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# Report from the Trenches: Implemening Curriculum to Promote the Participation of Women in Computer Science

**Report from the trenches:  Implementing curriculum to promote the participation of women in computer science**

Our article reports on the design and evaluation of a multidisciplinary course entitled Technology for Community (T for C) in which students develop computational products designed to serve the needs of local community service organizations.  The course uses a design-based learning pedagogy.  Our evaluation of it focuses on the role of this pedagogy and other course features believed to improve gender parity in technical fields.

We accepted the charge to design a course that might promote the participation of women, but we grappled with what that might mean.  Research on women's attraction to computing shows that pedagogical methods and assignments within early courses often emphasize abstract principles and that instruction rarely takes place with genuine users or computing applications.  Yet research also suggests that women enter computing study in order to apply computing to some human context (e.g., medicine or education) and that they are less likely than men to be interested in the computer as a machine.   Prior studies identify classroom practices that promote collaboration and knowledge sharing as supporting the recruitment and retention of women in technical fields.   See (Cohoon and Aspray, 2006) for a review of the literature.

Based on our prior experience with design based-learning, we believed it offered a coherent pedagogical framework that could collectively incorporate features believed to increase the participation of women.  In particular, the course includes authentic learning contexts (e.g., learning activities reflecting real-life professional practices), collaborative assessments, knowledge sharing among students, and the humanizing of technology (e.g., highlighting the contributions people bring to the design process).  In design-based learning, skill and knowledge development activities are all situated within an authentic problem-solving context where success is measured by the ability to produce a useful and useable artifact.  Collaborative assessment and knowledge sharing are readily incorporated in design-based learning through the inclusion of standard studio practices such as public critiquing of works-in-progress.

Our evaluation focused on whether the course was effective at recruiting women and at introducing women to technical development.  We also wanted to examine how design-based learning influenced the participation of women.  We examined the enrollment patterns from spring 2001 to fall 2003 across this and all other courses in our computer science curriculum.  We conducted classroom observations and interviews with students and examined feedback from end-of-course questionnaires.  We also analyzed the demographics of the project

sponsors.

The T for C course was effective at recruiting women students and external sponsors, but, on its own, was not successful at meeting the departmental goals of recruiting women into the major. Interviews with students highlighted that the course was successful at developing an authentic learning context and helping students learn how to collaborate across majors.  In fact, students reported that the most rewarding feature of T for C was working in multidisciplinary project groups.  To understand why this course attracted women, we compared it to other courses within the Department of Computer Science. This led us to identify three public markers that should be made readily visible to students making course enrollment choices:  1) course descriptions emphasizing the cognitive and social models that underlie design activities, not just technical content; 2) course description emphasizing the role of externally-sponsored projects as a course activity; and 3) cross-listing with other academic programs with greater enrollment of women.

We recommend the use of design-based learning, including the four features mentioned above; effectively advertising the nature of the course through public markers; and leveraging the infrastructures of external organizations for recruiting women.   Be aware that a course like T for C will be resource intensive in terms of both dollars and instructor effort.

Citation:
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