Taking the University to Task

For many colleges and universities, environmental studies are no longer just academic.

by William H. Mansfield III

When Megan Dunn arrived at the University of Rochester, New York in the fall of 1994 she was shocked to see a plume of black smoke pouring from the school's heating plant. University officials responsible for enforcing state air pollution standards replied vaguely to her inquiries, so she decided to take on the menace herself. During her sophomore year Dunn mastered the intricacies of the university's coal-fired power plant. She met with the plant's chief engineer and toured the facility. She dug into the air-quality regulations. Through her research she found that the plant's fly-ash and soot emissions exceeded standards largely because two of the plant's filters were out of commission. Renovations to one of the filter bag houses alone would cost $400,000. And the state had been extending the university's emission permit for 14 years while the Rochester administrators sought to raise the money.

A sketch by Jill Hindle, a senior at Middlebury College in Vermont, for the college's environmental publication *Otter Creek Journal*, described by its student publishers as "a local forum for discussion of ecology, sustainable living-eating-perceiving-being-relating-seeing-buying-energying...."

Aided by her English Professor David Bliesh, Dunn detailed her findings in an independent research paper, then took the bold step of meeting with the university's top officials. "I couldn't keep my findings a secret and I wanted to see some changes," she related at Ball State University's Greening of the Campus II Conference in Muncie, Indiana last September. "I made it clear that something needed to be done and that there was no more time for waiting." Her thoroughness and persistence paid off. The university made the necessary changes, including better management practices and more timely cleaning of the plant's filters, and soon the black smoke trailing over the campus disappeared. "Plant managers found out that these rules did not have to be a burden, but that they could actually help them run the plant effectively," Dunn reported. The administration now plans to phase in a natural-gas-fired generator to replace the existing coal-powered installation, further reducing pollution. Additionally, the university has decided to reduce energy consumption across campus by installing efficient lighting.

Dunn's experience illuminates a prominent new dimension to today's environmental education—students are challenging campus administrators to make the setting of their education more sustainable. Throughout the world students are taking part in college and university operations such as landscaping, food service, procurement, transportation, and waste-management aimed at improving the environments of their campuses. But more than that, these efforts are completely revolutionizing how education happens, moving beyond textbooks and lectures alone toward more experiential, interdisciplinary learning.

This movement is tearing down walls between academia and campus operations, often creating model programs that offer valuable lessons for businesses, governments, and communities. While these programs often cut operating costs and reduce the environmental impacts of the universities, they also help meet the desires of growing numbers of students to participate in environmental efforts. And they provide students with practical, job-related experience that buttresses their academic studies and enables them to apply classroom skills to solving real problems on campus.

The practices students are introducing—from organic farms and recycling programs to efficient buildings and conservation initiatives—can be employed equally well in their own communities in the future. As Oberlin College Professor David Orr writes in his book *The Campus and Environmental Responsibility*, "No institutions in modern society are better able to catalyze the necessary transition than schools, college, and universities .... The question is ... whether they have the vision and courage to do so."

Thomas Kelly, director of the Sustainability Program at the University of New Hampshire, describes the experience gained from students' efforts to combine environmental studies and day-to-day university operations as the "shadow curriculum." "One of the richest educational resources we have to help us integrate and internalize the values, principles, theories, facts, and skills for sustainable development," he says, "is our immediate surroundings—the campus. Campus operations and curricula are linked in principle, but they are often treated as separate and unrelated."

A strong advocate of incorporating campus operations into classroom work, Kelly says it requires nontraditional pedagogy: "Our campuses are overflowing with examples of ecologically irrational practices that are often economically and socially unsound as well. By identifying and analyzing them, formulating alternatives, and participating in their implementation, students are empowered and emboldened to take on issues of institutional change. This connects the core educational mission to the daily life of our institutions and truly engenders responsible citizenship in our graduates."

