

Published Online: February 5, 2008

Published in Print: February 6, 2008

COMMENTARY

Closing the Science Gap by Hand

By Anne Spence

America's latest report card on science and engineering education arrived last month, and let's just say that if our school system were a 16-year-old, it would be grounded immediately—and have the car keys taken away, too.

The key findings of the National Science Board's "[Science and Engineering Indicators 2008](#)" were no surprise. Our schools have been lagging behind in the vital science, technology, engineering, and mathematics, or STEM, areas for several years now. With rising competition from economic and entrepreneurial powers like China and India, the American education system has its work cut out for it.

As an engineer and educator who works to translate science to teenagers, I think the root problem lies not in American students' heads, but in their hands.

Our 21st-century students are media-saturated, tech-savvy, collaborative, and connected to a culture that has permanently altered the education experience. In 2008, an American high school or college science teacher who begins a lesson with "Open your books and turn to page X" might as well be speaking Mandarin or Pashto.

Contrary to the numbers, American students can quickly become passionate about STEM topics when they are taught in a hands-on way that clearly connects the content from the classroom to their lives and the world around them.

A skilled teacher equipped with cheap, hands-on tools like LEGOs, pingpong balls, and hair-dryer-powered hot air balloons can work magic in inspiring future scientists.

That isn't to say that students can only grasp science and math concepts when they're taught with Steve Jobs' latest \$500 toy, or that middle school teachers in Milwaukee must morph into "Mr. Wizard" overnight. But students do learn faster and more enthusiastically with surprisingly cost-effective methods that combine the American love of problem-solving and competition.

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Hands-on learning makes science relevant to students. When that spark of curiosity is fanned by strong teaching fundamentals in the classroom, both academic achievement and long-term interest in high-paying STEM careers rise.

I've seen some impressive evidence of what students can do when the hands-on/real-world connection clicks.

I've met a female high school student from New York who designed a cellphone-activated remote-start system for her car. She starts the car remotely and tells it to call her back when the interior temperature is comfortably warm.

I've worked with other students who got involved in the renovation and expansion of their school's cafeteria. They used professional-quality architectural software to design tables that made a more efficient use of space.

Americans don't like coming in second, but our competitive spirit has always fostered innovations that made our country great, and it will continue to do so. Change can happen with the increased involvement of parents, government, and especially the high-tech corporations that have the most riding on building a skilled workforce.

It won't be easy. Across the world, students are amazingly focused on improving their lives through education. In the African nation of Guinea, one of the world's poorest countries, students study late into the night in airport parking lots because that's the only reliable local source of electric light.

It can be intimidating to know that the U.S. class of 2012 will be competing against a world's worth of driven students, but with the right approach, it can also be inspiring.

I, for one, am willing to bet that with a more hands-on teaching approach, for every 9th grader burning the midnight oil in Mumbai, there can be an inner-city American student whose LEGO creation could be a model for the next Mars Rover.

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