A NATIONAL ELECTRONIC INDUSTRIAL MENTORING PROGRAM FOR WOMEN STUDENTS IN SCIENCE AND ENGINEERING: PLAN AND PROPOSAL

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INTRODUCTION

A student learns from an administrator at her university about a new mentoring program for students in science and engineering. She sits down at a computer and opens the homepage for “MentorNet” – the National Electronic Mentoring Program. After reading the program description and requirements, including potential interest in working in industry upon graduation, she decides she would like to have an industrial “E-mentor” and completes the on-line application form. Like hundreds of other students, and hundreds of volunteer scientists and engineers in industry who are willing to devote some time to mentoring younger aspirants to the field, she indicates her fields of interest, major area of study and degree program, hobbies, and desired characteristics in a mentor. This information is automatically entered into a database, and sorting software then identifies 1-2 potential mentors from those who have also completed similar electronic applications. The program’s mentoring specialist reviews and completes the match, and the pair is then launched on a year-long relationship via e-mail, with training, coaching, and regular communications provided by the national program.

This scenario could be a reality within a fairly short period of time if sufficient interest and support gathers behind the vision. Already, organizations such as the AT&T Foundation, IBM, the Intel Foundation, and the Alfred P. Sloan Foundation have put grant money to work in support of a pilot program and planning for a national program. There are numerous beneficiaries, chief among them the students who benefit from increased mentoring, and are more likely to stay in scientific and technical fields as a result. This outcome, of course, is congruent with the interests of numerous potential partners – universities, corporations, and professional associations, as well as government agencies.

BENEFITS OF A NATIONAL PROGRAM

Using electronic communications for mentoring, only recently widely and readily enough available to students and those in industry to make such a program possible, presents a potentially highly cost-effective opportunity, which also transcends previous constraints of time, synchronous communication, and geography. E-mail and related communications tools afford convenient, regular, informal discourse between individuals and among groups in disparate locations.

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Through the mentoring process, experienced professionals acquaint students with career opportunities, offer guidance and advice based on experience, and provide support, encouragement, and access to professional networks for further career development. The process of mentoring can be particularly helpful to those underrepresented in certain fields, such as science, engineering, and mathematics, because it offers not only important personal, one-on-one encouragement and support, but also help in “de-coding” less obvious cultural and structural elements of the field. Yet on many college campuses, the only mentors available are those in the academic profession, though most students ultimately find employment in industry. Where industrial mentors exist, location, work demands, and time commitments have constrained their participation. “E-mentoring” can complement and enhance existing efforts to encourage more students to pursue their interests in science, mathematics, and engineering. Industrial “E-mentors” can expand upon students’ usual campus experiences, offering an improved understanding of the excitement, challenges, and opportunities available in industrial settings to those with appropriately developed skills.

Students benefit from the mentoring experience, gaining additional information, encouragement, advice, insight, and a sense of community. Universities benefit from a program which encourages retention in scientific and technical fields and enhances presessional development. Corporations benefit from the opportunity to focus students’ attention on their particular business and organizations. Professional associations benefit from the opportunity to acquaint students with their membership, and to promote the profession and its networks. Mentors benefit from the satisfaction of helping to guide future professionals and contributing to the success of women in fields where they are currently underrepresented. Service as a mentor leads to improved understanding of one’s own organization, profession, and competence, to higher confidence, and to links to new professional networks. Using a technology-based strategy to gain access to a supportive, virtual community also helps more participants to become familiar with the technology and the opportunities it presents. All participants stand to benefit from a national program which extends the possible reach of local efforts, offering economies of scale, and greater diversity among and access to participants.

The development of this “E-Mentoring” program may also offer a model for other electronic mentoring programs, which can build on its systems and materials to adapt the program for other needs and target populations.

**PILOT PROJECT**

A two-year pilot project, initiated at Dartmouth in 1995 and funded principally by the AT&T Foundation with supporting funds provided by IBM and Creare, pairs students with industrial mentors via e-mail. Pilot versions of training materials have been developed for both mentors and students. Evaluation shows that the program is having a positive effect on participants, that more training and coaching of mentors and students is needed than originally expected, and that the medium works well for its intended purpose. The national program will build on the two-year pilot development and testing, expanding the program to other universities, using the tested training materials, greatly increasing the numbers participating mentors and protégés through a national matching service. The national program will require the development of more sophisticated software and systems to accommodate numbers of participants in much greater orders of magnitude.
HOW IT WOULD WORK

Through “MentorNet” – the national “E-mentoring” program, interested students and prospective mentors, recruited for participation by their respective organizations – complete an application indicating their preferences in being matched by areas of technical interests, industrial sector, geographic location, avocational interests, gender, ethnicity, or other factors. Matches are made centrally, based on a national database of prospective participants. Mentors and their assigned protégés receive information and direction for establishing an effective mentoring relationship over the course of the year, including setting goals, clarifying expectations, and following through on their commitment. A mentoring “coach” conveys useful information throughout the year through a short electronic newsletter, addresses problems or issues which arise, and is available for consultation as needed. Mentors and protégés are expected to communicate at least twice a month, or more frequently if both desire. Group mentoring experiences will be available, through which mentoring pairs may exchange information and opinions, and gain additional perspective on issues and problems. MentorNet’s webmaster develops and maintains software and systems to support the program and responds to requests for assistance in ensuring compatibility of systems across the spectrum of participants for e-mail, mailing lists, bulletin boards, and “chat rooms.” Use of the World Wide Web will be developed as its availability to all participants increases.

An estimated scale-up for the program is presented below. Because we have no known examples of similar endeavors scaling up in the magnitude we propose, these numbers may require adjustment after the experience of the first year or two of the program.

<table>
<thead>
<tr>
<th>Year 1 (97-98)</th>
<th>Year 2 (98-99)</th>
<th>Year 3 (99-00)</th>
<th>Year 4 (00-01)</th>
<th>Year 5 (01-02)</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 mentors</td>
<td>500 mentors</td>
<td>1,000 mentors</td>
<td>2,500 mentors</td>
<td>5,000 mentors</td>
</tr>
<tr>
<td>250 students</td>
<td>500 students</td>
<td>1,000 students</td>
<td>2,500 students</td>
<td>5,000 students</td>
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<tr>
<td>15-20 universities</td>
<td>25 universities</td>
<td>30 universities</td>
<td>50 universities</td>
<td>100 universities</td>
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Ongoing evaluation of the program through its development will provide information to assist continuous improvement and to gauge results against specified objectives. A steering committee will guide the specifics of program development and implementation, and an advisory board, composed of corporate and university stakeholders, will establish the project parameters and overall direction. There are numerous partnering opportunities for this project, and a limited number of organizations are sought to invest in its initial development at a sustaining level for the first five years. These investors will have the opportunity to guide the project’s development in useful directions for their constituencies as well as to be recognized for their contributions in launching the program at a national level.

The project budget is estimated at approximately $360,000 annually for the first three years. Four staff members are required – a half-time executive director for the project, a mentoring specialist, a webmaster, and an administrative support staff member, totaling 3.5 full-time-equivalent staff members. In addition, an evaluation consultant will be contracted to work with the staff in undertaking formative evaluation as the project is developed, and summative evaluation of its success. Other significant expenses include facilities and equipment, with smaller budget line items for travel and publications expenses associated with mentor recruitment, documentation, and dissemination of the program design and results. It is estimated that within 3-5 years, the project will have the capacity to serve 5,000 or more student-mentor pairs.

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