

THE DOUGLASS PROJECT FOR RUTGERS WOMEN IN MATH,
SCIENCE, AND ENGINEERING: A COMPREHENSIVE PROGRAM
TO ENCOURAGE WOMEN'S PERSISTENCE IN THESE FIELDS

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I want to start with some background and an overview of our programs. I will also look at the ways we are trying to measure the impact of these programs which I see as encouraging the persistence of talented young women in math, science, and engineering. Since the Douglass Project also sponsors a precollegiate program, I will touch upon that as well since efforts at the precollege level extends the impact any college program has.

First, some background. The Douglass Project began its life in January of 1986 with a three-year grant from the New Jersey Department of Higher Education. In the original grant, we proposed to provide support programs for women taking the basic math, biology, chemistry, and physics courses necessary for a math or science major. We did not plan programs for high school students nor did we plan specifically to involve engineering. The name of the program was called The Douglass Project for Rutgers Women in Math and Science. Quite recently we added Engineering to the title.

The original goals of the program included developing a network of support for undergraduate women students who were interested in math and science at Rutgers-New Brunswick and developing co-curricular programs to increase the confidence level of these students. We hoped that through our efforts, we would provide a "critical mass," to quote Mildred Dresselhaus, of undergraduate women who could offer each other peer support.

We planned to do this by organizing specific programs where students could meet other young women interested in math and science majors and see that they were not alone in their endeavors.

Since January of 1986, the program has expanded. Here is a general description of the types of programs we have found to be of interest to the students:

1. An orientation program for new students. We call it "Math and Science and You--Figure It Out!" This session gives entering students an opportunity to meet continuing students in the sciences as well as to meet faculty. It is a time for students to get an idea of what the Douglass Project is all about. The program usually features undergraduates talking about what it is like to be a woman math, science, or engineering student at Rutgers-New Brunswick.

2. We also offer Peer Study Groups in Calculus. These groups provide students an opportunity to talk out their subject with each other--i.e.--homework problems--under the guidance of a graduate student who acts, as some students have said as a "consultant." The groups

were based very loosely upon one component of Uri Treisman's Professional Development Program workshops. In fact, during the first year, we only offered the groups in Calculus. We did experiment with Biology and other subjects, but the groups appear to work best in Calculus and Chemistry--(especially Organic Chemistry). We hope through the Peer Study Groups to enhance both student achievement and self esteem.

3. Career options sessions. These are very popular. We now call them "Scientific Spinoffs" and have either faculty, women in industry, graduate students, women working in different positions but who have scientific backgrounds as panelists. Students like to hear about the jobs as well as how professional women deal with the career/family issue.

4. Faculty Talks Series. This is a seminar like program where individual faculty talk about his or her work. It gives students an opportunity to get to know faculty personally in a friendly environment and also gives an idea of what a seminar is like.

5. "Hands-on" lab visits. These are especially popular with entering students. We visit a lab and do something that students normally would not do in first year of college.

6. While most of our programs are aimed at first two years of college, we do have other programs which are for more advanced students. They include:

- a. an informal student seminar
- b. a student advisory board which offers more involvement in planning and implementing programs. The students then get to serve as role models for younger students and for high school students
- c. tours of some of our research facilities so that students can learn about research opportunities

Douglass also has a math and science residence which houses 100 undergraduate women and ten graduate student women who serve as mentors to the undergraduates. The graduate students receive fellowships (room and board and stipends).

I would like to add some history here too. The idea of a math and science house was not in original grant but during the first year of the Douglass Project some students thought it would be a good idea. We opened the first house in the Fall of 1987. It housed 17 undergraduates (first and second year students with one senior housechairwoman). The house was named Club Curie by its first residents. By the Fall of 1989, we opened the larger house, called the Bunting-Cobb Math and Science Hall (it is named for two former deans of Douglass who are both scientists--Mary I. Bunting and Jewel Plummer Cobb). This expanded residence also has a microcomputer room, a resource library, large lounge for programs, and a resident life counselor. Programs are organized by the graduate students as well as by the Douglass Project.

