

## The Science Education Myth

### Forget the conventional wisdom. U.S. schools are turning out more capable science and engineering grads than the job market can support

by [Vivek Wadhwa](#)

Political leaders, tech executives, and academics often claim that the U.S. is falling behind in math and science education. They cite poor test results, declining international rankings, and decreasing enrollment in the hard sciences. They urge us to improve our education system and to graduate more engineers and scientists to keep pace with countries such as India and China.

Yet a [new report](#) by the Urban Institute, a nonpartisan think tank, tells a different story. The report disproves many confident pronouncements about the alleged weaknesses and failures of the U.S. education system. This data will certainly be examined by both sides in the [debate over highly skilled workers and immigration](#) (BusinessWeek.com, 10/10/07). The argument by Microsoft ([MSFT](#)), Google ([GOOG](#)), Intel ([INTC](#)), and others is that there are not enough tech workers in the U.S.

The authors of the report, the Urban Institute's Hal Salzman and Georgetown University professor Lindsay Lowell, show that math, science, and reading test scores at the primary and secondary level have increased over the past two decades, and U.S. students are now close to the top of international rankings. Perhaps just as surprising, the report finds that our education system actually produces more science and engineering graduates than the market demands.

### Junior Scientists on the Rise

These findings go against what has been the dominant position about our education system and our science and engineering workforce. Consider reports on national competitiveness that policymakers often turn to, such reports as the 2005 ["Rising Above the Gathering Storm"](#) by the National Academy of Sciences. This report says the U.S. is in dire straits because of poor math and science preparation. The report points to declining test scores, fewer students taking math and science courses, and low-quality curriculums and teacher preparation in K-12 education compared to other countries.

The call has been taken up by some of the most prominent people in business and politics. [Bill Gates](#), chairman of Microsoft, said at an education summit in 2005, "In the international competition to have the biggest and best supply of knowledge workers, America is falling

behind." President George W. Bush addressed the issue in his 2006 [State of the Union address](#). "We need to encourage children to take more math and science, and to make sure those courses are rigorous enough to compete with other nations," he said.

Salzman and Lowell found the reverse was true. Their report shows U.S. student performance has steadily improved over time in math, science, and reading. It also found enrollment in math and science courses is actually up. For example, in 1982 high school graduates earned 2.6 math credits and 2.2 science credits on average. By 1998, the average number of credits increased to 3.5 math and 3.2 science credits. The percent of students taking chemistry increased from 45% in 1990 to 55% in 1996 and 60% in 2004. Scores in national tests such as the National Assessment of Educational Progress, the SAT, and the ACT have also shown increases in math scores over the past two decades.

And the new report again went against the grain when it compared the U.S. to other countries. It found that over the past decade the U.S. has ranked a consistent second place in science. It also was far ahead of other nations in reading and literacy and other academic areas. In fact, the report found that the U.S. is one of only a few nations that has consistently shown improvement over time.

Why the sharp discrepancy? Salzman says that reports citing low U.S. international rankings often misinterpret the data. Review of the international rankings, which he says are all based on one of two tests, the Trends in International Mathematics & Science Study (TIMSS) or the Programme for International Student Assessment (PISA), show the U.S. is in a second-ranked group, not trailing the leading economies of the world as is commonly reported. In fact, the few countries that place higher than the U.S. are generally small nations, and few of these rank consistently high across all grades, subjects, and years tested. Moreover, he says, serious methodological flaws, such as different test populations, and other limitations preclude drawing any meaningful comparison of school systems between countries.

## **Enough Jobs for the Grads?**

As far as our workforce is concerned, the new report showed that from 1985 to 2000 about 435,000 U.S. citizens and permanent residents a year graduated with bachelor's, master's, and doctoral degrees in science and engineering. Over the same period, there were about 150,000 jobs added annually to the science and engineering workforce. These numbers don't include those retiring or leaving a profession but do indicate the size of the available talent pool. It seems that nearly two-thirds of bachelor's graduates and about a third of master's graduates take jobs in fields other than science and engineering.

Michael Teitelbaum, vice-president of the Alfred P. Sloan Foundation, which, among other things, works to improve science education, says this research highlights the troubling weaknesses in many conventional policy prescriptions. Proposals to increase the supply of scientists and engineers rapidly, without any objective evidence of comparably rapid growth in attractive career opportunities for such professionals, might actually be doing harm.

## Shortages in Specific Skills

In previous columns, I have written about research my team at Duke University completed that shattered [common myths](#) (BusinessWeek.com, 7/10/06) about India and China graduating 12 times as many engineers as the U.S. We found that the U.S. graduated comparable numbers and was far ahead in quality. Our research also showed there were [no engineer shortages](#) (BusinessWeek.com, 11/7/06) in the U.S., and companies weren't going offshore because of any deficiencies in U.S. workers.

So, there isn't a lack of interest in science and engineering in the U.S., or a deficiency in the supply of engineers. However, there may sometimes be short-term shortages of engineers with specific technical skills in certain industry segments or in various parts of the country. The National Science Foundation data show that of the students who graduated from 1993 to 2001, 20% of the bachelor's holders went on to complete master's degrees in fields other than science and engineering and an additional 45% were working in other fields. Of those who completed master's degrees, 7% continued their education and 31% were working in fields other than science and engineering.

There isn't a problem with the capability of U.S. children. Even if there were a deficiency in math and science education, there are so many graduates today that there would be enough who are above average and fully qualified for the relatively small number of science and engineering jobs. Science and engineering graduates just don't see enough opportunity in these professions to continue further study or to take employment.

## Creating Wider-Ranging Demand

With U.S. competitiveness at stake, we need to get our priorities straight. Education is really important, and a well-educated workforce is what will help the U.S. keep its global edge. But emphasizing math and science education over humanities and social sciences may not be the best prescription for the U.S. We need our children to receive a balanced and broad education.

Perhaps we should focus on creating demand for the many scientists and engineers we graduate. There are many problems, from global warming to the development of alternative fuels to cures for infectious diseases, that need to be solved. Rather than blaming our schools, let's create exciting national programs that motivate our children to help solve these problems.

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