BREAKING the GEEK Myth

Addressing Young Women's Misperceptions about Technology Careers

If you gather a group of female computer scientists and ask for their early thoughts on careers in technology, you hear things such as:

I thought computer science majors had to know a lot more than I did. They had to play on computers all day.
— *CS undergraduate*

I thought you had to be a geek to be a computer scientist. I didn't want to sit in front of a computer all day, every day. I wanted a life. — *CS professor*

I felt computer science would never help someone. If anything, computers were destructive because they could simulate bombs. — *CS graduate student*

I liked using computers for the basics, like writing papers, but I didn't think I could major in computing because I was never good at math.
— *Informatics graduate student*

I'd never had an interest in how other machines, like cars, worked so I didn't have high expectations for computers.
— *CS lecturer*

Fortunately, all of these women had a turning point: they realized their misconceptions about technology careers. Computers are not just for geeks and boys who like computer games and to tinker with electronics. You do not have to be great at math to work with technology. You can use computers to help real people with real problems.

By Katie A. Siek, Kay Connelly, Amanda Stephano, Suzanne Menzel, Jacki Bauer, and Beth Plale
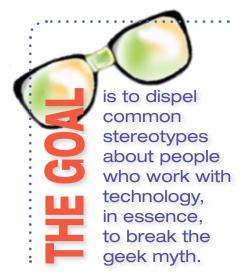
The women above discovered their passion for technology in college, almost by accident. However, for most, technology is never seriously considered as a career. Indeed, Jay Vegso's recent report for the Computing Research Association shows that incoming freshman interest in technology is at an all time low, for both men and women, and women's interest is declining fastest. Although the representation of women in other sciences is gaining, the percentage of bachelor's degrees awarded to women in computer science has been declining since 1985. (*Editor's note:* Find this and other Web Resources on p. 22.)

When the Women in Computing Group at Indiana University (WIC@IU) was looking for ideas on how to increase the number of women in computing majors at IU, we realized that women were turning away from technology careers before they arrived at college. How, then, could we convince women to join us when many had already decided against technology in high school? What could we do to address what we saw as a common misperception among young women that technology fields were asocial, uninteresting, and solitary?

Our solution is to reach out to regional middle and high school students who are likely to attend IU and persuade them to consider a career in technology. The goal is to dispel common stereotypes about people who work with technology, in essence, to break the geek myth. In this article, we describe our interactive presentation—Just Be—and discuss our experiences delivering it. Although our primary goal is to increase the number of women in CS, and as such we focus on issues that more often affect women, we believe Just Be will help attract boys to technology as well.

Just Be

Just Be is an interactive presentation composed of three parts: introduc-

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tion of speakers, an interactive quiz, and a discussion of exciting research in computing and technology at IU. During the introduction, presenters discuss how they got involved in computing when they were younger, their current work, and what they do outside of work for fun.

After introducing ourselves, we engage the students by asking what they think typical people in computing-related fields are like. We hear everything from people in computing are smelly to anti-social to intelligent. Once we have established a group model of the typical person in computing, the students take an interactive quiz with eInstruction modules.

The interactive quiz has two types of questions—students are asked to either identify the person in computing from a set of four images or to guess the occupation of the person pictured. All the questions are multiple-choice, and there are some false positives. For instance, we show a computer scientist rock climbing, and then a few questions later we show a professional rock climber climbing. Students usually assume the second rock climber is also a computer scientist. Whenever we show a set of four images, three of the people pictured are well-known people in our society (e.g., famous poets, photographers, painters, and Supreme Court judges), and the

fourth is of a famous person in computing or a researcher at IU. The people in the pictures are from diverse ethnic and age groups as well. The eInstruction modules allow students to see the results of the quiz immediately after each question in the form of a colored bar graph.

At the beginning of the quiz, students are very sure of themselves when they answer each question because they use their mental model of a person in computing to determine who is "the geek." However, by the end of the quiz, students are not sure what each person does for a living, and answers are more dispersed.

During the last part of the presentation, we ask students what they think people in computing-related fields do. Typically, students think people in computing create games, Web pages, and movies. We then show students other fields in computing, such as graphics, ubiquitous computing, and human–computer interaction. The slides contain flashy movies, screenshots, and pictures of the applications to show a more interesting side of technology.

The presentation is customized for each school based on the age group we are presenting to. For high school students, we add more specific information about computing-related majors and average salaries for popular computing jobs. We also meet after school or during lunch with female students to discuss opportunities for women in computing and answer any questions they may have.

The Just Be Experience

The interactive nature of Just Be is the key to engaging the students. During our introductions, the class is polite. But as soon as we start showing them pictures of people they think are geeks, the atmosphere changes dramatically. Students respond with laughter, groans, and general excitement. They enjoy seeing the collective

responses to our quiz questions and using the interactive technology. Presenters ask students why they selected a particular answer to initiate them in questioning their stereotypes aloud.

