

Chapter 1

Introduction



Ecology is becoming the way to understand the world. This is something that we are all going to have to learn how to do. Organizations and professions are set up in a mechanistic way, and that will have to evolve . . . it will be redesigned . . . and this applies to the ways of teaching and learning.

— Thomas Fisher, Assoc. AIA, Professor and Dean, University of Minnesota College of Architecture and Landscape Architecture, 2005

Chapter 1 captions (clockwise)

Students in Michael Berk's Passive Building Systems Course (Mississippi State University) end the semester with a team-designed and -built solar box. Photo by Russ Houston

Students from California Polytechnic State University-San Luis Obispo building on the Mall at the Solar Decathlon (October 2005). Photo by Stefano Paltera/Solar Decathlon

The Rhode Island School of Design house at the 2005 Solar Decathlon included a roof garden; the team dined on the roof one evening during the competition. Photo by Chris Gunn/Solar Decathlon

Students on the job site for John Quale's ecoMOD course. Photo by Dan Addison

CHAPTER 1: INTRODUCTION

EXECUTIVE SUMMARY

This report and proposal are the result of the American Institute of Architects (AIA) Committee on the Environment (COTE) Ecological Literacy in Architecture Education (ELAE) project. The seeds for the idea began with Daniel E. Williams, FAIA, and Mark Rylander, AIA, who were the 2003 and 2004 chairs of the AIA COTE Advisory Group. Vivian Loftness, FAIA, the 2005 chair, also played an important role in shaping the direction of the project.

COTE grew out of the AIA's Energy Committee and has been active since the 1980s, leading and coordinating the profession's involvement in environmental and energy-related issues and promoting the role of the architect in preserving and protecting our planet from environmental damage. The AIA COTE works to sustain and improve the environment by advancing and disseminating environmental knowledge and values and advocating the best design practices to integrate built and natural systems to the profession, industry, and the public.

Project Goal

A planning grant from the Tides Foundation's Kendeda Sustainability Fund set the project in motion. The goal was to assess the state of ecological literacy and the teaching of sustainable design in architecture education as part of a proposal for a large-scale, long-term effort, led by the AIA COTE, to inject ecological literacy and sustainability principles into architecture education in the United States. The education-focused effort would be concerned largely with schools of architecture, as well as other venues where students and practicing architects might learn about ecology and design.

Background and Terms

Chapter 1 provides background on efforts to bring environmental awareness into education across the board and recent efforts to bring issues of sustainability into architecture education. Chapter 2 includes a conversation with environmental educator David Orr as an important touchstone; his ideas are the underpinning of this report and proposal.

Chapter 2 defines sustainability, ecological literacy, and sustainable design for this document thus so: Sustainability envisions the prosperity of culture and nature. Discussions of sustainable design tend to be narrow in focus and vague in purpose so the broader goal of engaging various disciplines in the ecology of place tends to be misunderstood, marginalized, or dismissed altogether. Although architects now generally acknowledge that sustainability is important, many see it as a technical solution without fully understanding the mechanics or worth of green technologies. We posit that sustainable design must put as much emphasis on design as it does on sustainability.

Drawing on Orr's writings, we define ecological literacy as interdisciplinary education centered on direct interaction with the environment in which it occurs. The results are better minds and better places. We frame ecological design in Orr's words: "the careful meshing of human purposes with the larger patterns and flows of the natural world." To achieve this, designers need an intimate understanding of those patterns and flows, and they cannot attain that understanding within the conventionally narrow scope of their discipline. A broader, interdisciplinary education and process are essential.

Curriculum Catalysts and Current Snapshot

Chapter 3 addresses some of the leading examples of U.S. architecture departments where ecological literacy has made some or great impact. It points out where ecological literacy is seen in testing laboratories, history courses, community outreach, design-build, and green campuses. The chapter also covers organizations and programs that have been active in curriculum support in recent years. Chapter 4 profiles the winners of a call for coursework that yielded 44 submissions. Three were awarded grants and eight received special recognition.

