

LEARNING

STUDY CALLS FOR OVERHAUL OF COLLEGE SCIENCE

Colleges and universities should teach science as a liberal art and redesign courses toward a multidisciplinary approach, according to a three-year study conducted by the American Association for the Advancement of Science (AAAS).

The report, "The Liberal Art of Science: Agenda for Action," calls for curricular reform to focus on the undergraduate level. "The four years of college are really critical for solving the whole problem of science education... because half of America goes to college and the other half is taught by people who go to college," says Susan E. Cozzens, an associate professor at Rensselaer Polytechnic Institute and a member of the AAAS study group.

"Well-prepared teachers are crucial to the proposed upgrading of scientific understanding for all Americans," the report concludes. "Within five years, a new cadre of teachers taught in this manner should be in classrooms throughout the nation."

It makes some specific recommendations for college-level science instruction:

- Require undergraduates to take 15 or 16 semester hours of science instruction.
- Increase faculty-student ratios by decreasing class sizes.
- Adopt innovative textbooks and teaching materials.

The report supports the principle of teaching science "as it is practiced at its best... as open-ended rather than closed and investigative rather than merely confirmatory."

It advocates "more stringent education in science for future teachers" and recommends that all students planning to teach science should major in the natural science they intend to teach.

The report notes that "the costs of implementing a new era in science education will be high. However, the costs of continuing to educate undergraduates inadequately in the sciences will be even higher."

— Laurel Shaper Walters, staff writer

Women Live and Breathe Science

An all-female dormitory for science majors gives students extra support and encouragement

By Simson L. Garfinkel

Special to The Christian Science Monitor

NEW BRUNSWICK, N.J.

WHEN Carolyn Headleg needed help in one of her science classes this year, there were plenty of people for her to ask: Everyone of the 100 women in her dormitory at Douglass College in New Brunswick, N.J., is majoring in math, science, or engineering.

"There are a lot of math and science people around. If I have a problem, I know that I can always find somebody to answer my question," says Ms. Headleg, a freshman who intends to major in math. "There are upperclassmen you can always speak with. A lot of friends I meet here can tell me what to expect," she says. "I get a lot of moral support."

The dorm, the Bunting-Cobb Math and Science Hall, is part of a three-year-old program intended to increase the participation of women in the sciences at Rutgers University, the state university of New Jersey. The Douglass Project for Rutgers Women in Math, Science, and Engineering also conducts small study groups for women taking classes in the sciences, sponsors talks by famous women scientists, and organizes field trips for women to visit businesses. But nothing seems to have motivated women as much as living with other women who share their interests.

"The day of our organic [chemistry] exam, a lot of our friends who are organic buddies had a big organic bash in the kitchen," says Holly Benedict, a sophomore majoring in pharmacy. "We just did organic and had pretzels and tea." She got a good grade on her exam.

Ellen Mappen, a professor at the college, started the Douglass Project in January 1986. "We looked at our statistics — national and university — and saw that [few] women were going into math, science, and engineering," says Dr. Mappen, the program's director. "We looked at it from a point [of] equity: It was just not fair." Since then, numerous reports have said that the failure to increase the number of women and minority students in the sciences is a national crisis in the making (see chart). "We just won't have enough mathematicians, scientists, and engineers," Mappen says.

The Douglass program started with a series of laboratory visits, study groups, and social events for the students. "During the first year of the program, some of the

undergraduates decided that it would be a nice idea to have a special house [for women in the program] — like a language house," recalls Mappen. The house was called "Club Curie," named after Madame Curie, the French scientist who discovered radium. Sixteen students moved into Club Curie in 1987. The next year there were 22.

"They had developed a peer support network of students taking similar courses," says Mappen. The experience was so positive that Douglass's dean of the college, Mary S. Hartman, decided to devote an entire dorm to the project this past school year.

Bunting-Cobb looks like a regular dorm — up to a point. Posters in the hallways proclaim "the new era of dentistry" and "great minds in science and engineering." On the dorm's third floor, the name tags on students' doors are in the shape of calculators.

the students every day," says Veta L. Pierce, coordinator of special-interest houses at Douglass.

With 3,300 students, Douglass College is the largest women's college in the United States. But only 146 of those women major in science or math, says Mappen. Since more than half the women in Bunting-Cobb are first-year students, administrators hope the dorm will keep some women on the science track who otherwise wouldn't make it.