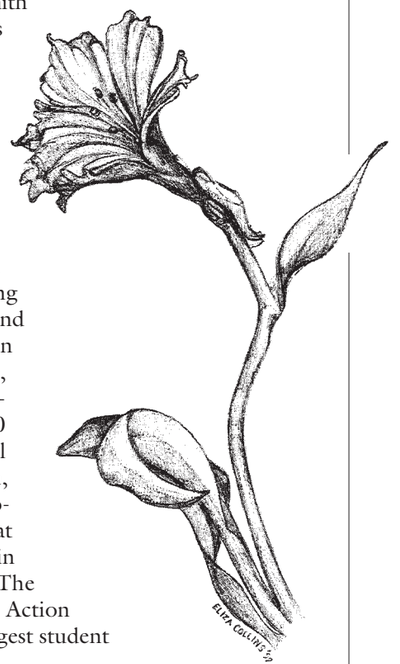
Because institutions of higher learning are critical components, and oftentimes the hubs, of their communities, campus environmental stewardship encompasses virtually every facet of university and community life. Universities and colleges import energy, food, water, and other materials; they generate solid, organic, and toxic wastes; and their policies influence building construction, landscaping, transportation, and even local and international investments.

One starting point for identifying and taking on environmental issues at the campus and in the surrounding community is the so-called campus environmental audit—a procedure devised by a graduate student, April Smith, at the University of California at Los Angeles. As a thesis project in environmental studies, she and five peers decided to apply their classroom knowledge to the physical operations of the campus.

The group set out to analyze the environmental effects UCLA's 50,000 people had on its 411 acre campus and the surrounding West Los Angeles community. Over a period of six months they investigated 11 key campus environmental issues: the use and disposal of solid, hazardous, medical, and radioactive wastes; the air quality surrounding the campus; the condition of storm-water and waste-water runoff; the use and conservation of water and energy; and the procurement of goods consumed on campus. They scrutinized university and student governance mechanisms and the regulatory framework for campus policies. They interviewed university management and state officials, reviewed practices at other universities, and then made concrete recommendations for improving UCLA's environmental policies and programs. The university, they felt, was a microcosm of the environmental problems—and solutions—facing the entire community.

The students' report drew substantial media coverage and an initial defensive response from the university's administration, which felt the findings cast UCLA in a too negative light. But as the dust settled, the administration gradually began to work with students to make needed environmental improvements.

Inspired by a flood of inquiries from other schools, Smith and her colleagues refined, updated, and published their assessment methodology as *Campus Ecology: A Guide to Assessing Environmental Quality and Creating Strategies for Change* (see Resources, page 30). Since then, and often using *Campus Ecology*, college and university students in North America, Europe, and Australia have completed well over 1,000 campus environmental audits, which, in turn, have triggered an explosion of student projects at their institutions and in their communities. The Student Environmental Action Coalition (SEAC), the largest student



A sketch by sophomore Eliza Collins in *Otter Creek Journal*, which the Middlebury College students further describe as a forum for "farming-loving-classifying-voting-zoning-preserving-radicalizing...."

environmental organization in the United States, incorporated *Campus Ecology*'s methodology into its program work, giving its members a tested tool for spurring environmental activities on their campuses. Students at Lansing Community College in Michigan used it as a guide for a solid waste study that led to a successful campus composting program. Work on these and other projects has catapulted environmental education out of the ivory tower and in many instances put student actions in the vanguard of campus and local environmental enhancement.

Increasingly, these "shadow curriculum" activities at colleges and universities are collaborative endeavors between students, faculty, and administrators. In Australia, the Royal Melbourne Institute of Technology is integrating academic studies and university operations together into a program designed to make the 44,000-student institution "an environmentally responsible corporate citizen." The starting point is a university-wide environmental policy that encourages departments to implement strategies to reform curricula, reduce wastes, conserve energy, and preserve natural resources. Oversight is provided by a student coalition and a management committee comprised of administration, faculty, and students.

Conservation education need not be an oxymoron. But if it is to become a significant force for a sustainable and humane world, it must be woven throughout the entire curriculum and through all of the operations of the institution, and not confined to a few scattered courses.