Grant Recipients

- The Sustainable Environments Minor: Sustainable Environments and Implementing Sustainable Principles at California Polytechnic State University-San Luis Obispo, College of Architecture and Environmental Design; submitted by Jonathan Reich, AIA
- Comprehensive Green Design Studio and Professional Practice Seminar at the University of Wisconsin-Milwaukee, School of Architecture and Urban Planning; submitted by James Wasley
- Seminar in Architectural Technology and Technological Traditions at the University of Tennessee, College of Architecture and Design; submitted by Mark DeKay and Ted Shelton

Special Recognition

- Master of Science in Architecture: Sustainable Design Track at the University of Minnesota, College of Architecture and Landscape Architecture; submitted by Mary Guzowski
- ecoMOD Project at the University of Virginia, School of Architecture; submitted by John Quale
- Animated Architecture: Master of Architecture Thesis Research and Design Studio at Clemson University, School of Architecture; submitted by Keith Evan Green
- Arch 501 Graduate Design Studio and the Greening of the Campus Program at Ball State University, College of Architecture and Planning and the Center for Energy Research/Education/Service; submitted by Robert J. Koester
- Issues and Practices in Modern Architecture and Urbanism at Parsons School of Design at the New School, Department of Architecture, Interior Design, and Lighting; submitted by Jean Gardner
- Environmental Systems in Architecture and Other Coursework at Kansas State University, Department of Architecture; submitted by Gary Coates
- ARC 2713 Passive Building Systems (Ecological Design) at Mississippi State University, College of Architecture; submitted by Michael A. Berk
- Arch 316 Environmental Design and Mechanical Systems and Environmental Systems Laboratory at the University of Hawaii, School of Architecture; submitted by Stephen Meder

Proposal for the Center for Ecological Design

Chapter 5 is a proposal for the AIA COTE Center for Ecological Design (CED), which would focus on architecture education at all levels. The center would manage a series of activities and alliances, each aimed at advancing ecological literacy and the study of sustainability as an integral part of the study and practice of architecture.

This proposal is for the project to be housed within the AIA, largely guided by COTE and like-minded AIA constituencies, with its own staff and mission approved by the AIA Board of Directors (please note, however, the AIA has not accepted this proposal yet). It is the hope of

current AIA COTE leaders that this report will lead quickly to a deeper discussion with the Tides Foundation, COTE, and AIA leadership about how the center would fit into the AIA and how it would operate with outside funding. Several models exist that would work, and the discussion should involve all stakeholders. Not every recommendation in Chapter 5 would fit easily within the AIA; the full report will help the AIA identify priorities and synergies with initiatives currently under way.

That discussion would also include defining the key early priorities and initial relationships. The general priorities of the center can be understood in three umbrella areas: consolidation, advocacy, and consultancy. Specific priorities would include, for example, designing and producing an adaptable foundations course or courses that involve interdisciplinary collaboration. Partnerships and conversations with several organizations would commence immediately. This would lead to an articulation of where the center could best contribute, the resources required immediately and long term, a timeline, and a work plan for next steps.

Several of these activities could and should begin right away, even as the particulars of a center are assessed. As overall framework and budget issues are reviewed (the AIA declines to release specific budget details at this time), seed funding could be put to immediate use for workshops, research, publications, and curriculum development.

The pressing issue is to keep the dialogue active and move quickly to make positive change and lasting impact. This report is a snapshot in time and a call to action. Climate change, resource use, and building trends comprise an imperative for change for the profession and academia and for sustaining human life and quality of life on earth.

This is an unprecedented opportunity to have broad impact through modest and strategic initiatives; the possibility for overlapping benefits is great. Reinvigorating architectural research and creating opportunities for the profession to inform the academy will benefit practitioners, students, teachers, schools, and clients alike.

PROJECT OVERVIEW

The AIA Committee on the Environment (COTE) has long supported the study of sustainable design in architecture schools. A few years ago, AIA COTE leaders, including Daniel E. Williams, FAIA, Mark Rylander, AIA, and Vivian Loftness, FAIA, began talking about architecture education and ecological literacy, a deep understanding of the natural world, and systems that had emerged as the foundation for meaningful exploration of sustainable design. In 2004, the AIA COTE received a grant from the Tides Foundation to determine how the profession, through the AIA COTE, could affect the effort to bring sustainable design and ecological literacy into architecture education. “Progress has been made on sustainable design issues in the building professions,” Rylander said. “It is now important to make sense of the changes for educators and capitalize on the momentum of this practice trend.”

Rylander proposed that environmental educator David Orr’s ideas about ecological literacy be guideposts for the study and report. Orr proposed six foundations for ecological literacy in formal education or six principles to define what it would mean to educate people to live sustainably:

- All education is environmental education

- Environmental issues are complex and cannot be understood through a single discipline or department
- Education occurs in part as a dialogue with a place and has the characteristics of good conversation
- The way education occurs is as important as its content
- Experience in the natural world is an essential part of understanding the environment and conducive to good thinking
- Education relevant to the challenge of building a sustainable society will enhance the learner's competence with natural systems.¹

These principles are further discussed in Chapter 2. The purpose of the Ecological Literacy in Architecture Education project was to

- Consider how Orr's ideas could or should affect the substance and process of architecture education
- Define sustainability and sustainable design as part of articulating why this subject is important to architects and their education and profession
- Evaluate current coursework for progress, profile leading examples, and provide an overview of existing and recent past efforts as the context to this planning effort
- Consider how sustainability and ecological literacy relate to the culture and values of architecture schools and the profession and consider ecology as the foundation for a transformative shift in architecture pedagogy and the architect's role in the collaborative process of design
- Propose a Center for Ecological Design and a series of events, research efforts, studies, and other activities to advance the goal.

