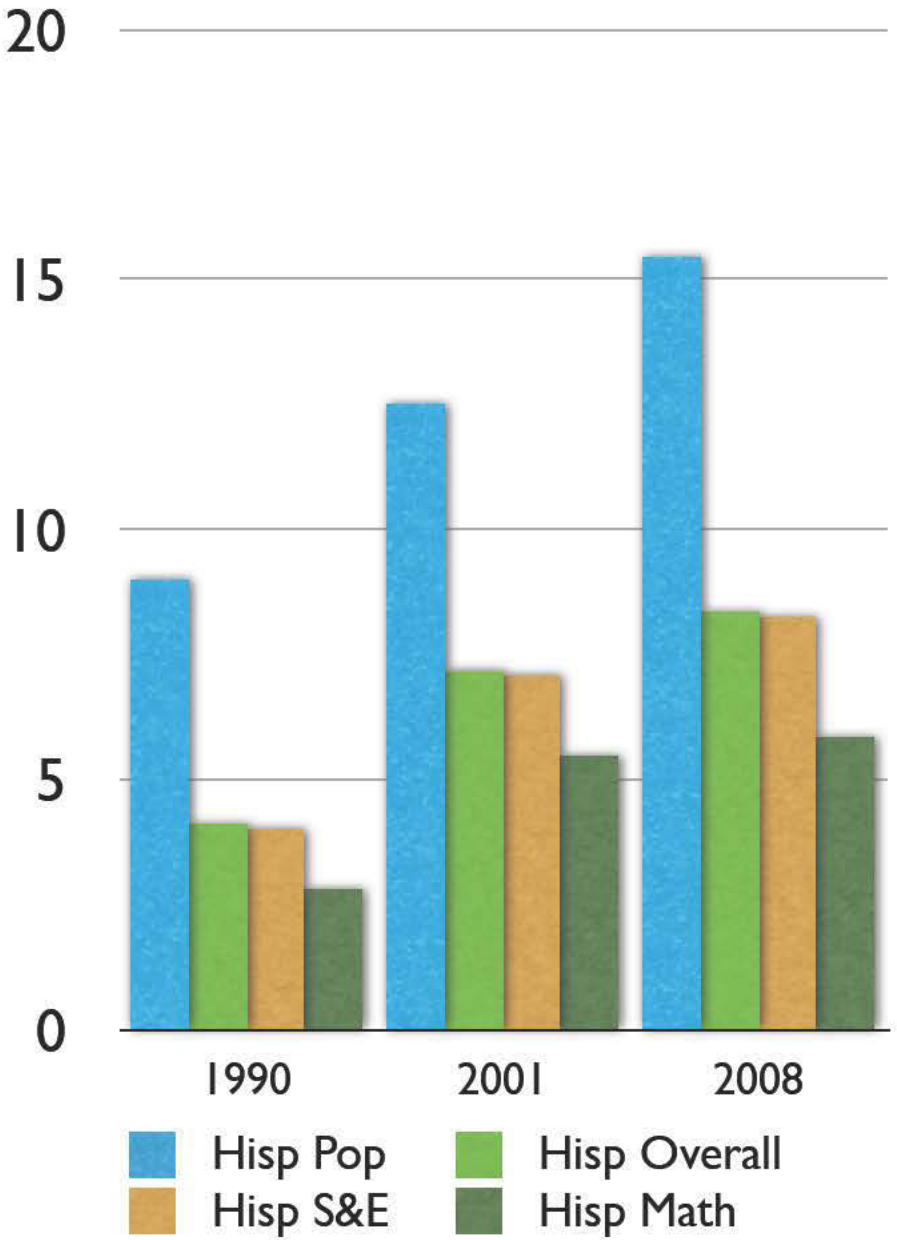
Numbers of Bachelors



National Science Foundation, Division of Science Resources Statistics. 2011. Women, Minorities, and Persons with Disabilities in Science and Engineering: 2011. Special Report NSF 11-309. Arlington, VA. Available at http://www.nsf.gov/statistics/wmpd/.

% of Total Bachelors





The Emerging Scholars Program

100+
local adaptations

Berkeley
Texas
Wisconsin
Rutgers
Kentucky
Illinois

state colleges
liberal arts
two-year

SF STATE

African Americans and Latinos at UC Berkeley, 1970s

Calculus 1 Failure rate	A's and B's per semester
~60%	**~1**

What theories did they put forward?
(Take a guess.)

SF STATE

Theories of Failure, UC Berkeley 1970s

Motivation
Academic Preparation
Family Support
Income
Racial Inferiority

None the school's fault.
Also, all wrong.

SF STATE

Uri Treisman's Ethnography (mid 1970s)

African American	Chinese
all HW on time	all HW on time
8 hrs/wk alone	8 hrs/wk alone
studied the book	studied the book
(as recommended)	+5 hrs/wk group study

Chinese Students...

...edited each other's math
...edited each other's English
...did old (killer) exams together
...discussed how long they studied
...shared efforts on difficult problems
...encouraged each other
...ate together

Students calibrated their effort and understanding using the visible practice of peers.