David W. Orr

Natural-habitat restoration and sustainable agriculture projects at St. Olaf College in Minnesota got their roots in the early 1980s when undergraduate David Wedin, now a botanist at the University of Toronto, initiated an independent research project aimed at improving college-owned agricultural lands and natural habitat. Intrigued by his research and proposals for change, St. Olaf's administrators devised plans to consolidate and conserve the lands. His faculty advisor, Gene Bakko, helped obtain wetland restoration funds from the U.S. Fish and Wildlife Service, the U.S. Department of Agriculture's Conservation Reserve Program, and state conservation agencies.

By 1988 Wedin's groundwork study became an official college program that has to date restored 40 acres of native woodland, 33 acres of native prairie grasses, and 13 acres of wetland, with more restoration yet to come. Meanwhile, 44 acres of college-owned farmland have been converted from conventional to sustainable agricultural rotation.

Students at St. Olaf's have helped to plant and tend more than 20,000 tree seedlings and nursery stock trees. They work summers on maintenance projects and conduct feasibility studies on sustainable farming practices—helping to fill an agricultural void in their liberal arts curriculum. They conduct individual and joint research projects on tree growth, plant biodiversity, and waterfowl migration and nesting. And several have presented their findings to the Minnesota Academy of Science. This reclaimed natural area is now the reality testing ground for the college's biology courses and provides the training paths for the school's cross-country team. It also furnishes a substantial greenspace for the expanding local community.

Many of the student-initiated programs focus on energy efficiency and conservation. At Brown University in Rhode Island, a project called "Brown is Green," or "BIG," came to life in 1991 after students in professor Harold Ward's environmental studies classes issued recommendations that the university adopt several money-saving conservation initiatives. The administration jumped on board and the ensuing program has created institutional guidelines for resource conservation, recycling, waste reduction, and environmentally sound operations. Each student chooses an environmental issue on campus, researches the problem, and recommends solutions. Recommendations to date have included increasing bicycle use, using low-flow showerheads, and cutting intra-campus mailing. Then the students work with plant operations, university administrators, and faculty members to produce a report which is reviewed for possible implementation.

In 1991, students working with BIG successfully lobbied to incorporate energy efficient lighting in renovated dormitories. The resulting changes saved the university some $16,000 annually in power costs. In addition, the renovation earned cost rebates of $100,000 from the local power company for installing fluorescent lighting. The program provided extensive information on campus energy use, which fueled additional awareness and action to conserve energy. Students analyzed appliance purchases for electrical operating costs, proposed changes in lighting configurations, and organized energy-conservation competitions between dormitories to encourage students to cut their energy bills. Since the program began, students living in Brown's West House, a typical wood-framed New England house used as a working model and environmental laboratory, have recorded a consistent 40 percent reduction in gas, electricity, and water consumption. The program has cut costs at the house by thousands of dollars through experiments with better thermostat controls, removing the electric clothes dryer, weather-stripping windows and doors, and installing low-flow showerheads and toilet dams, which reduce the amount of water in each flush.

Students have induced almost 80 percent of universities in the United States to develop recycling programs. In addition, a number of institutions have redirected their dining facilities to purchase fresh, local produce and then to compost dining hall food wastes.

At the University of Colorado in Boulder, a recycling program started by students in 1976 got a major boost in 1990, when the college's facilities department agreed to become a full partner and contributed full-time facilities and custodial staff. Under the partnership, students are responsible for operation of the recycling facility, campus promotion and education, and marketing materials to outside vendors. Recycling pickup now reaches 8,000 deskside recycling containers and collection has grown to 3 to 5 tons daily. Recyclables collected include glass, newspapers, aluminum cans, office paper, cardboard, batteries, plastics, books, and yard wastes. The decreased trash handling and disposal costs helped the program achieve a total payback of $470,000 in disposal costs—$50,000 per year—by the end of 1997. Staffed by students (26 of whom are on the payroll), community service volunteers, a recycling services director (who started out in the program as a student volunteer), and two other full-time employees, the program also regularly sponsors between 15

