

Special Issue on Gender-Balancing Computing Education

Post-secondary computer science education and computing occupations are largely composed of men. Data from the National Science Foundation shows that in 2001, the gender composition of computer science was 18 % female at the Ph.D. level, 34% at the Masters level, 28% at the Bachelor level, and 41% at the Associate level. This imbalance affects individuals, the discipline, and society. Consequences range from lost career and income opportunities for women, to a narrowed range of life experiences available to enrich the practice of computer science, and the social cost of under-representing half our population in creating our future.

Many factors contribute to gender imbalance in computing by inhibiting women's entry, retention, and advancement or by giving men advantages not given to women. Investigators have considered numerous factors for the imbalance, including the culture and image of computing; lack of female role models and mentors; and gender differences in computing experience, learning styles, academic preparation, self-confidence, and interest or value associated with computing. This special issue focuses on the role played by the educational process.

The authors in this issue consider the ways in which the educational environment can affect gender balance. In particular, they look at how different pedagogical practices affect students. **Garvin-Doxas** and **Barker** discuss their case study of the classroom climate in a first-year computing course. They observed defensive communication practices that could lead to the attrition of women in the field. Focusing on a practice with positive outcomes, **Berenson et al.** offer an in-depth view of student experiences resulting from a collaborative learning environment. **Werner et al.** extend this discussion with quantitative data demonstrating the benefits of pair-programming. Their evidence indicates that student confidence and retention both improve with this pedagogical method. **Lester** and **Brown** also measure a positive effect on student feelings of computer self-efficacy, and show that vicarious learning produces this effect. Finally, in contrast to the benefits from positive personal interactions, **McKenna** casts doubt on the value of certain approaches to the presentation of content. He shows that men and women do not differ in their preferences for abstraction or "black boxes" in the programming curriculum. Taken together, these articles indicate that the nature of student-student and student-faculty interaction is a critical element in the educational environment's effect on the gender balance in computing.

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