

# Teaching Girls to Tinker

By Lisa Damour

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Girls now surpass boys in nearly every measure of academic success. A [2004 report](#) from the National Center for Education Statistics confirmed that girls had higher educational goals than boys, were less likely to repeat a grade or drop out of school, took more Advanced Placement courses, and were more likely to go to and graduate from college.

Even in high school mathematics— a subject where boys have consistently held an edge—the playing field seems, somehow, to have leveled. As a 2008 report in the journal [Science](#) calmly declared, “Standardized tests in the U.S. indicate that girls now score just as well as boys in math.”

Yet, even as girls open new gender gaps by outpacing their male peers in most subjects, men still receive roughly 77 percent of the bachelor’s degrees awarded in engineering and 85 percent of those in computer science. Why aren’t girls choosing to enter these critical fields of the future?

There are several familiar explanations: Girls lack sufficient female role models in computer science and engineering; girls prefer sciences that are clearly connected to helping others; girls are turned off by the “isolated geek” stereotype that dominates their view of computer science and engineering.

Here’s another explanation: Girls don’t tinker.

As the American Association of University Women noted in its 2000 report ["Tech-Savvy,"](#) boys see computers as toys interesting in their own right, while girls see them as tools for accomplishing tasks. By approaching computers and other mechanical devices as toys, boys are able to learn how they function from the inside out. When tinkering with programming, they develop an intuitive understanding of how computers work. When tinkering with machines, they develop their mechanical reasoning, an arena of cognitive skill that boasts one of the largest of all gender gaps.

Why don’t girls tinker? The answers aren’t clear, but for starters, it seems that adults don’t encourage them to. In their 1994 book *Failing at Fairness: How Our Schools Cheat Girls*, Myra and David Sadker observed that teachers allow boys to struggle with mathematics problems long after they have rushed in and rescued girls from the same struggle. Further, the Sadkers noted, teachers show boys how to work machines such as staplers or VCRs, while they tend to staple papers or start VCRs for girls. By letting boys struggle and tinker, the Sadkers wrote, adults send a message: “I have high expectations for you, so I will wait a little longer. I know you can get it if I give you a chance.” By intervening rapidly with girls, adults let them know that they should be afraid of doubt, investigation, and experimentation—all of the essential elements of tinkering.

Yet when adults do encourage girls to tinker, they often find that girls are reluctant. Having mastered an education system that prizes outcome over process, girls can be at a loss when asked to engage in a method that may or may not produce a polished finished product.

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So what are parents and teachers to do?

First, know that tinkering takes time, and sometimes space. Look for opportunities for girls to tinker without worrying about deadlines or grades. After-school Lego Leagues, school intersessions, and unstructured class time are prime times for tinkering. Parents can designate work areas at home where broken appliances, scrap wood, and tools can be put to new and creative uses.

Second, don't expect girls to tinker alone. The next time your toaster breaks, get a screwdriver and ask your daughter to join you in taking it apart. She doesn't need to fix it—unless she wants to—but she should enjoy seeing what's inside. At school, have girls tinker with a partner; studies show that women in computer-science classes who work in pairs are more likely to feel confident about their programming and to go on to major in computer science.

Finally, when asking girls to tinker, give them meaningful goals. At the all-girls school where I teach in Ohio, the high school engineering students tinkered with surprising enthusiasm as they designed chicken coops—with scale models and blueprints—to be constructed by their classmates during a summer trip to a Tanzanian orphanage. They erased, reconsidered, and redesigned as they worked their way through the engineering challenges that come with chicken-coop construction. Tinkering with the slope of a roof and the proper fastenings for chicken wire becomes a lot more compelling when trying to provide a sustainable protein source for an orphanage.

Girls have made fantastic academic gains in the past 15 years, but they are still sorely underrepresented in engineering and computer science. To engage in these critical fields, girls need compelling role models and an appreciation for the collaborative nature and human applications of engineering and computing. And, from their earliest days, girls need to tinker.

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