THE WOMEN IN SCIENCE PROJECT AT DARTMOUTH COLLEGE
ELECTRONIC MENTORING PROGRAM

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In 1995-96, the Women in Science Project (WISP) at Dartmouth College initiated a two-year pilot program for industrial electronic mentoring ("e-mentoring"). Support came from the AT&T Foundation, IBM, and Creare, Inc. to cover program start-up costs other than WISP staff time. The program was conceived by Carol Muller, while she was Associate Dean of Dartmouth's Thayer School of Engineering, to pair undergraduate and graduate women in science, math, and engineering with industrial scientists and engineers using electronic mail as the primary means of communicating and building a relationship. Through these e-mentoring relationships, the protégés would become acquainted with opportunities in technical and industrial careers, gain access to professional networks, and receive personal and professional guidance, support and encouragement from their mentors. The program entered year two (1996-97) enhanced by recommendations from the first year evaluation, an increased number of participants, additional support from the AT&T Foundation, and the hire of an assistant director to oversee a set of electronic program initiatives.

The e-mentoring program expands WISP's constellation of retention strategies in a new and needed direction. The goal of all of our programs is to promote retention, particularly of women, in areas of study leading to scientific and technical careers. WISP uses proven intervention strategies to foster a supportive academic and social climate for undergraduate and graduate women. The industrial e-mentoring program complements these program goals and makes a stronger connection within the "pipeline" between students and professional scientists. Students are encouraged to think about their needs for information, connections with more experienced scientists and engineers as they select programs to participate in. Dartmouth College chose to develop an industrial electronic mentoring program because women students, currently under-represented in the fields of physical and quantitative sciences and particularly in engineering, can benefit from having more experienced "mentors" who help them make the connection between their classroom studies and the world of work.

The rural location of a college like Dartmouth (the small town of Hanover, N.H. is 3 hours from Boston) can be isolating for students who are curious about careers in industry but who may have no way to make connections on their own. In traditional mentoring programs, the opportunity is usually restricted to participants whose workplace locations and time commitments permit face-to-face involvement. The mentors most available to women on rural college campuses are those in the academic profession, though many

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students eventually seek employment in business and industry. The separation of academic and industry work cultures also makes it difficult for industrial scientists and engineers who want to share experiences, perspectives, and information to connect with students. The expansion of electronic communications capacity and the increasing prevalence of e-mail usage on college campuses and industrial workplaces diminishes the previous limitations of time and location and opens up new mentoring possibilities. WISP built upon a well-established student e-mail culture as well as existing campus infrastructure and technical support for the program. Most WISP program contact is currently done through e-mail and our WISP newsletter, which keeps participants informed twice a month, has been distributed electronically for at least 5 years.

Pilot Year 1

In the 1995-96 academic year, WISP paired 34 undergraduate and graduate students with professional scientists and engineers at nine companies including AT&T, Digital Equipment Corporation, Hewlett-Packard, and IBM. WISP recruited mentors from companies who had a relationship with WISP or with Dartmouth and considered shared interests and proximity to Hanover when matching protégés with mentors. Participants began the program by meeting face-to-face on campus at a special dinner in the fall. Everyone received written materials describing the program and suggesting topics for correspondence and agreed to communicate electronically at least once per month through the academic year. WISP encouraged the participants to meet at Dartmouth or at the mentor’s workplace at least once during the year. Mary Pavone, Director of WISP, administered the program with help from a part-time student coordinator.

Cynthia Char, Ph.D., of the Educational Development Corporation in Cambridge, Massachusetts, evaluated the electronic mentoring program at its mid-point and conclusion. Twenty-four students and 20 mentors completed final surveys. A majority of all protégés and mentors met the minimum conditions of sustaining electronic communications at least once per month on average and shared responsibility for initiating contact. Electronic conversations covered academics, career guidance, and personal and professional advice. More than two-thirds of students and mentors returning surveys generally found it easy to find topics of mutual interest and to ask questions and express thoughts freely. A majority of protégés and mentors returning surveys reported relative ease in maintaining a satisfactory, timely flow of communication, although some participants commented on the impersonal quality of electronic mail. Because of the difficulty in arranging other contact, there were few face-to-face meetings after the initial dinner and few telephone conversations.

