

Math/Science Career Conferences for Girls

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In 1975 a number of women scientists and engineers in the San Francisco Bay area organized the first Expanding Your Horizons career conference to interest girls in math/science based careers. These one-day conferences offer girls a variety of hands-on workshop experiences as well as an opportunity to get to know women active in math/science fields and discuss their career paths and plans. These conferences were well received in the Bay area and inspired many similar conferences across the country.

Two years ago at this time, a colleague from the Mathematical Sciences Department, Dr. Doris Hertsgaard, and the author resolved to try a similar conference for this area at North Dakota State University. Enthusiastic moral support was received from Campus Equity, an informal group of university faculty and staff concerned about equal opportunity issues, and active help came from an how-to manual (1) published by the Bay Area Math/Science Network which organizes the Bay Area conferences.

Since this was their first venture in this direction, the organizers decided to limit the scope of the conference for a number of reasons. In contrast to the Bay Area, where many technical professionals are employed, including many women, the Fargo-Moorhead area is not highly industrialized. Thus it would appear difficult to find a large number of professional women to serve as role models for the conference. The author is presently the only female faculty member in the College of Engineering and Architecture. At the time planning of the first conference began, Hertsgaard was one of only half a dozen female full time faculty members in the College of Science and Mathematics. Finding sufficient women to lead workshops for only one to two hundred students appeared to be a formidable task in itself.

Funding also appeared to be a problem. Hertsgaard and the author received the blessing of their department heads and thus access to secretarial services and duplicating facilities. Nominal financial support was also received from their colleges as well as the College of Pharmacy. Expenses would therefore have to be kept to a minimum. In the Bay area, where many large firms are located, sources of funding, as well as people to solicit those funds, are more readily available.

To conserve personnel as well as funds, it was decided to aim the conference at junior high school girls, 7th through 9th graders. It was felt that these girls would be more interested, since extracurricular opportunities of this nature are not as prevalent at the junior high level as at the senior high level. More importantly it was felt the greatest long term impact could be

made on this age group. In North Dakota, senior high school math is optional. Nationally only 17 percent of all high school students take 11th and 12th grade science and math (2) and the majority of these are boys. While boys are socialized to continue in high school math, even if they may dislike it, because they know it will be required for a job they know they will need, girls are socialized to consider math unfeminine, unnecessary and too difficult. Unfortunately they are often supported in this attitude, not only by their peers, but also by their parents, teachers and counselors.

The organizers wish to encourage these girls to think about their future, not necessarily in terms of a specific occupation, but in terms of today's statistics (3):

More than half the women in this country are in the workforce.

Women work an average of 25 years.

80% of working women are employed in the low paying, low status areas of clerical, retail sales, service and factory work.

Women earn 59¢ for every dollar men earn.

Under these circumstances it becomes important for girls as well as boys to think about a career rather than just a job. And mathematics preparation is the critical filter in access to promising fields(4).

The hands-on workshop format used in the Bay Area Conference appeared to be a successful model to get this message across. The day itself will be discussed in somewhat more detail below.

The first effort was to secure facilities for the conference. Since the organizers were university faculty and staff, campus facilities were available at no charge or at nominal fees for custodial services. Most department heads were willing to allow access to their classrooms and laboratories, occasionally even by off-campus professionals.

For the first conference the organizers were able to solicit the assistance of about 60 women to serve as workshop leaders and role models in exchange for only a box lunch and a wine and cheese reception following the conference. Although essentially all the female math/science faculty participated, this gave us only a small start. Local medical research facilities such as the Neurological Institute and Veterans' Administration Hospital, university affiliated research establishments such as the U.S. Department of Agriculture and the Metabolism and Radiation Research laboratories as well as larger local industry such as Northwestern Bell and American Crystal Sugar were contacted and several women recruited from these institutions. All women contacted were requested to suggest additional contacts and when these routes were exhausted about half of the anticipated requirements for role models had been recruited.

Women on local mailing lists from national organizations such as American Women in Science and the Society of Women Engineers and the alumnae of the

of the university's science and engineering programs were contacted next. As a result, a number of women from Minneapolis/St. Paul as well as Wyoming and Wisconsin were sponsored by their employers to participate in the program. The remaining role models were drawn from the university's female math/science graduate and undergraduate students.

In a basically rural area such as this, large numbers of professionals are not employed and some ingenuity is required in locating sufficient women to staff the first conference. On the other hand, most of these women do not have a multitude of other demands of a similar nature on their time and therefore everyone contacted was willing to donate a free Saturday for this purpose. They were especially attracted by the opportunity to meet other women professionals since many of them are very isolated in their work setting. This eager response made recruiting a very pleasant task.

The necessity of recruiting graduate and even undergraduate students as role models turned out to be something of an advantage from several points of view. The junior high school students felt somewhat more comfortable with these young women and not so awed by their qualifications. It seemed easier to imagine becoming a college student than a Ph.D. with some impressive job title. The girls felt freer to ask "trivial" questions (What is dorm life like? Do you have time for dating? etc.) and weren't concerned if some of their scientific questions could not be answered quickly or completely. The interaction between the professionals and the student role models also proved to be quite an inspiration for the students and renewed their enthusiasm for their chosen careers. Thus the professionals acted as role models for the junior high school girls and the college students as well. This initial group of 60 leaders served as the core for the second conference's leadership which was expanded to about 100 role models.

The first conference was funded as follows:

The university facilities were used at no charge.

