

# Reaching Out to High School Girls: The Role of a Student Organization in Developing an On-campus Technology Workshop

Mara H. Wasburn, Susan G. Miller  
Purdue University

## Abstract

Women and girls will comprise at least half of the available science, engineering, and technology talent pool. Therefore, it becomes imperative to attract more women and girls into these disciplines. In 2002 at Purdue University, the student group Women in Technology invited a select number of high school juniors who were at risk of losing interest in math, science, and computers, and their parents to the Purdue campus for an all-day workshop. The program was planned, designed, and executed by Women in Technology students. Its purpose was to give the high school girls who participated an understanding of the various majors available in the School of Technology through tours, presentations by women faculty from each discipline, a question and answer session with students, and hands-on laboratory experiences. In this paper, we will present an overview of the organization; discuss the lessons learned from the first Women in Technology Workshop, and suggest strategies for developing such workshops into vital components of efforts to recruit more high school girls into the fields of technology, engineering, and science.

## Introduction

There have been many programs that have succeeded in attracting more women into the fields of science, engineering, and technology over the past two decades. However, although women constitute 51 percent of the population of the United States and 46 percent of the labor force, less than a quarter of the scientists and engineers in this country are women<sup>1</sup>. A July 2001 report released by The National Council for Research on Women finds that much of the progress that women have made in these areas has stalled or eroded<sup>2</sup>. The report underscores the increasing need for a scientifically and technologically literate workforce as we enter the new millennium. Women and girls will comprise half of the available science, engineering and technology talent pool. Therefore, it becomes imperative not only to attract but also to retain women and girls in technology-related areas.

Beginning in elementary school, male/female attitudes toward science and technology begin to differ. This continues on into high school during the critical period when girls begin to develop an understanding of their appropriate social roles.<sup>3, 4, 5, 6, 7</sup> Girls have some reservations about the seemingly male “computer culture” as they watch boys utilizing computers for violent computer games and what they see as technology for its own sake<sup>5</sup>. There is little software that appeals to them. Therefore, the tendency of boys to monopolize the computers is not being vigorously challenged<sup>8</sup>. As a result, girls do not take advantage of after school computer clubs or enroll in higher-level computer classes<sup>9</sup>.

By the time they are at the point where they must choose careers, girls have less experience with computers and perceive that they are behind, decreasing their likelihood of entering the fields of science, engineering, and/or technology <sup>8</sup>.

Nationwide, few young women enroll in secondary school computer science advanced placement classes. Their absence does not appear to stem from disinterest in computers but rather from applications that seem more attuned to the interests of boys <sup>5,10</sup>. Therefore, as these young women enter colleges and universities in the areas of science, engineering, and technology, they are disadvantaged by their lack of computer experience <sup>9</sup>. They also appear lack confidence in their abilities <sup>11,12</sup>. Additionally, they often encounter college and university classes that are unfriendly to them, impeding their learning. The absence of women faculty and mentors both within the classroom and outside of it, few women students in their classes, and the lack of supportive networks can create a “chilly climate” for women in non-traditional fields. It is during this critical period that many of them transfer into other disciplines. <sup>2, 6, 13, 14</sup>

This paper presents an overview of the Purdue University student organization Women in Technology, describes the on-campus outreach workshop developed by the student members, discusses the lessons learned from that workshop, and provides recommendations for developing such workshops into recruitment tools that can encourage high school girls to enter the fields of technology, engineering, and science.

#### An Overview of Women in Technology

Purdue University’s School of Technology consists of eight departments: Aviation Technology, Building Construction Management, Computer Graphics Technology, Computer Programming Technology, Electrical Engineering Technology, Industrial Technology, Mechanical Engineering Technology, and Organizational Leadership and Supervision.

In spite of the growth of career opportunities for women in all areas of technology and heavy efforts to recruit women into the areas of science, engineering and technology, Purdue University’s School of Technology experienced no growth in the proportion of women students enrolled during the most recent five year period. As shown in Table 1, women continue to represent only 15% of the school’s student body.

Table 1. Students by Gender at Purdue University, School of Technology

	1997		2001	
	Percentage	n	Percentage	n
Male	84.9	3,526	84.8	3,600
Female	15.1	629	15.2	646
Total	100.0	4,155	100.0	4,246

In order to address this issue and to assist in the recruitment and retention of women students, the School created Women in Technology as a student organization in December 1998. Its stated purpose was “promoting the leadership of women in technology through networking, encouragement, mentoring, and outreach” (Women in Technology Constitution). Seventy-five women from the School of Technology joined the new organization.

The authors became faculty advisors to Women in Technology in Spring 2001. We found an organization that seemed to be in disarray. The membership, which had initially stood at seventy-five women, had dropped significantly. Few women were attending meetings, and we were told that an assertiveness training programming scheduled for the spring semester had been cancelled. The first several meetings we attended seemed largely focused on process, with few interpersonal interactions occurring and little input from the members in attendance. Many of those members did not know one another. There was little agreement on what the organization’s goals should be or on how to achieve the goals that had been set.