SF STATE

1. The IBL Workshop Core

Hard, non-rote Worksheets
Cooperative problem-solving
Visible struggle
Community building

SF STATE

2. Making the Core Possible

Honors, not remedial

Multi-racial recruitment

Lecture sections (GTA)

TA PD managing groups

Worksheet resources

hard, non-rote, unfinishable, chestnuts, aerobics

Coordinator

SF STATE

3. Other Elaborations

- **UG Assistants**
- **Worksheet web database**
  - BetterFileCabinet.com
- **Big classes, big surfaces**

Common Outcomes of Emerging Scholars Programs

higher grades

more calculus completion

more calculus-based majors

(even controlled for SAT)

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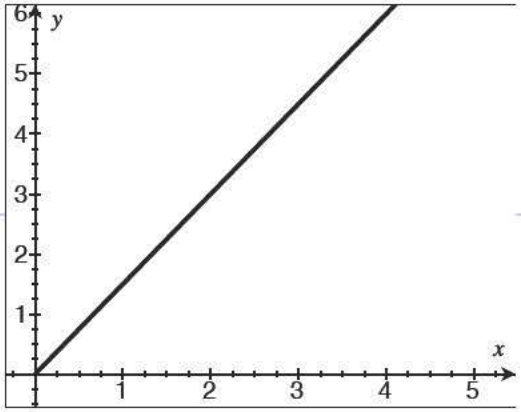
Adapting ESP to SF State

1/2 Problem-driven group work
1/6 Individual (think, quiz)
1/3 Whole class (lecture, etc.)

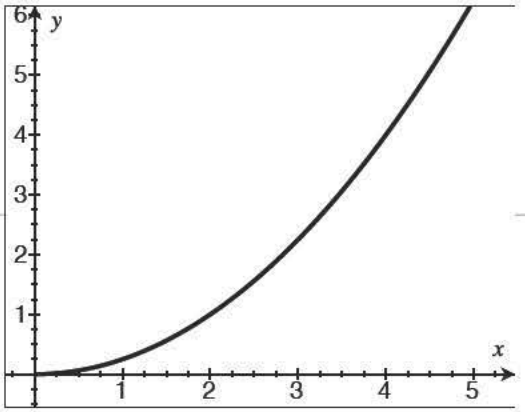
standard syllabus
streaming lectures, online HW

SF STATE

(A)



(B)



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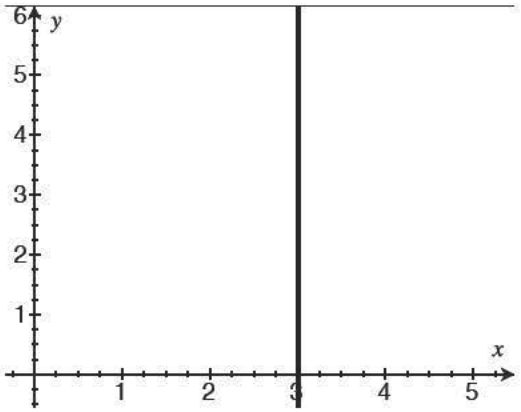

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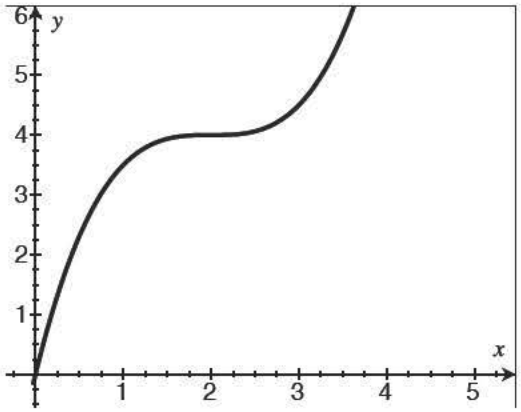

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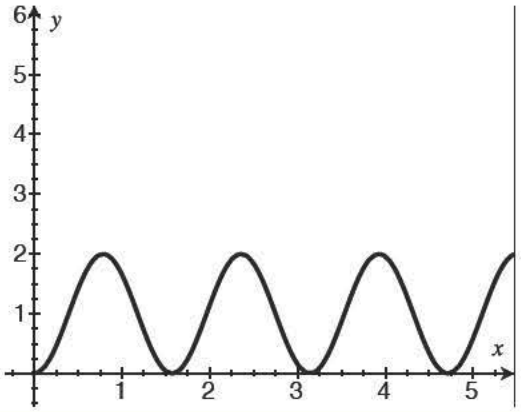

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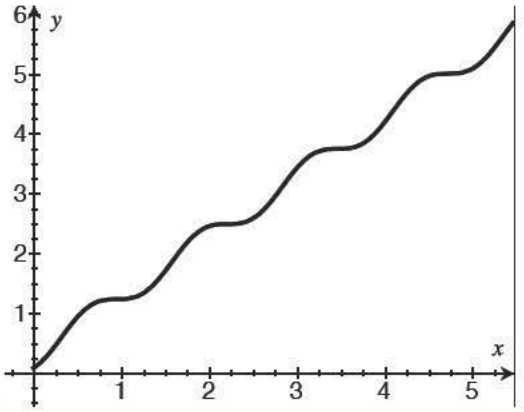

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(Play video.)

Some Further Reading

Hsu, Murphy and Treisman, "Thirty Years of ESP" in *Making the Connection: Research and Teaching in Undergraduate Math* (2009, MAA Notes)

Gandara, "Priming the Pump" (1999, College Board)

Rothstein, *Class and Schools* (2004)

More at my home page

math.sfsu.edu/hsu

THE END