Besides normal dormitory amenities such as laundry facilities and kitchens, Bunting-Cobb offers students a library stocked with scientific reference books and a computer room with 13 personal computers for their exclusive use. This summer, the dorm's computer room will be linked to the Rutgers University network. "This will be the first time that a residence hall will be hooked up," says Ms. Pierce.

conductive to study:

"There are probably fewer parties here. We take science more seriously," says Benedict. "Everybody knows how hard it is to be a science major. It takes more dedication than to be a business major."

Indeed, at the beginning of the year other students at Douglass thought the women in Bunting-Cobb would be "science nerds, always in our books," says Bhavini Shah, a junior in clinical psychology and president of the dorm's student council. The students in the adjoining dorm changed their opinion "after they had to call the police on us for one of our parties," says Ms. Shah with a grin.

But even the parties at Bunting-Cobb are different, says Pierce. "What I found in this dorm is that even the social playtime is more structured than other dorms." Study breaks are planned for set hours — after that, it's back to the books.

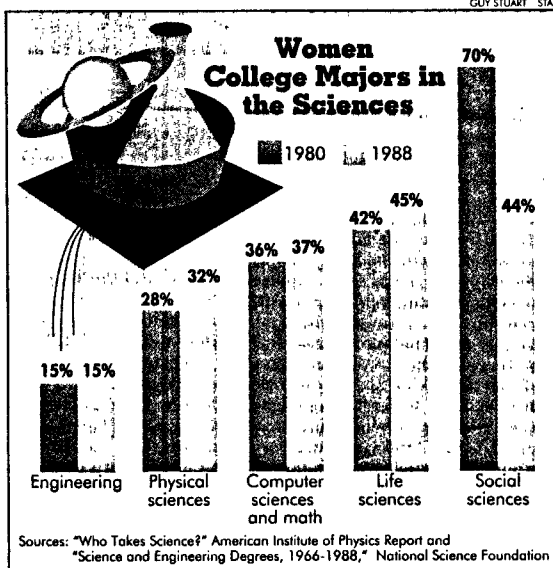
Another thing that might be helping the women is the fact that studying science is no longer isolating them from their peers.

"We often talk about isolation in terms of the number of women majoring in engineering or math," says Sue Kemmitzer, deputy director of engineering infrastructure at the National Science Foundation. "But perhaps more important is a sense of isolation that they feel when they leave class and go to their dormitory or residential living arrangement: There the women are much more likely than even in the engineering classes to feel isolated."

Since fewer than 1 percent of women major in engineering, she says, it is unusual for women in a traditional women's dormitory to have neighbors who are taking similar courses.

At Douglass College, Pierce says that the dorm is retaining women in the sciences who otherwise change their major when they run into that first hard course. "They are getting reinforcement from the graduate fellows and from their hall mates."

Nevertheless, Pierce says, the dorm hasn't been around long enough to see if the unique social environment is really improving student's grades or keeping them in science. To answer those questions, both Pierce and Mappen are hoping to use a \$75,000 grant from the Exxon Education Foundation to fund a long-term study that will follow the students' performance. What is learned from that study, says Mappen, will help other colleges decide if they want to institute their own residential programs for young scientists.



In addition to 100 undergraduates, the dorm houses 10 graduate students, who receive room, board, and a \$2,000 stipend in return for tutoring and counseling the young women. "Some of the questions they ask me can range from 'What should I wear' to what to do about serious problems," says Ana Vargas, a first-year graduate student in civil engineering. Other questions may be about calculus or chemistry. "If we sit and go through [the problems] together, they learn it better," says Ms. Vargas.

The graduate students "are committed to five to 10 hours per week of actual tutorial time, but just by the nature of living in the dorm they come into contact with

The dorm has sponsored numerous field trips. Last month, 10 students observed the effects of soil erosion at New Jersey's Sandy Hook. Another group of students toured the laboratory of a nearby pharmaceutical company.

"They gave us job applications and their business cards!" says Neglaa Elmasry, a sophomore majoring in biology and English. Since she has been in Bunting-Cobb, Ms. Elmasry's grade-point average has risen from 1.8 to 2.5. "My friends have helped me," she says.

Ms. Benedict's average also has risen — from a 2.6 to a 3.6. She says the support is important, but another thing that helps is the fact that Bunting-Cobb is very