It was our belief that if we did not intervene, we would find ourselves presiding over Women in Technology’s demise. As we saw it, the students were taking little responsibility for the organization, looking instead to faculty for direction. We could find no indication that the members had been consulted when setting the group’s agenda. Research indicates that groups whose members actively participate in establishing group goals tend to be more committed to those goals than groups with “top-down” structures.<sup>15,16</sup>

We were in agreement that if, in fact, Women in Technology were to survive, it would have to move from a faculty-driven to a student-driven organization. Hence, we decided to let the students plan and implement all of the programs the members wanted. As we would soon discover, too much responsibility can be as detrimental to a student organization as too little.

### Planning the Outreach Workshop

During the spring 2001 semester, the Women in Technology officers decided to fulfill the outreach portion of the organization’s mission by holding an on-campus workshop. The objective was to recruit more women into the School of Technology. As faculty advisors, the authors applied for and received funds from General Motors to underwrite the workshop, which was to be held the following year. The underwriting meant that there would be no cost to the participants.

The officers decided that the entire event should be planned and implemented by the students, with the faculty advisors serving as resources. This was consistent with our assessment that the students needed to assume more responsibility for their organization. The proposal was put before the membership at the last meeting of the year and received strong support.

At the October 2001 meeting, the officers outlined the proposed workshop to the members and invited suggestions. By the end of the meeting, the workshop had been scheduled for April 6, 2002, and the following program had been adopted:

1. Invitations would be sent to a select number of female high school juniors in Indiana with strong math, science, and technology backgrounds. They and their parents would be invited to the Purdue campus for an all-day workshop.
2. The program components would be designed to give participants an understanding of the various majors available in the School of Technology at Purdue.
  - a. Participants would have the opportunity to tour the School's state-of-the-art laboratories, and have hands-on experiences with the latest computer applications. They would explore how their talents and interests could be utilized in exciting technology-related careers.
  - b. The participants would be able to pose questions to a panel of women technology students.
  - c. The Women in Technology members would serve as mentors and role models for the participants during the course of the workshop.
  - d. Lunch would be served, and a keynote speaker would address the students and parents.

### Implementation of the Outreach Workshop

Unaware of the time involved in complying with their request, in February 2002, the Workshop Committee asked for address labels of students who met the above-mentioned criteria from Student Services. By the time the labels were received, it was already mid-March, meaning that the labeled and stamped invitations to the workshop were not mailed until March 20th. Not surprisingly, out of the 180 invitations that were sent, only 21 accepted the invitation.

The committee chair sent an email to the membership and to the authors as their advisors asking whether the workshop should be cancelled. Because the funds for the workshop were designated, we decided to regard this as a pilot study from which lessons could be learned and improvements made. The workshop proceeded as scheduled.

On April 6<sup>th</sup>, students and parents arrived for the workshop. Below is the schedule of events:

- |              |  |
|--------------|--|
| 9:00 - 9:30  | Students and parents arrived at the Purdue Memorial Union for opening statements.  |
| 9:30 - 2:00  | Students rotated through four sessions, each hosted by a faculty member and a student<br>Session A: Computer Technology, Hands-on laboratory experiences<br>Session B: Business Technology, Presentation |
| 12:00 - 1:00 | Lunch and keynote speaker who was an alumna of the School of Technology and a former Women in Technology member  |
| 1:00 - 3:30  | Session C: Engineering Technology, Hands-on laboratory experiences<br>Session D: Aviation Technology, Presentation and tour of the facilities  |
| 3:30 - 4:00  | Question and answer session with School of Technology students, and evaluations of the workshop  |
| 4:00 - 5:00  | Tour of campus   |

## Recommendations

Despite the best of intentions, our effort to cultivate student responsibility was partially the cause of the workshop's failure to attract a substantial number of students. Had we intervened earlier, the invitations would have been sent in a timely manner, which would doubtless have resulted in many more acceptances.

We now realize that while we must maintain a student-driven organization, we will need to provide more guidance and support for the decisions they make and the programs they seek to implement. Although the students have excellent ideas, they lack the experience to follow their ideas through to completion. With that in mind, based on the workshop evaluations we received, we are proposing the following changes:

- 1. The workshop will be held in November, and high school seniors who have been admitted to Purdue but have not yet accepted, will be invited.**  
Rationale: Many respondents commented that they would have preferred the workshop to be held in the fall of the students' senior year rather than the spring of the junior year. By that time, they would know whether or not they have been admitted, and the workshop could help them decide if Technology is the right major for them.
- 2. One Women in Technology member will be assigned as a mentor to each workshop participant.**  
Rationale: Several of the respondents expressed the desire to maintain contact with a Women in Technology member. Having personal contact initiated before the workshop could facilitate the high school seniors' desire to attend the workshop. It also has the potential of providing a resource throughout their senior year, continuing into their freshman year of college.
- 3. The participants will spend more time in the technology laboratories and less time at presentations.**  
Rationale: More than half of the participants commented that they would have preferred more time to explore and use the equipment and less time listening to presentations.
- 4. Parents will be provided with evaluation forms.**  
Rationale: Several parents mentioned that they would have liked the opportunity to provide feedback to the program.
- 5. Participants will be given a Women in Technology t-shirt or sweatshirt.**  
Rationale: Several participants asked where they could purchase the Women in Technology t-shirts and sweatshirts that the Purdue students were wearing.
- 6. The School of Technology homepage will have a link to the Women in Technology website, which will have an area dedicated to the workshop to facilitate communication with the participants on a routine basis.**  
Rationale: Both parents and students commented that they had seen nothing about the workshop when they logged onto the School of Technology website.