The final survey revealed that 42% of the protégés didn’t have a significant adult role model on campus who they could seek out for guidance and 58% indicated they had no previous contact with science/math professionals in industry. A majority of the protégés considered the program a valuable experience and expressed an interest in continuing their communication with mentors after the program ended. One woman appreciated “making a connection with someone in industry” and said that it was “difficult to meet people on an informal basis living in such an academic environment.” Another student said that it was “nice to have a perspective on the real world from someone who is there right now,” and one woman appreciated “having someone to talk to as I try to make the choice between getting a job after graduation or going to graduate school.”

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One first-year student said that it “was nice to have the advice of someone who graduated recently enough that the professors and course descriptions are still similar, but had been out in the real world and could help me keep things in perspective. It was also nice to know that someone who has been successful in science-related business had similar difficulties her first year.”

Six women returning surveys found the program to be of minimal value, and four of these women were first-year students. First year students seemed to use the mentoring opportunity to broadly explore their career options in industry in contrast to older students who had more focused objectives for participation.

Mentors participated in the program as a means of encouraging women in science and of serving as a resource for students in ways they found useful or would have found useful in college. One mentor noted the convenience of electronic mail and welcomed the opportunity “to help someone when physical proximity isn’t possible.”

“It allows women in my position (10 years in engineering),” said another mentor, “to share experiences and insight with women who do not have the benefits of having worked in industry yet. Women have different issues than men and are not typically nurtured to take an interest in science. Someone in my position can potentially make a difference by providing that insight and encouragement. I love science and engineering and I hope to share that and nurture that in someone else who needs it.”

One-half of the mentors returning surveys said that the program had generally met their expectations. “I believe that I was able to give needed support and advice to my students,” said one mentor. Another professional said that her student “asked many questions that I felt were useful and relevant to her education and eventual career.”

Mentors also reported personal and professional benefits. “I had an excellent mentee. She is enthusiastic, had lots of questions, and is very responsive and introspective. I feel we’ve built a nice friendship that will continue regardless of this program.” “This program” said another mentor, “allowed me to rethink my own early years in the computer science industry. This helped to ground me in why I like this industry, especially in these days of corporate turbulence and change!”

A number of mentors praised WISP’s electronic mentoring program and recommended expanding it to include more students and schools. Only two mentors returning surveys said that they would not be interested in participating in the program again.

**PILOT YEAR 2**

During the 1996-97 academic year, WISP’s pilot electronic mentoring program matched 43 undergraduate and graduate students with 41 mentors at 21 companies. New companies represented in the program’s second year included Abbott Laboratories, Ashland Chemical Company, Ford Motor Company, Oracle Corporation, and Tally Systems Corporation. In the fall of 1996, WISP hired a new Assistant Director to assume administrative responsibility for the electronic mentoring program. Working with a part-time student coordinator, goals were established to expand and enhance the electronic mentoring program and make improvements based on recommendations from previous participants.
One area of emphasis has been to provide greater program support to protégés and mentors. Recruitment, application and training materials have been revised. The matching process has been modified so that students can review mentor profiles and pre-approve matches. Participants are now asked to correspond by e-mail at least twice a month and are encouraged to use other means of communication, such as telephone, regular mail and workplace visits, to enhance the relationship. The face-to-face dinner was eliminated as a requirement for mentors and was moved to mid-April as a means of renewing the commitment and revitalizing the relationship midway through the program. An introductory kick-off event for students clarified program requirements and expectations and built enthusiasm and commitment through personal goal setting activities.

A facilitated listserv has been initiated which will allow online group communications between protégés and staff and significantly expand the network of contacts available to students and broaden the mentoring experience beyond the one-to-one relationship. Electronic surveys of mentors and protégés distributed at the end of the program will enable WISP to continue to evaluate the program’s effectiveness and to look at a number of issues including the effect of gender and race in the mentoring relationships, the impact of listserv discussions, the effectiveness of alumnae/non-alumnae mentors, the importance of face-to-face meetings, and the extent and impact of non-electronic communications within the relationship.

Our preliminary assessment is that electronic mentoring is an efficient and cost-effective means of facilitating communication between college students and industrial scientists and engineers and has great potential to be expanded to a wider scale. Electronic mentors provide fresh, realistic, non-academic perspectives and support for students at critical times in their academic life. They add to information students already know about educational choices, career options, and internship and employment opportunities. There are potential benefits for all participating parties.

WISP’s future plans for the electronic mentoring program include dissemination of this model program to a national e-mentoring program sponsored by the Women in Engineering Program Advocates Network (WEPAN) in 1997. The national program will significantly expand the number of opportunities for young women to meet mentors in science, engineering and technology careers and involve a larger number participating institutions and corporations.