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Special Report

From the issue dated October 20, 2006

THE SUSTAINABLE UNIVERSITY

Saving the Planet, by Degrees

Programs in sustainability draw from many disciplines

By PIPER FOGG

For a course at the University of Minnesota-Twin Cities, undergraduates must keep a "trash journal," recording every scrap of paper or banana peel they chuck in the garbage. At Miami Dade College, interior-design students experiment with "green" materials, such as bamboo and nontoxic paint and carpeting. And at Rochester Institute of Technology, engineering students help test methods for turning used automobile parts into new products.

In the academic curriculum, sustainability has officially arrived.

Ten years ago, students interested in studying sustainability had few options. They usually had to craft their own programs of study in environmental-science departments or attend one of a handful of colleges that incorporated sustainability into their

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curricula.

Now the green field of sustainability is blossoming. Colleges are funneling money into new degree programs, building campus sustainability centers, and finding many ways to build the theme into existing programs.

"We've seen a really high growth rate emerge in the last couple of years," says Debra G. Rowe, president of the U.S. Partnership for a Decade of Education for Sustainable Development, a nonprofit group that advocates teaching the concept.

Some colleges and universities have created undergraduate minors and certificate programs in sustainability, while others offer a special focus or concentration within traditional master's degree programs, such as engineering, design, or biology. Arizona State University at Tempe is creating the first school devoted to sustainability, with a Ph.D. program that focuses exclusively on the subject, two related bachelor's degrees, and two master's degrees.

The big question is whether students in the various programs will be able to find jobs related to their studies. Sustainability is still a relatively new idea, and some faculty members admit they will have to convince employers of the field's value. Drawing faculty members to the programs can be a hurdle as well.

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An Interdisciplinary Effort

Led by the president at Arizona State, students, faculty members, and an interested donor have all pushed to make sustainability a central theme of the university. A \$15-million gift from Julie Ann Wrigley, the widow of the chewing-gum magnate William Wrigley Jr., will finance a Global Institute of Sustainability as well as a new School of Sustainability, which will house the degree programs.

Charles L. Redman, the institute's director, will oversee the operations. Mr. Redman, who directed Arizona State's center for environmental studies, says that center had become successful in attracting research dollars on environmental problems but was not considering the social and economic contexts of those issues or of the related built environment. Mr. Redman saw a need to connect people in engineering with those in economics and with policy makers. He hopes the school will bring students of different academic interests together.

Charles Perrings, a professor of environmental economics who will teach there, says most Ph.D. candidates will have been grounded in specific disciplines, then will focus on learning how communities of people work together with their built and natural environments.

To accomplish that, students will have to take a series of core courses dealing with such topics as the allocation of resources, environmental science, and quantitative methods. The program will also require five "clustered learning" courses, each taught by two faculty members from different disciplines. In those courses, students will solve specific problems or complete tasks, such as working on a transportation challenge in the city of Phoenix. About 20 full-time faculty members will be attached to the school.

While the program will not be fully up and running until next fall, Arizona State is already accepting applications. Mr. Redman expects some of the students who sign up for the Ph.D. to be "zealots" about sustainability but also hopes the core courses will attract graduate students outside the program or undergraduates with a more casual interest.

The Rochester Institute of Technology has tailored its sustainability program more narrowly, to focus on engineering. The institute already had facilities for remanufacturing, an environmentally friendly process that minimizes waste and restores "dead" products that would otherwise be discarded to a

fully functioning state.

Its new, interdisciplinary Ph.D. program in sustainability, financed by a \$465,000 grant from the Henry Luce Foundation, will build on that area by integrating engineering and science with economics and public policy. The program, which is scheduled to start in two years, will stress product and industrial development. Students will take core courses in industrial ecology, sustainable design, and other topics, and the curriculum will combine new courses with existing courses in public policy, environmental management, business, and engineering.

"It's a truly interdisciplinary program," says Nabil Nasr, the assistant provost for academic affairs who directs one of the manufacturing centers at RIT. Students in the program will have to consider the technical, social, economic, industrial, and environmental implications of product design, such as the expense of transporting any waste products, the environmental impacts of disposing of them, and any social consequences. "What we're talking about is a new breed of programs," he says.

