

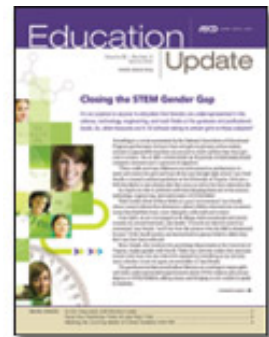
# Education | Update

March 2010 | Volume 52 | Number 3

## Closing the STEM Gender Gap

by Ellen Ullman

**It's no surprise to anyone in education that females are underrepresented in the science, technology, engineering, and math fields at the graduate and professional levels. So, what measures are K–12 schools taking to attract girls to these subjects?**



March 2010

According to a recent assessment by the National Association of Educational Progress, performance between boys and girls in primary and secondary schools is separated by less than one percent in math and less than three percent in science. Yet, in 2007, women made up 26 percent of mathematical and computer scientists and 11 percent of engineers.

"There really aren't any differences in achievement or performance in math and science for girls and boys all the way through high school," says Fred Smyth, a research assistant professor at the University of Virginia. Girls are a little less likely to take physics, but they score as well as the boys when they do.

So, if girls are able to perform well what's keeping them out of the science, technology, engineering, and mathematics (STEM) fields?

"Girls tend to think of these fields as a guys' environment," says Smyth, whose research shows that elementary school children demonstrate an unconscious bias that links boys, more than girls, with math and science.

From birth, we are encouraged to do things, both consciously and unconsciously, by our environment, says Smyth. "If you do an Internet search on astronauts," says Smyth, "you'll see from the pictures that the field is dominated by men." Girls, Smyth asserts, are less inclined to pursue fields in which they don't see their faces reflected.

Brian Nosek, who works in the psychology department at the University of Virginia, studies gender with Smyth. "Girls may not even realize they associate science with boys, but any time we're exposed to something in our environment, whether or not we agree, we remember it," says Nosek.

The good news is that several school districts are working to inspire girls and other

underrepresented populations to study STEM subjects and pursue degrees in STEM fields by adding classes and bringing in role models to speak to students.

## **Mentoring Miami Girls**

"When I was teaching computer science in 2005, I wondered why there were only one or two girls in the class," says Lourdes Whittington, who handles curriculum development for Miami-Dade (Fla.) County Public Schools' instructional technology department. One way she addressed that imbalance was to invite a panel of women in STEM fields to come and talk with her students about IT jobs.

Nola Garcia of StarBot Inc., who participated in Whittington's panels, teaches workshops on engineering, robotics, and technology to students and teachers in south Florida. Garcia says she often sees young girls who are so excited about the sessions that they recruit their friends to participate. "The girls bring new girls to each workshop or meeting. They say, 'If I can build a robot, I can do anything.' It's incredibly empowering," says Garcia.

Whittington says another of her former panelists invites female students from various schools to visit her in the IT department at Burger King each year. The students spend the day shadowing employees as they perform their various IT roles. "We're definitely having an impact," says Whittington. "When girls initially heard about IT, they were unsure, but after going to Burger King, they had a much clearer understanding of what technology helps people do in their jobs. They want to know more."

## **Engineering a Change**

"In 2003, we researched the U.S. labor market and learned that 70 percent of all jobs are going to be in the STEM fields," says Lauren Baker, coordinator of career and technical education for Milwaukee (Wisc.) Public Schools.

Baker knew, based on her district's demographics, that the parents did not have backgrounds in these fields; therefore, the students might not be aware of possible career tracks. "I did not want them to be cut off from these opportunities," she says.

Baker partnered with Project Lead the Way (PLTW), a national organization that provides STEM classes for middle and high school students. Even more important, PLTW offers the necessary professional development for participating teachers. "PLTW allowed my math, science, and technology teachers to learn how to teach engineering. The sustainability component is huge, especially in an urban district with a lot of turnover," says Baker.

Today, engineering is offered at 21 of Baker's schools, and nearly 4,000 students have taken it. Thanks to stimulus funds and federal dollars, Baker will add the program to 12 more schools in the next two years. In addition, she has raised close to \$2 million from her supportive local business community.

Forty-four percent of the students who have taken a PLTW class are female, and 90 percent are students of color. "Although we lose some girls after middle school, we're very proud of the penetration," says Baker. "From our school board on down, there's a tremendous commitment to this effort."

Baker believes that starting the classes in the 6th grade has helped to attract and retain such a high percentage of female and minority students. Once the kids build their first robot or circuit, she says, they're hooked.

## **Injecting Life into Computer Science**

In 2003, Joanna Goode, assistant professor at the University of Oregon in Eugene, and Jane Margolis, who runs the Institute for Democracy, Education, and Access at the UCLA Graduate School of Education and Information Studies, visited three schools in the Los Angeles Unified School District (LAUSD) to study their computer science classes. Goode and Margolis, who were doing research for their book, *Stuck in the Shallow End*, found that few of the classes included female students and that teachers seemed to struggle with effectively teaching the courses.

A year later, the pair began offering summer professional development to improve the computer science offerings. Within another two years, the number of girls taking AP computer science tripled and the number of Hispanic girls taking it quadrupled. The number of classes being offered doubled as well, and the teachers learned about the importance of collaborating with colleagues.

They invited four teachers (two from LAUSD) to develop a six-unit class for 10th and 11th graders called Exploring Computing Science and covering Web design, human interaction, Scratch programming, robotics, and computing applications. The course is continually updated as technology changes. This year, 20 LAUSD instructors at 24 high schools are teaching the course. To prepare, the educators attend a weeklong summer institute in which they present the units to each other as they learn them. Goode and Margolis are petitioning the state to award college credit for the training.

Margolis thinks that society's misconceptions about computer science contribute greatly to the lack of women in the field. "People think it's for a social people who don't care about social issues. But computer science encompasses robotics, graphic design, fabric creation, and [many other fields]," she says.

John Landa, who teaches computer science at Southeast High School, believes that girls enjoy the class because of its real-world focus. For one unit, he asks students to analyze a local or global problem, develop a solution, and create a Web site about it. "Students learn that computer science is a tool to tackle issues," he says.

Todd Ullah, the principal at Washington Preparatory High School, has worked with Goode and Margolis since the beginning. To ensure the course's success, he called district principals to make sure they were aware of it. "The girls have come forward because they are interested and are being told they can do it," he says. Now that the course is well established at LAUSD, Ullah is sharing it with other school districts.

## **Grabbing Girls' Attention**

What else can schools do to develop girls' passion for science, technology, engineering, and mathematics?

Glenn Blank, principal investigator of the Lehigh Valley Partnership for STEM Education in Pennsylvania, offers the following suggestions.

- Recruit female students to join science or computing clubs.
- Hang posters that show a variety of people doing math and science in interesting ways.
- Assign reading material about people working in different STEM fields.
- Bring in people from the business world or local universities, especially women, to educate students about the opportunities in STEM fields.
- Have students talk with one another about misperceptions. Help them to explore what they are good at instead of following stereotypes.

As educators think of new ways to engage girls in STEM classes, they may even develop innovative ways of making these courses generally more enticing. "We're not talking about creating a gender-sensitive curriculum," says Smyth. "But good science teaching should be engaging, fun, and connected to things that matter in the real world." Keeping these tips in mind will definitely benefit both girls and boys, opening the doors to exciting new opportunities for all students. **EU**

---

Copyright © 2010 by ASCD

---

[Contact Us](#) | [Copyright Information](#) | [Privacy Policy](#) | [Terms of Use](#)

© 2010 ASCD