Annual Revenues and Savings for 23 Campus Conservation Projects

PROJECTS	ANNUAL REVENUES AND SAVINGS
Transportation	
Getting students and staff out of the car at Cornell University, NY	$3,123,000
Creating a bus-riding campus at the University of Colorado-Boulder, CO	1,000,000
Energy Conservation	
Creative strategies for saving energy at SUNY-Buffalo, NY	9,068,000
Lighting and equipment retrofits at Elizabethtown College, PA	247,000
A campus energy reduction strategy at Brevard Community College, FL	2,067,000
Using efficient lights in dorm rooms at Dartmouth College, NH	75,000
Solar panels generating savings at Georgetown University,Washington, DC	45,000
Water Conservation	
New toilets and water fixtures at Columbia University, NY	235,000
Installation of water-saving showerheads at Brown University, RI	45,800
Re-Use	
Washable cups in the Freshman Union at Harvard University, MA	186,500
Sale of surplus property at the University of Wisconsin-Madison, WI	241,800
Second time around for chemicals at the University of Washington, WA	14,400
Chemistry classes with fewer chemicals at the University of Minnesota, MN	37,000
Composting	
Creating fertilizer with food waste at Dartmouth College,NH	10,000
Composting landscape waste and scrap wood at the University of Colorado-Boulder, CO	1,300
Recycling	
Award-winning materials-recovery program at the University of Colorado-Boulder, CO	107,000
Dining services recycling at Harvard University, MA	79,000
Getting top dollar from paper recycling at the University of Wisconsin-Madison, WI	120,000
TOTAL (including projects and universities not listed here)	$16,755,500

From *Green Investment, Green Return* by David Eagon and Julian Keniry, a new report from National Wildlife Federation. For more information, contact Ed Wiley at NWF, (703) 790-4097. See Resources, page 30.

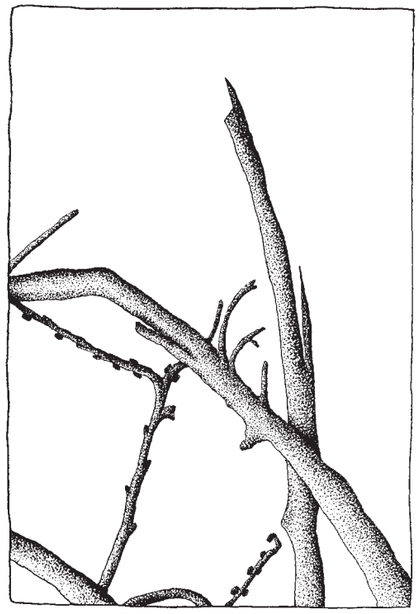
and 20 academic class research projects for credit.

To cut waste generation, the university encourages use of e-mail, double-sided copying, recycled paper products, reusable mugs, retreaded tires, and washable dishes, and conducts orientation for first-year students. The effort has stimulated Boulder's municipal recycling program and fostered good relations between the university and the city.

An innovative initiative at Bowdoin College in Maine led to reductions of hazardous wastes in chemistry labs. Prompted by an outdated ventilation system and fast-growing chemistry classes, Professor Dana Mayo, with the help of his student Caroline Foote, developed the concept of microscale experiments—reducing the scale of experiments to lower the amounts of materials needed overall. By using smaller quantities of chemicals in lab experiments, Mayo and Foote cut substantially the use and disposal of such hazardous substances as benzene and formaldehyde, at the same time enabling students to conduct more experiments.

Foote stayed on at Bowdoin a year after graduating, working with 12 student volunteers to develop and test the experiments. In addition to reducing toxic waste, the procedures reduced the chemistry department's organic lab costs from $8,000 to less than $1,000 per lab. Using the same methodology, the University of Minnesota's chemistry department later reduced its costs by more than $34,000.

Professor Mayo notes that universities are now employing microscale procedures in Australia, Finland, Israel, Sweden, and the United Kingdom. He estimates that in the United States alone, approximately 50 percent of all undergraduates in chemistry labs are now using them. "The combination of environmental and economic advantages made this a 'win-win' initiative," he says. "In addition, the cost-savings have rescued a number of economically strapped freshman, and even high school teaching labs."



