Diversity and Undergraduate Physics in the 21st Century

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When Diversity Training Goes Awry

Done incorrectly, what should be a useful exercise can and has backfired on some colleges and universities.
Progress report on bridging the divide between race and gender...

Well, we're getting closer.
Personal Glimpses
Defining Moment?

Prince Edward County, VA (1964)
I Believe!

Those educated in diverse settings are:

- More likely to make meaningful contributions
- More likely to be team players
- More likely to be successful leaders
What do we need to know and do to diversify the scientific community?
Girls As a Percentage of Total High School Physics Students

Source: AIP Statistical Research Center

»Rutgers – 6-05-10
Figure 1. Physics Enrollment in U.S. High Schools, 1948-2005

% of seniors who have taken or are taking physics

- All Schools
- Public Only

Year

1948  '54  '56  '58  '60  '62  '65  '71 '72  '76  '80  '86 '87  '90  '93  '97  '01  '05

Percent of Students in Each Racial Group Taking Physics

AIP Statistical Research Center: High School Physics Surveys

- **Asian**
  - 1990: 34%
  - 1993: 37%
  - 1997: 44%
  - 2001: 47%
  - 2005: 48%

- **White**
  - 1990: 24%
  - 1993: 27%
  - 1997: 32%
  - 2001: 33%
  - 2005: 36%

- **Black**
  - 1990: 10%
  - 1993: 13%
  - 1997: 16%
  - 2001: 22%
  - 2005: 23%

- **Hispanic**
  - 1997: 10%
  - 2001: 15%
  - 2005: 21%

http://www.aip.org/statistics
Percent of Bachelor's Degrees Earned by Women in Selected Fields, 1986 to 2000

Year of Degree

Geoscience
Mathematics
Astronomy
Physics
Engineering

All Fields
Life Sci.
Chemistry
Geoscience
Astronomy
Physics
Engineering
Percent of physics bachelor’s* who were African American, 

Percent

Class of

1996 1999 2001 2003 2005 2007

* US Citizens only

http://www.aip.org/statistics
Race of High School Physics Teachers

- White: 94%
- Black: 2%
- Hispanic: 2%
- Asian: 1%
- Other: 1%

Source: 2000-01 AIP High School Physics Teacher Survey
Percentage of All African-American College Students Who Were Enrolled at a Historically Black College or University

- 1976: 20%
- 2001: 15%
Likelihood of earning a bachelor's degree by 2000, African-Americans compared to all others.

Source: NCES National Education Longitudinal Survey 1988, compiled by AIP Statistical Research Center
Why Do Students Leave Science?

Tobias, S. 1990  They’re not dumb, they’re different.  
climate, facts vs. concepts, what vs. why

poor teaching, no support; weed-out mentality

atmosphere, discrimination, alienation, exclusiveness

NOT THE ANSWER:  lack of intelligence, personal problems, laziness, poor TAs
Research on Bias

• In every study, significant effect of gender or race of person evaluated

• **NO** significant effect of gender or race of person doing the evaluation

Courtesy: Jo Handelsman  »Rutgers – 6-05-10
Research on Bias

Auditions for symphony orchestra positions

• Started using a screen, carpeting to hide gender of person auditioning

• Resulted in as much as a 60% increase in frequency of women being selected

Goldin and Rouse, 1997

Courtesy: Jo Handelsman
Research on Bias

• Double-blind peer-review process

• 8% increased in women articles accepted for publication

» A. Budden-New Scientist – Jan 19, 2008 (WSJ)

» Rutgers – 6-05-10
Visual Priming

Images of great black figures positively affected ratings of black applicants

(Blair et al., 2001; Dasgupta & Greenwald, 2001)
Reactions to Evidence of Bias

- Not here.....
  - “It’s like that in Sweden, but not here in the U.S.”
  - “It’s like that at rural universities, but not urban ones.”
  - “It’s like that at Harvard, but not at UW.”
  - “It’s like that at UW, but not at Harvard.”
  - “It’s like that in the economics department, but certainly not here in chemistry!”
- “Women and minorities are just too sensitive”
- “What’s the standard deviation in line 4 of Table 3 of the 1988 study?”

»Rutgers – 6-05-10

Courtesy: Joe Handelsman
“Until our scientific and technological workforce reflects our diversity, we are not working to our potential as a nation.”

Constance A. Morella
Former member, U.S. House of Representatives
8th Congressional District, MD
The Darden Perspective

• Are we paying attention to the differences that matter?
• Are we gaining knowledge about how those differences matter?
• Are we experimenting with how to do business as a result of those differences?
The Greatest Fears……

- Are we losing better minds than we are retaining?
- Are we losing “different” thinkers?
- Are we losing the most curious students?
- Are reducing the quality of education?
Some Thoughts

• Is the curriculum more than content?
• What set of experiences do you want students to have?
• To what extent are you having conversations with the customers?
• Are we focusing on what we know vs conventional wisdom?
Some Thoughts

- Measure what is important, not what is easy (Measure what we value rather than valuing what we can measure)
- As you interact with prospective students—answer the question “What’s in it for them?”
Things To Remember

- If at first you don’t succeed, take time to figure out why
- If it’s worth doing, it will take longer that you thought it would
I believe I must be maturing

I'm starting to question whether I have all the answers
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