The time of all workshop leaders and role models on the day of the conference as well as all the time of the organizers was contributed without charge.

The travel expenses of out-of-town women were paid by their regular employers.

Conference materials (handouts, chemicals, supplies) were donated by the departments in which the workshops were held.

The services of the Communications staff for type setting and publicity are free of charge for university events.

Lunch was covered by the registration fees of the participants (\$3.00).

Women attending the speakers' breakfast paid their own way.

The reception for leaders following the conference was donated by members of Campus Equity.

The contributions of the university colleges and the Division of Continuing Studies were used to pay for printing of brochures, postage and some services of the staff of the Division of Continuing Studies for help in publicity, mailing and registration.

This first conference attracted 240 junior high school girls and about 30 adults. These participants were recruited mainly through direct mailings to the principals and math/science teachers of the junior high schools in North Dakota and western Minnesota. Some participants came from as far as 200 miles away. Local publicity in the mass media was also used when available without charge but the return was not deemed sufficient to consider purchasing such services.

The first conference offered student participants a choice of 27 hands-on workshops and a dozen career panels each one hour in length. Students could choose a total of three events during the day. The workshops were designed to give the students a chance to actually do some activity--microscopically examine bacteria, take apart an engine, process sugar, experience learning disabilities, operate a computer. Each of these activities was intended to convey the message that science based careers are interesting and enjoyable.

The career panels each consisted of three professionals, who reported on their educational and career paths and described a typical working day. Students were given an opportunity to ask questions at all sessions. The presentations by exclusively women role models was intended to emphasize that women can and do work in these fields. All participants received a list of workshop leaders and were encouraged to contact them personally if they ever have further questions.

A parallel program was held for parents, educators and counselors. Topics for this program included families and work, career planning, and sex bias in math/science education. Ample opportunity for discussion was allowed. The adults also had an opportunity to attend a career panel of their choice.

All participants attended an initial orientation session which exposed them to the working world statistics mentioned earlier and emphasized the theme of continued math/science education in order to keep career options open. A closing session at which evaluation questionnaires were collected and participation certificates issued ended the conference.

Judging the effects of these conferences on the students will of necessity be a long term undertaking. It will be two more years before the oldest of the first conference participants will complete high school. A grant proposal to fund the evaluation of these students, their high school course choices, their post-high school plans etc. has been submitted by Hertsgaard and the author but is still pending action. The conference evaluations indicated that the day was educational and fun for all participants. Almost all participants indicated they wished to attend again the following year.

Interestingly, short term effects have been observed on the workshop leaders and role models, unanticipated but valuable. One career panelist

volunteered to undertake fund raising for future conferences and received donations of over \$1000.00 from local banks and industry for the second conference held last spring. In addition a network of area women scientists has evolved which meets regularly once a month. This is a focal point for an exchange of employment, grant and scholarship information and a source of support and encouragement for the women involved and especially for female math/science students in the area universities. The enthusiastic interaction between the professional and student role models at the conference was already mentioned. The organizers are convinced that this atmosphere must positively affect the course and career choices of the junior high school students but more time will be required to obtain evidence to support this conclusion.

The response to the second conference may be a further indication of the fact that these conferences are serving a useful purpose. The second conference had about 100 role models offering 42 different hands-on workshops. Since it had proved difficult to encourage junior high school students to ask questions during the career panel sessions of the first conference, these were eliminated and the workshops expanded to 75 minutes to allow time for career discussion to take place within the more informal workshop atmosphere. Students then had a choice of three workshops during the day. New workshop offerings included giving a physical exam, land surveying, wheat research, blood studies, etc. The orientation session was retained but the closing session eliminated and the participation certificates issued in the final workshop session. An astronaut candidate spoke at the lunch session about the space shuttle and her training program.

The second conference was attended by 400 junior high school students and 50 adults. An additional 160 girls had to be turned away for lack of facilities. About fifteen per cent of the girls from the first conference returned. Several schools encouraged group participation and brought in bus loads of students, in some cases again from more than 200 miles away. Evaluations were again enthusiastic, all but six girls indicating they would like to attend again the following year.

Except for some of the services of the staff of the Division of Continuing Studies for publicity, mailing and registration, all time was again contributed free of charge. Food expenses (\$1700.00) for lunch and the speakers' breakfast were covered to a large extent by conference fees and the on-campus women who paid their own breakfast (\$1550.00). University facilities were again free of charge, travel expenses paid by regular employers and the reception donated by Campus Equity. The funds required for printing, duplicating, postage, supplies and Continuing Studies services (\$1800.00) were covered by the local contributions (\$1000.00), a grant (\$1000.00) received through the Mountain West Sex Desegregation Assistance Center and contributions from some of the university's colleges.

The organizers continue to feel that these conferences are having a positive impact on the number of girls continuing their math/science studies

in high school and eventually choosing careers in these fields. It is felt that the cost is reasonable for the service offered and, although secure permanent ongoing funding would be desirable, the donation of time spent in connection with these conferences will continue to be requested. This is considered an important aspect of the attitude and atmosphere prevalent at the conference.

In a rural environment such as this, these conferences are one of the few opportunities, perhaps the only one, for students to get an idea of what math/science careers may be like and to meet women actually working in these fields. Without some sort of exposure such as this, many capable students will never even consider entering these areas of study. This represents an unfortunate loss, not only to the students but to society as a whole. Those of us associated with these conferences are most enthusiastic about them and would be happy to share further information, sample brochures, etc. on request.

REFERENCES

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