Strategy Trumps Money: Recruiting Undergraduate Women into Computing

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Computing departments can maximize recruitment of qualified female students with a low-cost, “high yield in the short term” strategy.

Most college and university departments have outreach efforts to boost undergraduate enrollment, often with the added goal of improving the representation of women and minority students. Yet most departments don’t properly evaluate the return on investment of this nontrivial use of scarce resources. These scenarios are common:

A motivated and passionate faculty member creates an outreach program but colleagues know little, if anything, about it because the department doesn’t officially sponsor it.

Outreach is funded by short-term grants rather than low-cost projects sponsored routinely by the department.

A faculty member or graduate student finds out about an outreach event and by chance is available to attend, but scrambles to come up with an appropriate message or memorable swag on such short notice.

The department holds an annual summer camp for middle school students despite the countless competing messages and experiences the students will be exposed to before they can enroll in college.

Such opportunistic approaches usually show little evidence of success. The National Center for Women & Information Technology (NCWIT), a coalition of more than 200 universities, corporations, and nonprofit organizations working together to increase girls’ and women’s participation in computing professions, offers one solution to this problem. NCWIT promotes a low-cost, “high yield in the short term” strategy that helps computing departments identify the largest groups of female students with the appropriate aptitudes who are ready to declare a major or minor in the next one to three years.

FOCUS ON STUDENTS LIKELY TO SUCCEED

On campus, you can heighten awareness of your department’s offerings among qualified undeclared majors, students seeking to add a second major, and potential minors. Off campus, you can reach out to those who influence secondary students—teachers, counselors, parents, and alumni—to do the outreach for you, provided you give them the right information.

Most undergraduate computing programs expect relatively high mathematical aptitude, usually measured by college entrance exams. Figure 1 shows Scholastic Aptitude Test (SAT) scores, ranked
by intended major, for US students in 2008. Some study areas have much larger numbers of students than others; it's a good idea to carefully examine your institution’s academic structure and identify those majors likely to have many students with high mathematical aptitude. Once they're identified, you can tailor the information you provide them to their existing interests.

PROVIDE RELEVANT INFORMATION

Research shows that secondary students, teachers, and parents often don’t know what a computing major studies and that they have misconceptions about computing-related careers. To overcome this knowledge gap, highlight the following:

- Computing-related jobs are predicted to be among the fastest growing and highest paying, despite continued off-shoring of jobs with rote requirements or little person-to-person communication. Use reliable sources to support these claims, such as US Bureau of Labor Statistics (www.bls.gov) projections.
- Underscore the social relevance of computing today. Computing is an essential component in solving many of the world’s problems, from poverty to climate change.
- The expertise that comes with studying computing is applicable in a wide variety of domains. Computing professionals work in every industry, including healthcare, education, business, transportation, and national security.
- Contrary to many media portrayals of computer scientists as isolated or reclusive, computing requires working with others.
- Computing is a practical way to apply mathematical skills.

Tailor the message to the audience

Before investing time and money in communicating with your audience, find out what’s important to them. Not all parents are alike, nor do counselors and teachers have identical goals for their students. Middle and high school girls have different career goals. Consider these realities as you craft your messages:

- Parents, advisors, teachers, financial aid officers, and career services staff are all unlikely to recommend career trajectories when they believe there are no jobs or the work is unpleasant.
- Parents want to know that their children will be happy and financially independent. Counselors and advisors want to know that their guidance will be useful for a lifetime.
- Young people hope to earn a decent living, but not at the expense of doing work that isn't worthwhile. They often express a desire to do something that is socially relevant; most also prefer working environments with social interaction.

Many organizations provide free or low-cost reports on youth that are available online, such as Junior Achievement/ING’s 2010 Kids and Careers Survey (www.ja.org/files/polls/kids_careers_2010-JA-ING-Teens-and-Career-Poll.pdf), DMW Direct Insight Reports (www.dmwdirect.com/insightreports.html), and the Pew Research Center’s Internet & American Life Project (www.pewinternet.org).

