November 16, 2008

DIGITAL DOMAIN

What Has Driven Women Out of Computer Science?

By RANDALL STROSS

ELLEN SPERTUS, a graduate student at M.I.T., wondered why the computer camp she had attended as a girl had a boy-girl ratio of six to one. And why were only 20 percent of computer science undergraduates at M.I.T. female? She published a 124-page paper, “Why Are There So Few Female Computer Scientists?”, that catalogued different cultural biases that discouraged girls and women from pursuing a career in the field. The year was 1991.

Computer science has changed considerably since then. Now, there are even fewer women entering the field. Why this is so remains a matter of dispute.

What’s particularly puzzling is that the explanations for under-representation of women that were assembled back in 1991 applied to all technical fields. Yet women have achieved broad parity with men in almost every other technical pursuit. When all science and engineering fields are considered, the percentage of bachelor’s degree recipients who are women has improved to 51 percent in 2004-5 from 39 percent in 1984-85, according to National Science Foundation surveys.

When one looks at computer science in particular, however, the proportion of women has been falling. In 2001-2, only 28 percent of all undergraduate degrees in computer science went to women. By 2004-5, the number had declined to only 22 percent. Data collected by the Computing Research Association showed even fewer women at research universities like M.I.T.: women accounted for only 12 percent of undergraduate degrees in computer science and engineering in the United States and Canada granted in 2006-7 by Ph.D.-granting institutions, down from 19 percent in 2001-2. Many computer science departments report that women now make up less than 10 percent of the newest undergraduates.

In 1998, when Ms. Spertus received her Ph.D. in computer science, women received 14 percent of the doctorates granted in the field. Today, she’s an associate professor at Mills College and a research scientist at Google. Her life story supports the hypothesis of Jane Margolis, co-author of “Unlocking the Clubhouse: Women in Computing,” who highlights the ambient ideas in a family that are enormously influential in career decisions.

Last week, Ms. Margolis said that “a lot of the girls who were doing computer science came from families of computer scientists and engineers.” Her explanation: “It was in the air. There was the expectation that they could do whatever they wanted.” Ms. Spertus’s father was an M.I.T.-trained engineer. She learned programming even before personal computers had arrived, using computer terminals in her house that were connected to a Honeywell mainframe used by the family’s business.

Twenty-five years ago, more young women in colleges and universities were drawn to computer science

than today. From 1971 to 1983, incoming freshman women who declared an intention to major in computer science jumped eightfold, to 4 percent from about 0.5 percent.

Jonathan Kane, a professor of mathematics and computer science at the University of Wisconsin-Whitewater, recalls the mid-1980s, when women made up 40 percent of the students who majored in management computer systems, the second most popular major on campus. But soon after, the number of students majoring in the program had fallen about 75 percent, reflecting a nationwide trend, and the number of women fell even more. "I asked at a department meeting," he says, " 'Where have the women gone?' It wasn't clear." His theory is that young women earlier had felt comfortable pursing the major because the male subculture of action gaming had yet to appear.

Justine Cassell, director of Northwestern University's Center for Technology & Social Behavior, has written about the efforts in the 1990s to create computer games that would appeal to girls and, ultimately, increase the representation of women in computer science. In commenting as a co-contributor in a new book, "Beyond Barbie and Mortal Kombat: New Perspectives on Gender and Gaming," Ms. Cassell writes of the failure of these efforts, "The girls game movement failed to dislodge the sense among both boys and girls that computers were 'boys' toys' and that true girls didn't play with computers."

She said last week that some people in the field still believed that the answer to reversing declining enrollment was building the right game. Another school of thought is what she calls the "we won" claim because women have entered computer-related fields like Web site design that are not traditional computer science. Ms. Cassell points out that it's not much of a victory, however. The pay is considerably less than in software engineering and the work has less influence on how computers are used, and whether this actually accounts for the diminishing numbers of female computer science majors remains unproved.

Ms. Cassell identifies another explanation for the drop in interest, which is linked to the pejorative figure of the "nerd" or "geek." She said that this school of thought was: "Girls and young women don't want to be that person."

I spoke with Ms. Spertus last week about her thoughts about the declining percentage of undergraduate women majoring in the field. "Women choosing not to go into computer science is fine," she said, "if there aren't artificial barriers keeping them out." She lamented the recent decision of one of her outstanding computer science students who chose to major in nursing because of what the student perceived as better prospects for finding employment.

Such students who choose not to pursue their interest may have been introduced to computer science too late. The younger, the better, Ms. Margolis says. Games would offer considerable promise, except that they have been tried and have failed to have an effect on steeply declining female enrollment.

At least we know one thing: it's possible to have about the same number of men and women in computer science classes. That just about describes classrooms of 25 years ago.

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