

U.S. STEM WORK FORCE

Study Finds Science Pipeline Strong, But Losing Top Students

A new study* finds little evidence for leaks in the U.S. pipeline for producing native-born scientists except for a steep drop in the percentage of the highest performing students taking science and engineering jobs. The findings suggest that the United States risks losing its economic competitiveness not because of a work force inadequately trained in science, as conventional wisdom holds, but because of a lack of social and economic incentives to pursue careers in science and technology.

The researchers, led by B. Lindsay Lowell, a demographer at Georgetown University in Washington, D.C., and Harold Salzman, a sociologist at the Urban Institute and Rutgers University, New Brunswick, analyzed data from six longitudinal federal surveys of education and employment trends conducted between 1972 and 2005. The surveys follow students as they graduate from high school and enter college, and again 3 and 10 years after leaving college.

The researchers found that the percentage of high school students who were enrolled in a science, technology, engineering, or mathematics program or had earned a STEM degree

"Steady as She Goes? Three Generations of Students through the Science and Engineering Pipeline," www.heldrich.rutgers.edu.

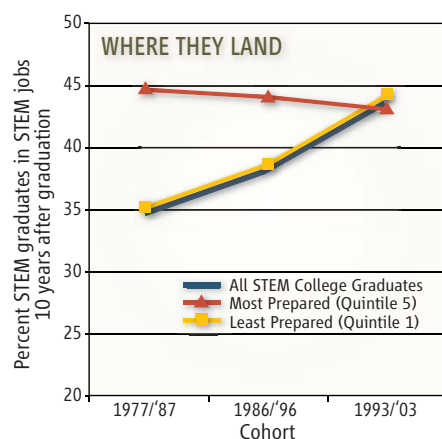
U.S. STEM EDUCATION

Obama's Science Advisers Look at Reform of Schools

Confident that its opinions will be welcomed by the Obama Administration, the President's Council of Advisors on Science and Technology (PCAST) has launched a study of how best to improve U.S. science education. The goal is a quick-turnaround analysis to help guide U.S. policy on ways to raise student test scores and provide higher-octane fuel to run the nation's innovation system.

"Filling the scientific pipeline is a critical issue for this country," says PCAST Co-Chair Eric Lander, who will team up with council member James Gates to lead the study. "Our feeling was that we cannot avoid taking on this challenge."

PCAST will be entering a crowded field. There have been numerous such studies in the past 2 decades, including one by another presidentially appointed body, the National Science Board. Its 2007 report, which called for a national council to coordinate the country's STEM (science, technology, engineering, and mathematics) education system, has



Greener pastures. More recent high-performing STEM graduates than in the past are finding jobs outside the field.

5 years after graduation dipped only slightly between 1972 and 2000, from 9.6% to 8.3%. The percentage of those STEM graduates who were working in STEM occupations 3 years after college increased over the period—from 31.5% for the 1977/'80 cohort to 45% for the 1997/2000 cohort. Similarly, the percentage of STEM graduates who continued to work in STEM occupations 10 years after college rose from 34.8% in the 1977/'87

cohort to 43.7% in the 1993/2003 cohort.

That's not the case for the highest performing students, however, as measured by college entrance test scores and college grades. Although the percentage of those in the top quintile who pursued STEM in college climbed from 21% in the 1972/'77 cohort to 28.7% in 1992/'97, it plunged to 13.8% in 2000/'05. Likewise, the share of the top quintile still holding STEM jobs 10 years out of college dipped from 44.8% in the 1977/'87 cohort to 43.2% in the 1993/2003 cohort (see chart).

The authors say those findings square with anecdotal evidence of STEM graduates being drawn to careers in management and finance starting in the early 1990s. Lowell says employers "seem to be poaching the best and the brightest" of STEM graduates by offering higher salaries for management and other non-STEM positions.

Lisa Frehill, executive director of the Commission on Professionals in Science and Technology, thinks the key to keeping talented STEM majors in science is to emphasize the opportunities that exist to solve society's problems. "Really good people will be less concerned about money if they can do work that is meaningful to them," she says.

—YUDHIJIT BHATTACHARJEE

been largely ignored. But board chair Steven Beering says that "the problem hasn't changed, and I can't imagine how [PCAST] could come up with a different set of issues to address. The key is to get the White House and Congress to act on them."

Last week, PCAST took its first steps by hearing from two expert panels and Secretary of Education Arne Duncan. The speakers offered suggestions on many topics, including reducing the achievement gap among students, increasing parental involvement, opening up the teacher-certification process, and strengthening the curriculum.

Duncan offered a blunt diagnosis: "Frankly, too often science and math are boring for children ... because it's been about memorizing facts, and because students have been taught by teachers who don't know the content themselves." His solution was equally direct: "In the end of the day, it's about how do you get more adults with those skills in front of children."

Several speakers focused on those adults.

Cora Marrett, who leads the \$1 billion education directorate at the National Science Foundation, homed in on the need to do more research on the undergraduate experience. That's where the nation's teachers are trained, and giving them a stronger foundation in math and science is seen as key to making them better STEM teachers. Carl Wieman, a physics Nobel laureate, wowed the council with preliminary data on how his research team has begun to transform introductory STEM courses at the University of Colorado, Boulder, by understanding how students learn and then getting faculty to modify their teaching. But Wieman also warned the council not to expect a quick fix. Asked by one member what PCAST could do to implement his work, Wieman answered: "I'm not going to answer that. Despite the long-term nature of education reform, people always want a one-line solution."

Lander said PCAST hopes to deliver its recommendations to the president within 6 months.

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