Tracy A. Freas and Kathryn M. Howard, two graduate students at RIT, are eager to apply to the Ph.D. program. "It would broaden the engineering background I have," says Ms. Freas, who is in her second year of a master of science in management leadership offered by the college of engineering.

Ms. Howard, a first-year master's student in environmental health and safety management, is already working with Ms. Freas on extending the life cycle of automobiles. Together they helped design a monitoring system that tells drivers when a part is starting to run down and needs service. They are also converting a car to burn ethanol fuel.

Being in the Ph.D. program, they assert, would complement their current work and expose them to an even wider breadth and depth of material. That, says Ms. Howard, "makes you a better manager and better business person because you know a lot about everything."

Many Models

Some other institutions have been experimenting with their own breeds of programs.

Stanford University offers a master's degree and a Ph.D. through its Interdisciplinary Graduate Program in Environment and Resources. The program, according to Helen J. Doyle, its associate director, takes students from different academic

backgrounds and tries to give them a breadth of experience in several areas. Those include the natural sciences; engineering and technology; economics and policy analysis; and "culture and institutions," which draws from law, history, and the social sciences.

Although "sustainability" does not appear by name, the theme runs throughout as "a guiding philosophy," says Ms. Doyle. "It certainly is what inspires the students and motivates them."

At Minnesota, part of a \$900,000 grant from the Bush Foundation is being used to pay for a new minor in sustainability. It includes a survey course on the history of the movement, a course in a student's major that focuses on sustainability, two electives, and a "capstone experience" in the senior year, such as a project in the field. Kris A. Johnson, a graduate student in conservation biology who coordinates the minor, says he wanted to keep requirements relatively light, to make the minor accessible to already overloaded students.

Slippery Rock University of Pennsylvania has had a master's program in sustainability since 1990. Today students study sustainability through the integration of agriculture, natural-resource management, and the built environment with an emphasis on systems design and management.

Yet another model is used at Prescott College, in Arizona, where students can complete a Ph.D. in education with a focus on sustainability education. The distance-education program, which requires students to come to the campus only three times a year for weeklong residencies, is two years old and comprises 20 students and two professors. A combination of core courses, electives, and independent studies with experts lets students largely choose their own program of study.

Since students can continue living and working in their home communities, the program allows them to affect their own environments. "They often want to focus [their Ph.D.] on change, locally," says Paul G. Sneed, the program's coordinator and one of the professors.

One Prescott student, Janis Breidenbach, a former union organizer and affordable-housing advocate, is writing a book about training community-based organizers. "It's really important to have a basis in understanding sustainability," she says. Her work, which has included revitalizing neighborhoods and increasing local democracy, requires a knowledge of green buildings, sustainable urban development, and the creation of long-term jobs.

Sustainable Staffing

Although students are excited about these programs, harnessing their interest is not enough. Recruiting professors to work on an interdisciplinary program takes effort. A new enterprise carries risk, and taking part will not necessarily win professors kudos — or tenure — in their own departments.

"The challenge with faculty is that it's comfortable to do what you know," says Mr. Redman. Mr. Nasr agrees. "Faculty like to own things and have their own initiatives," he says. "None of them is going to own the whole thing."

Once faculty members are convinced, employers and industry must also see the light. "It might be perceived as a narrow market, but I truly think that the needs are out there," says Mr. Nasr. "It is so important that we connect with, ultimately, the organizations or entities that would have to apply these concepts, to make sure we are grounded." He says professors and administrators will have to "convince people that the graduates of this program are very valuable."

Rochester's students will probably have an inside line on jobs at some companies, though. Mr. Nasr says that two local companies, Kodak and Xerox, have expressed interest in the program.

Industry contacts are key. Mr. Redman says Arizona State may hire a former executive from Intel as a career coordinator. And he envisions graduates working not just at companies but at nongovernmental agencies and in local and national government.

Mr. Redman's colleague, Mr. Perrings, stresses the importance of defining a set of problems that are seen as relevant to local, state, national, and even global interests. Climate change, biodiversity, and global trade are some of the challenges, he says. Through the new interdisciplinary program, the university hopes to equip students with the skills needed to tackle those complex problems.

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