Use persuasive images

Images have the power to persuade or dissuade students from choosing a career. Show people applying computing to problems your target audience cares about. For example, in the 2008 SAT, roughly 38 percent of university-bound US girls reported their intent to pursue a health- or biology-related career. Using images of medical solutions, such as robotics in the service of healthcare, could be powerful with this large group of girls.
**WHAT EXISTING ASSETS CAN YOU LEVERAGE?**

Numerous organizations, both on and off campus, can help computing departments’ efforts to recruit undergraduate women:

**College/university resources:**
- Admissions office
- Communications/press office
- Community relations office
- Career services office
- School of education/teacher’s college
- Schools/faculty of science, technology, engineering, and mathematics (STEM) disciplines

**Student groups and services:**
- Nonmajor-related student volunteer organizations
- Student computing groups
- Women’s center
- New student week/orientation

**Allies and influencers:**
- Computing alumni
- Friends and family of computing students and faculty
- Current computing students

Be sure to furnish these groups with accurate and up-to-date information about computing careers, their importance in the US economy, and the social and financial benefits of becoming a computer scientist. For more information about how to leverage these assets, download NCWIT’s Strategic Planning for Recruiting Women into Undergraduate Computing: High Yield in the Short Term workbook (www.ncwit.org/recruitingworkbook).

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**Difficult.** Instead of using images of things such as binary code or headshots of faculty, consider images with captions that highlight the importance of computing in today’s critical technologies (for example, the echocardiogram) and the human problems they’re solving. The Dot Diva initiative (www.dotdiva.org) provides more ideas and information.

**Avoid creating negative impressions**

Some research points to the stereotype of the “geek” as a significant barrier to women’s entry into computing, while other studies suggest that secondary students think computer scientists sit behind a computer all day alone writing code. Yet a very large segment of potential majors has no conception of these issues, whether they’re true or not. Talking about them can “plant a weed,” creating a negative impression where there was no impression at all.

Research indicates that outreach efforts in which faculty emphasize their students’ extraordinary abilities with terms like “mathematical genius” or “computing wiz” can discourage candidates by convincing them that they couldn’t possibly be qualified. Clearly students need to be capable, but they don’t have to be geniuses or wizzes.

**Test the message**

One of the best ways to learn if a message is persuasive is to test it with its intended audience. Create a draft and show it to some of your audience members. Let your testers know that they should be honest. Listen as they share their impressions of what your message communicates to them. Ask them what they would do in your position.

**REACH YOUR AUDIENCE**

Creating a brochure, postcard, poster, or other medium to share information with different audiences can help you control your message. Many free resources are available. For example, the Computer Science Teachers Association provides a customizable poster, brochures, links, and other sources on its website (www.csta.acm.org/Resources/sub/Careers.html).

NCWIT has several Talking Points cards to guide discussions about computing. For example: What should parents or teachers say to girls? What should school boards and other education decision-makers know about the importance of computing? These and many other materials can be downloaded for free at www.ncwit.org.

The “What Existing Assets Can You Leverage?” sidebar lists many on- and off-campus sources that may be willing to support your recruiting efforts.

**Reaching students on campus.**

Inform students about computing through nonmajor or other computing-provided service courses. Describe exciting work and careers in these classes so that students know more about the field. Share interesting personal anecdotes, distribute brochures, bring in guest speakers, and more.

It’s a powerful motivator when a respected professor or professional tells students, “you’re good at this; you would make a good major.” Many students don’t realize when they’re doing well in relation to their peers and are thrilled to get positive reinforcement.

Ask members of student groups to post promotional material in their residence hall rooms or hand it out as freshmen leave large lecture courses.

Ask the career services office if you can put a poster on its bulletin board or leave brochures. Provide the office with useful information about computing careers.

Distribute information to the network of advisors on campus. This is an important way to control the message about what computing majors do and what kinds of people belong to your department.

**Reaching students off campus.** Send promotional material to teachers, principals, and high school counselors at your largest feeder schools. Be sure there’s a link to an appealing website—not the site showing your
major's requirements. Leave information with community groups, religious organizations, libraries, and other reputable resources.

Mail postcards or brochures directly to your institution's incoming students. Their parents are likely to see them if they're not sealed in envelopes, creating another potential recruiting ally. If your department has funds to purchase a mailing list of students who have applied to your institution that indicates their mathematics scores, send personalized letters to qualified students. The American College Testing Educational Opportunity Service (www.act.org/eos) and the College Board's Student Search Service (http://professionals.collegeboard.com/k-12/prepare/sss) provide names and test scores at just over $0.30 per name.

Engage your existing students in outreach activities. NCWIT's Roadshow-in-a-Box includes everything you need to train students to conduct fun learning activities in the classroom. Have students train the next class of students so that it consumes less of your time.

**Evaluation is essential to a quality recruiting program.** Once you've set a finite goal and planned your activities, you should create an inexpensive system to track outcomes. For example, you can administer the customizable NCWIT entry survey to newly declared majors to determine which of your recruitment activities and products were most effective. The Roadshow-in-a-Box includes more details about evaluating outreach activities.

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