Becky Duerst, a sophomore at St. Olaf's College in Minnesota, participated in the college's wetlands restoration project and commemorated the experience with this drawing.

An important side benefit of these out-of-classroom environmental initiatives is student participation in institutional decisionmaking. When Northland College in Wisconsin decided to build a new residence hall, the administration solicited student input from the outset. Students met at the beginning of the planning process to specify the needs they envisioned for a 21st century resident hall that would also serve as a living, learning laboratory for environmental studies. They were represented by faculty and administrators on the college's planning committee, and worked closely with the building's architects.

The students generated a list of 40 elements to be included in the design, from energy efficiency to water conservation, and nearly all were ultimately incorporated. After extensive research, the students called for a goal of energy efficiency 40 percent greater than the building code required. Other items on the list included a passive solar design in one wing, supplemental photovoltaic and wind-electrical generators, solar preheated water, two greenhouses, high-efficiency gas heating, optimum insulation, several composting toilets, low volume showers and toilets, and energy efficient appliances and lighting. They made a special effort to identify and insist on the use, and ultimate disposal, of environmentally sound building materials. When completed later this year, the 110-bed building is expected to be one of the most environmentally advanced residence halls in the world. To broaden the learning experience, Northland will conduct a course to study the building and its construction, and carry out research on energy and water use and other environmental effects of student life in it.

Schools such as Oberlin College in Ohio and Middlebury College in Vermont are also pushing forward with progressive building projects. At Oberlin, Professor David Orr has been instrumental in promoting—and raising funds for—the construction of a new environmental studies center that promises to tread lightly. The building will generate more electricity than it uses, discharge wastewater at least as pure as the water it takes in, use materials grown or manufactured sustainably, and consume energy efficiently.

At Middlebury, the administration has agreed to cover all of the costs of a sustainably designed environmental center and has adopted forward-thinking plans to promote similar projects in the future. The college, which claims the oldest environmental program in the United States, has student environmental monitors in every building, and has moved to infuse environmental commitment and campus action into a wide range of activities—including solid waste management and recycling, landscape and grounds maintenance, printing and communications, and dining services.

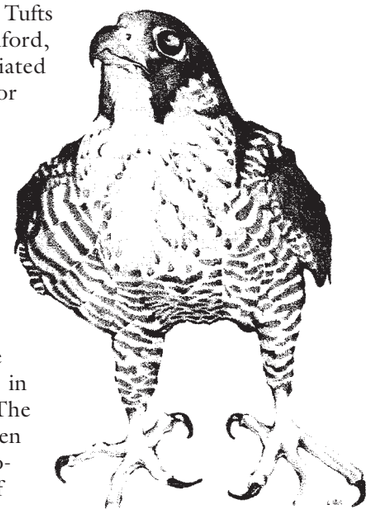
In 1994, students organized a "Campus Earth Summit" at Yale University in Connecticut, to share insights and systematize approaches to campus environmental projects. The conference drew 450 faculty, staff and student delegates from 22 countries and all 50 U.S. states. Together they crafted *Blueprint for a Green Campus*, later published by the Heinz Family Foundation. The blueprint makes recommendations on conducting environmental audits, integrating coursework with campus stewardship projects, researching campus and local environmental issues, reducing wastes, promoting energy efficiency, determining sustainable land use, developing clean and safe transportation systems, constructing efficient buildings, finding environmental careers, and networking with similar domestic and international programs.

Ball State University in Indiana brought together several hundred participants from a number of countries to follow up on the conference and exchange ideas for further environmental activities at colleges and universities. Another conference is scheduled for September, 1999. "The secret to our success," says Bob Koester, director of the Ball State Center for Environment, Research, Education, and Service, "is in getting the academic and facilities departments to sit down at the table and talk to one another. The spin-offs are remarkable. Our facilities staff now reports to the community on the university's energy use and recycling, and the deans of the colleges have just agreed to a common set of four environmental studies minors programs in which case studies and field research are conducted with the help of our facilities staffs."

