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Broadening Participation: Bringing Young Women into Computing Through the NCWIT Aspirations in Computing Program

A program to encourage and support girls and women in pursuing their computer science interests.

W O M E N  H A V E  A C H I E V E D parity, or majority, in many previously male-dominated fields, including law, medicine, business, and biology, but not (yet) in computing and engineering. We know that women are just as capable as men at succeeding in these fields. At this point, young women often need individual encouragement to pursue computing. The National Center for Women & IT (NCWIT) is supporting women’s entry and persistence in this field, while at the same time helping to create academic and work environments that are egalitarian and welcoming to them. One avenue NCWIT is pursuing is the Aspirations Computing program, which identifies and supports girls in their computing interests and includes an award honoring high school girls for their computing-related achievements. The program also includes a growing number of other components and activities, as described in this column.

Research shows that encouragement helps individuals persist in the face of adversity. Individual encouragement is essential to retention when girls and women express doubts about whether they belong in computing. Women report more often than men that they entered computer science because of a teacher, family member, or friend’s encouragement. Support can make a big difference in a girl’s belief that she is competent enough to succeed at computing tasks, which can lead to persistence in the field.

The Problem
Being female in a male-dominated field is not easy. Girls in high school must contend with unintended biases on the part of teachers, counselors, and parents, as well as sometimes overt prejudices. The NCWIT Aspirations in Computing program was developed to provide these girls with encouragement, a network of support, and examples of success—all factors that have been shown to influence females to choose to study or work in computing.

We know that girls’ interest in computing classes is influenced by whether or not they have friends in the class or if boys dominate the classes. In one survey of girls, nearly half (47%) said they would feel uncomfortable being the only girl in a group or class. The Aspirations program enables girls to feel less isolated in these situations.

A sense of belonging, or a feeling of “fit,” is important for interest and persistence. Subtle cues like sexist posters or “geeky” paraphernalia in a computer lab can suggest to girls that they do not belong. Less subtle messages such as teachers, counselors, or parents steering female students to non-technical classes tell girls that technology is not for them, even when they may have interest or aptitude. Worse, even well-meaning adults sometimes believe that males have a “natural” talent for computing compared to females. We know this feeling of “fitting in” is a major factor for
females in choosing a major and a career. Programs like Aspirations can help to inoculate girls against feeling like a misfit.

Role models also can influence girls’ decisions to pursue computing. Such role models, however, are often less available for those students who do not come from affluent communities, positions of privilege, or school systems that provide high access to computing courses. Some Aspirations awardees fall into these categories: In 2013, for example, 10% were from schools with 40% or more free or reduced lunch, 61% reported being a racial/ethnic minority, and many came from schools with few or no rigorous computing classes. One of the most important characteristics of a role model is that girls perceive these role models as “relatable” and similar to themselves in important ways. Awardees have reported that the support they receive and the role models they see among Aspirations awardees and NCWIT staff are essential to their continued pursuit of computing.

A Solution: The NCWIT Aspirations Award

Since 2007, NCWIT has been supporting young women through the NCWIT Award for Aspirations in Computing. Awardees are selected for their computing and IT aptitude, leadership ability, academic history, and plans for post-secondary education. The NCWIT Aspirations Award has a national competition as well as local competitions in all 50 states, plus Washington, D.C., Puerto Rico, and the U.S. Virgin Islands.

As the reach and awareness of the program increase, so do the number of applications, with 54% more girls applying in the 2013 season compared to 2012. With the increase in the number of applicants and regional awards, the number of winners and runners-up has also increased (see Figure 1).

The high school girls being rec-
Women event and the Aspirations Day at Google.

The Aspirations in Computing Program is currently being studied by NCWIT research scientists DuBow and Wu. We have undertaken a three-year longitudinal, mixed-methods study assessing the influence of the Award for Aspirations in Computing on awardees’ and non-awardees’ choices of college major and career. We also will be studying the obstacles girls face in pursuing computing, and the circumstances under which they persist.

Another Solution: An Expanded Aspirations Program

Building off of NCWIT’s Aspirations Award, the Aspirations in Computing program now spans from middle school, through high school and college, into the workforce.

Aspirations Educator Award. The NCWIT Aspirations in Computing Educator Award recognizes educators for their efforts to promote gender equity in computing. In the past three years, over 100 educators have been recognized and awarded over $100,000 in professional development funding.

One educator said: “As a result of having won the NCWIT Aspirations in Computing Educator Award, and recognized are a racially and ethnically diverse group, compared to the typical post-secondary computing department’s student body. Figure 2 shows the racial/ethnic composition of the most recent season’s awardees. Among awardees, 0.7% (n=8) identified as persons with disabilities.

Aspirations Affiliate Awards. NCWIT provides an online toolkit and other support to enable this program to be replicable and adaptable across the U.S. Typically, regional award events involve collaboration between community organizations, and academic and corporate entities. To date, 1,400 individuals from academia, non-profit organizations, and corporations have reviewed applications. Reviewers often remark on the high quality of the applications they read, which reinforces their desire to keep these talented young women in the field. The girls’ applications are often truly inspirational, as evidenced by this excerpt: “I am most proud of starting a non-profit organization called Robot Springboard with my sister. Robot Springboard helps start robotics programs in underserved or underprivileged communities. This summer, my sister and I are teaching robotics camps in Kodiak, Alaska, a remote island community, and Wonder Park, Alaska.”

Aspirations Award Program Outcomes. Evaluation data for the Aspirations Award program suggests the program is working. Awardees have reported greater confidence in their technical abilities, increased enthusiasm about computing, and greater awareness of the career opportunities available to them. Although 45% of Aspirations participants report not having taken a CS Advanced Placement exam, 71% of Aspirations participants in college are now majoring in a computer science or engineering field.

In the past award season, more than $300,000 in scholarships were offered by 45 NCWIT Academic Alliance institutions. Other opportunities for awardees include internships at NCWIT Workforce Alliance companies, complimentary registrations for technical conferences, meet-ups with corporate executives, and special events just for Aspirations recipients, such as the Apple TECHnically...
The Aspirations Program has the potential to bring many new women into the pipeline and retain thousands more. Consider getting involved as a volunteer in this rewarding work. Both women and men are encouraged to volunteer; it takes all of us to make change.

- Application Reviewer. Help select the winners from thousands of applications submitted each year. Read and score online at your own pace during three weeks in November. Reviewers typically spend two to five hours per competition; you can choose to review applications from your own community or nationwide. Visit http://www.ncwit.org/review to sign up.

- Committee Member. Connect with an established award program in your community. Local Affiliate Award programs are in need of committee members for publicity, judging, and event planning.

- AspireIT Host. The AspireIT middle-school outreach program matches Aspirations award recipients with NCWIT Academic Alliance or K–12 Alliance members to create and run computing programs. If your organization is an NCWIT member, we can connect you with an award winner who wants to run a middle-school outreach program for girls.

For more details about the NCWIT Aspirations in Computing Program, see http://www.aspirations.org.  

References

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The authors thank the U.S. National Science Foundation for support under award CNS-0813956; NCWIT’s Strategic Partner Microsoft, and Investment Partners Avaya, Pfizer, and Bank of America. All opinions reflected in this column are those of the authors and not necessarily those of the U.S. National Science Foundation.

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