In addition to programs at the undergraduate level, we offer a precollege program--the Douglass Science Institute (DSI). The DSI is a two-week residential program for girls going into the 11th grade--it features "hands-on" science, network building, role models, field trips, and fun. We picked the summer between the sophomore and junior year because it is a time when girls begin making decisions about their future academic careers. As part of the DSI, we invite the summer students back to campus during their junior year in high school for a "reunion"--we invite parents and teachers as well. We are now entering the third summer of the DSI.

Unfortunately, we can only handle 46 girls each summer. Our big-

gest problem with this program is to decide how to offer something to the large numbers of good students we have to turn away because of lack of funding.

I have tried to give an overview of the types of programs we have implemented since January 1986. Now I would like to spend some time looking at impact and then give my ideas about other strategies.

Basically, we have had mostly qualitative evidence to evaluate the impact of the Douglass Project and its related programs.

For example, for the precollege program we have had letters from students and parents.

I'd like to quote a couple:

One parent wrote that the DSI provided "a very worthwhile, intellectually enriching experience" which "significantly changed her [daughter's] outlook and contributed toward motivating her to stay in school."

One 1988 DSI participant also wrote that the Institute "allowed her to look at [her] options in different careers associated with math and science." She added "that before I went to the Institute I thought of careers in other fields. Now I have a strong urge to look more deeply into careers in physics and engineering. If I had not been a part of the program, I would not have thought twice about physics or engineering."

The 1988 students obviously realized the significance of what we were providing them, when they wrote in a song presented to their parents on the final day of the program, "At Douglass Science Institute for Women in Science & Math, We learn to choose and discover Our Own career path."

We do have some evaluation of the impact of the DSI. In the Fall of 1989, our evaluator, Dr. Patricia Campbell did a follow-up study of the 1988 students who were at that time entering their senior year in high school. Fifty-one percent of the students responded to her questionnaire. She concluded that the major impact of being in the DSI was to reduce the students' sense of isolation as a smart girl in math and science, increase their interest in science careers, and reduce the stereotypes they held as to who does math and science. We are currently undertaking another follow-up study of these students and also the 1989 students.

For the college level program, I thought I would share with you a video of an interview of an engineering student. Jennifer is entering her junior year--she is affiliated to Douglass College. That is, she lives on the Douglass campus although she is a student at the College of Engineering. This video was filmed at the end of her first year of college for a college recruitment video. This is the unedited version. I think it says a lot about what intervention programs can do to encourage the persistence of young women in math, science, and engineering. Jennifer says she came to Douglass because of the Math and Science House. She definitely puts "the nerd image" to rest. (In the video, the student discussed why she came to Douglass, what living in Club Curie meant to her as an engineering student, what were the benefits of other programs sponsored by the Douglass Project, and also the benefit of a women's college, especially one in a large research university.

This is all mostly qualitative and anecdotal--although positive. We still do not get a full idea of our impact in changing the numbers, which is something we all must do.

To do this, we are undertaking a longitudinal study funded by the Exxon Education Foundation. Beginning in the Fall of 1990, we will study the entering class. We will focus primarily on Bunting-Cobb residents but also look at other Douglass math and science students, non Douglass students involved in the Douglass Project, and first year men and women at Rutgers-New Brunswick in math and science. We will use a combination of "pencil and paper" tests as well as interviews. The control group will be students who applied to Bunting-Cobb and were not admitted because of space limitations.

We hope that through the results of the Exxon study we will learn more about which strategies are most successful for our students. We also hope that these strategies can serve as a model for other institutions. It is important to know what works for women--whether these strategies for precollege students and undergraduates will impact on the number getting doctorates.

There are still, however, other pieces of the pie which I think a program like ours can implement. For example, having students get more involved with research from the time they enter college. Or, for instance, providing other co-curricular support for the critical filter courses (first-year courses) through a "hands-on" math and science learning center. Also, I think that at the precollege level, we need to develop more outreach strategies. I think that the high school program can have some positive impact in developing a continuum of support for young women interested in math, science, and engineering.

In our own program at the high school level, we are making some changes. We will be offering physics for all of the participants. During the first two years, only half of the group had physics while the other half had a biology lab. We are also adding a program on engineering.

In conclusion, I would like to say that what we have tried to develop since 1986 is a program of support from the last years of high school through the college years. Our programs are basically co-curricular in nature. We work with the faculty but they are not the organizers of the programs. I am interested in knowing from members of the audience what other types of strategies are useful in retaining students.