Because the shadow curriculum activities have developmental and institution-building potential, they are getting attention in developing countries. Five universities in Brazil are emphasizing collaborative environmental research involving professors and over 100 students. They have pooled human and financial resources to help preserve the biodiversity-rich Pantanal wetlands—the world's largest remaining wetland. Bordering southwest Brazil, Paraguay, and Bolivia, the Pantanal covers more than 106,000 square kilometers. The wetland is threatened by large transportation and development projects, agricultural expansion, municipal pollution, and environmentally unsound tourism. The Federal Universities of Mato Grosso, Mato Grosso do Sul, and Rio Grande do Sul and the Universities of Sao Paulo and Cuiba have secured World Bank funding for a conservation plan for the Paraguay River basin, employing 17 interdisciplinary teams. A primary focus of the plan is to carry out remedial measures that provide environmental easements in road improvements, water and sewage treatment in small watersheds, and sustainable agriculture and cattle ranching in the region. Students contribute by helping to provide environmental education and working with community leaders to shape the local institutions that will carry out the plan.

In Bolivia, students and administrators at the University of Bogata have launched a program to collect 17 tons of campus organic, plastic, and paper wastes each month for recycling and reuse. The program has cut collection costs by 25 percent in the first six months. And in Turkey, students, faculty, and facilities staff at the Middle East Technical University have led a reforestation program that has transformed 3,750 acres of wasteland into the largest green space in Ankara.

At the hub of the international campus greening activities is the Association of University Leaders for a Sustainable Future (ULSF), formerly located at Tufts University in Medford, MA and now affiliated with the Center for Respect of Life and Environment in Washington, DC. ULSF is the member organization of some 250 university presidents and chancellors from 42 countries who signed the Talloires Declaration in France in 1990. The declaration outlines ten commitments signatories make on behalf of



Liba Pechar, a Middlebury College graduate, made this drawing to accompany her thesis on the return of the peregrine falcon to Vermont. In her paper, she writes that the bird's return is "a catalyst for both action and celebration.... We should rejoice in the slow healing of human mind and wild land that has allowed the peregrine's return."

their institutions to promote leadership, campus environmental management, and environmental literacy. The ULSF secretariat provides educational programs, conducts workshops and seminars, offers support services and a flagship publication, *The Declaration*, and maintains an inquiry and referral service on sustainable development. It helps shape curriculum design and pedagogy for interdisciplinary faculty development, and assists in formulating and carrying out environmental research. And it promotes ecologically sound institution policies and practices and furnishes a network of partnerships among its member institutions of higher learning.

Colleges and universities can reduce their adverse impact on the environment, enrich the education that they provide to students, and significantly reduce their costs of operation. Why is it so difficult to persuade them to do so?

David J. Eagan and David W. Orr

To further the momentum for campus greening worldwide, the U.S.-based National Wildlife Federation launched its "Campus Ecology Program" in 1989 to help develop sustainable practices in higher education. The program provides educational materials for campuses and communities, and has compiled summaries of a number of successful campus greening projects in the book *Ecodemia*.

Worldwide interest in experiential environmental education is on the rise. Students gain a better grasp of abstract global issues by working on manageable local ones. Educators are inspired by the new-found student enthusiasm and the learning generated—and are coming to appreciate that campus operations can be incorporated into the academic curriculum with excellent results. Administrators are beginning to see the operational benefits of recycling, waste reduction, energy savings, and improved food services.

Campus environmental programs are leading a shift in the very fundamentals of education, says Nan Jenks-Jay of Middlebury College, away from pedantic learning focused on individual specialization, toward interdisciplinary experiential learning. "We are gradually seeing one of the most traditional and rigid of all institutions, the 'academy,' accept the challenge to educate and prepare students to live and work in a world in which they must individually and collectively effect change and also to recognize its role as a large business and influential entity in acting responsibly with regard to decisions that impact the environment," she says. Together students, faculty, and facilities managers are revolutionizing environmental education and reshaping institutions of higher learning in a way that benefits academic, environmental, and economic goals while teaching all of them how to live more sustainably.

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