**7. The keynote speaker will be a woman technology professional who will focus on technology careers and women.**

Rationale: Several participants and their parents said they would have liked some career related information. One of their concerns was how well technology careers suit women.

## Conclusion

The School of Technology will need to recruit more women students to meet the increasing demand by companies for technologically sophisticated employees, especially since many companies are increasing efforts to diversify their workforce. It is our intention to lay a foundation for increased recruitment of women to the School of Technology programs.

In order for the Women in Technology workshop to be a successful recruiting tool for the School, a concerted effort by a consistent and dedicated team of students, faculty, and staff will be necessary. Industry support will be needed as well, in order to offset costs. Continual re-evaluation of the workshop, with input from colleagues in the School, across the Purdue campus, and at similar universities, will strengthen and improve our program. Combined with other recruitment tools, the outreach workshop should result in a greatly increased proportion of women students in the School.

As faculty advisors, we will continue to gather data and information in order to assess the progress that has been made and to target areas that still need to be improved. Above all, we will continue to keep the Women in Technology members at the center of all our efforts. In the final analysis, it is their organization.

## Bibliography

1. Mervis, J. (2000). Diversity: Easier said than done. *Science*, 289 (5478), 378-379.
2. National Council for Research on Women. (2001). *Balancing the equation: Where are women and girls in science, engineering and technology?* New York: National Council for Research on Women.
3. Committee on Science, House of Representatives. (2000). *A review of the Morella Commission report recommendations to attract more women and minorities into science, engineering, and technology*, Serial No. 106-83. Washington: U.S. Government Printing Office. *Education*, 6 (10), 1-2.
4. Welty, K., & Puck, B. (2001). *Modeling Athena: Preparing young women for citizenship and work in a technological society*. University of Wisconsin-Stout.
5. AAUW. (2000). *Tech-savvy: Educating girls in the new computer age*. Washington, DC: AAUW Educational Foundation.
6. Seymour, E. (1999). The role of socialization in shaping the career-related choices of undergraduate women in science, mathematics, and engineering majors. In C.C. Selby (Ed.), *Women in science and engineering: Choices for success* (pp. 118-126). New York: The New York Academy of Sciences.
7. Belenkey, M. F. et al. (1986). *Women's ways of knowing*. New York: Basic Books.

8. Borg, A. (1999). What draws women to and keeps women in computing? In C.C. Selby (Ed.), *Women in science and engineering: Choices for success* (pp. 102-105). New York: The New York Academy of Sciences.
9. Sanders, J. (1995). Girls and technology: Villain wanted. In S.V. Rosser (Ed.) *Teaching the majority: Breaking the gender barrier in science, mathematics, and engineering*. (pp. 147-159).
10. Molad, C. B. (2000). *Women weaving webs: Will women rule the internet?* Houston, TX: CBM Press.
11. Astin, H. S., & Sax, L.J. (1996). Developing scientific talent in undergraduate women. In Davis, C. et al. (Eds.), *The equity equation: Fostering the advancement of women in the sciences, mathematics, and engineering*. (pp. 96-121). San Francisco: Jossey-Bass.
12. Vetter, B. M. (1996). Myths and realities of women's progress in the sciences, mathematics, and engineering. In Davis, C. et al. (Eds.), *The equity equation: Fostering the advancement of women in the sciences, mathematics, and engineering*. (pp. 29-56). San Francisco: Jossey-Bass.
13. Hanson, S. L. (1997). *Lost talent: Women in the sciences*. Philadelphia, PA: Temple University Press.
14. Seymour, E., & Hewitt, N. H. (1997). *Talking about leaving: Why undergraduates leave the sciences*. New York: Westview Press.
15. Quinn, R. E. (1996). *Deep change: Discovering the leader within*. San Francisco: Jossey-Bass.
16. Schein, E. H. (1992). *Organizational culture and leadership, 2<sup>nd</sup>. Ed.* San Francisco: Jossey-Bass.

## Biographical Information

SUSAN G. MILLER is an Assistant Professor in the Department of Computer Graphics Technology at Purdue University. She received her Master of Science from Purdue University in 1997 and her Bachelor of Science from The Ohio State University in 1988. Prior to working in academia, Susan worked as a professional graphic designer for Purdue, and spent time working for an advertising agency and an architectural firm.

MARA H. WASBURN is an Assistant Professor of Organizational Leadership and Supervision (OLS) at Purdue University. She holds a Ph.D. from Purdue University. She teaches courses in training methods and service learning, is coordinator of the coop and internship programs in OLS, and serves as faculty advisor to Women in Technology. Her research interests focus on mentoring with an emphasis on women in technology-related disciplines.