The rapport between the presenter and the class is so relaxed by the end of the quiz that students remain active during the discussion of the various computing topics researched at IU. Even though students see computer graphics on television shows, they are most amazed when we talk about graphics research. The graphics videos we show are not as detailed as current computer animated movies, but students are intrigued by the possibility that one day they too could make computer animations. We ask students what kind of applications or computers they would create if they were in a specific field. A lot of the applications students suggest help with everyday chores and communication with loved ones. Students ask presenters insightful questions about everything from how a computer compiles programs to what the effects are of outsourcing on computing jobs.

Teachers sometimes warn us that their students are tech-savvy and we should not feel bad if students are not impressed with Just Be. Despite the caveats, we have yet to meet a class who is not excited about technology after participating in Just Be. They want to visit the cave, create computer animations, and learn more.

After each school visit, we follow up with the teachers to see if we are achieving our goals and reaching the students. Overwhelmingly, teachers think Just Be is a good use of class time and that it helps battle stereotypes about geeks. Indeed, some teachers have been able to encourage more students to take their high school computing courses as a result of our visit. Teachers notice that we keep their classes engaged and enjoy watching the interactions between their students and presenters. The

teachers learn about cutting edge technology from the presenters and the presenters learn how to more effectively talk to their students during breaks between presentations.

Just Be not only benefits the students—it has had a positive effect on the presenters as well. The presenters' main motivation for getting involved in Just Be is the lack of women in computing. They want to show students how computing is important to many fields, such as biology, design, and healthcare. Student reactions to Just Be and the new concepts they learn are what keeps the presenters excited and willing to continue to be involved. Presenters love the interactions they have with students during presentations and at home when they receive e-mail from students.

Outreach in Your Area

You may be wondering how you can host a presentation like Just Be at your school. Currently, there are not many "in-school" outreach programs. Here are ones we recommend from the United States and Canada:

- Carnegie Melon University (CMU) Women at School of Computer Science Roadshow (Pittsburgh, Pennsylvania): This presentation, shown to both boys and girls, defines computing. Female presenters share their experiences, too.
- Simon Fraser University's Computer Science Presentation (Burnaby, British Columbia, Canada): This presentation is targeted toward 11th-grade math classes to define computing, discuss experiences, and share a day in the life of a CS student.
- University of Illinois at Urbana-Champaign Women in Computer Science's Chictech (Urbana): Female CS students visit high schools and treat girls to lunch. They discuss life as a CS student, debunk geek myths, and share experiences.

Just Be and the CMU Roadshow both have their presentations online for

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teachers to download and present to their classes. In addition, you can find technology summer camps listed at the University Programs for High School Students page.

What Next?

We will continue to visit area schools in the next year. Please see the WIC@ IU Web site for more information about presentations. We eagerly anticipate presenting at summer camps and retreats for children that focus on technology. We plan to expand the project beyond Indiana University and encourage other Indiana schools to develop their own Just Be presentations. In fact, we led a Teach the Teachers session at the Indiana Women in Computing (InWIC) conference in February. InWIC is a regional version of the national Grace Hopper Celebration of Women in Computing conference and gathers more than a hundred women from several Indiana schools for a two-day event in a state park.

By sharing our personal experiences and contagious enthusiasm, we hope to increase the number of women pursuing computing degrees at Indiana University in any field of computing—computer science, informatics, library science, or information systems. The development of Just Be has been a unifying force, bringing together women from the different groups on campus, working toward a common goal, and increasing our own understanding of the pervasive nature of technology. Our greatest hope is that we will reach some of these young women and someday they will say "I thought computing was for geeks, but then Just Be came to my school, and I was hooked!"

Resources

Carnegie Melon University Women at School of Computer Science Roadshow (Pittsburgh, Pennsylvania): http://women.cs.cmu.edu/What/Outreach/Roadshow; e-mail women@scs.cmu.edu

Simon Fraser University's Computer Science Presentation (Burnaby, British Columbia, Canada): http://cs.sfu.ca; e-mail csadvise@cs.sfu.ca

University of Illinois at Urbana-Champaign Women in Computer Science's Chictech (Urbana, Illinois): http://women.cs.uiuc.edu/staticpages/index.php?page=studentmain; e-mail heeren@cs.uiuc.edu (Cinda Heeren)

University Programs for High School Students: http://www.studentsreview.com/hslist.php3

Vesgo, J. (2005). *Interest in computer science as a major drops among incoming freshmen.* Available: http://www.cra.org/CRN/articles/may05/vegso

Women in Computing at Indiana University: http://www.cs.indiana.edu/cgi-pub/wic

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