In autumn 2004, a call for submittals was issued (through the Association of Collegiate Schools of Architecture and other channels) to collect a body of current coursework for examination. A second call was issued in early 2005 to increase the number of examples. Several volunteers joined the team and a process of analysis and discussion of the submitted coursework commenced. In May 2005, three examples were honored with grants and eight others were identified for special recognition; these programs are profiled in Chapter 4. Following publication of the report, the team will present the results and work with many of those profiled and mentioned herein to develop strategies to execute steps outlined in Chapter 5.

About the Project Team

The AIA Committee on the Environment (COTE) grew out of the AIA's Energy Committee, which was founded in the 1970s.² Today, the AIA COTE's purpose is to lead and coordinate the profession's involvement in environmental and energy-related issues and to promote the role of the architect in preserving and protecting our planet from environmental damage. The AIA COTE works to improve and sustain the environment by advancing and disseminating environmental knowledge and values, and advocating the best design practices to integrate built and natural systems to the profession, industry, and the public.

¹ Orr, David. 1992. *Ecological Literacy*. Albany: State University of New York-Albany.

² That committee had ties to the AIA Research Corporation, an Institute organization that conducted significant building science and design research funded by several federal agencies. The effort was disbanded in the 1980s, and is widely understood as the last period during which the United States led the world in research on those topics.

The AIA COTE secures outside funding to sponsor project recognition programs, conferences, and other outreach and advocacy activities geared toward architects and related professionals. The national advisory group is made up of five volunteer professionals who plan major initiatives and work with volunteers to execute them. The AIA COTE's regional team is made up of six volunteer professionals (past chairs of local COTE chapters); there are 49 local chapters and more than 7,000 members nationwide. As an open committee (one that invites non-AIA member participation), the AIA COTE is a conduit to knowledge on environmental and energy-related issues and advises the Institute on related policy matters affecting the practice of architecture nationwide.

The AIA COTE seeks to

- Educate architects about the environment and the energy-related impact of design decisions and to encourage membership participation in these activities
- Communicate the AIA's environment and energy-related concerns to the public and private sectors and influence the decisions of the public, professionals, clients, and public officials on the impact of their environmental and energy-related decisions
- Foster leadership among architects in all facets of environmental decision-making
- Maintain alliances with organizations such as the U.S. Green Building Council, Urban Land Institute, American Solar Energy Society, Sustainable Buildings Industry Council, and UIA World Congress of Architects
- Promote and support the integration of sustainable design and ecological literacy in architecture education and practice as the key to the future of the profession and the planet.

Project Originator, Member of the Selection Team, and 2004 AIA COTE Advisory Group Chair

Mark Rylander, AIA, is an associate partner at William McDonough + Partners. He has worked there since 1995 on projects that advance eco-effective design and address issues of community health, which include the Nike Europe headquarters in the Netherlands and the recently completed Woods Hole Research Center Campus in Massachusetts. He has helped develop the AIA COTE's Top Ten Green Projects design awards program, initiated advocacy and education programs, and advised AIA leadership on policy issues. Mr. Rylander is an advisory board member, the sustainable design editor of *Architectural Graphic Standards*, and a guest speaker at conferences and architecture schools, including the University of Virginia.

ELAE Project Funder: The Tides Foundation

The Tides Foundation has worked with donors committed to positive social change since 1976. The Kendeda Sustainability Fund, a donor-advised fund at the Tides Foundation, was created in 2003 to explore how to live within the limits of the natural world in ways that promote community, equity, prosperity, and health. It funds organizations that focus on higher education, religion and faith, healthy buildings, materials and processes, and communications/media and the arts. Through its grant-making programs, the Tides Foundation strengthens social change organizations and increases the capacity and effectiveness of the nonprofit and public sectors. It supports activities in the areas of economic and social justice, environmental sustainability, and democratic renewal. In 2005, the Tides Foundation awarded almost \$90 million to more than 2,000 nonprofit organizations. The ELAE project was managed by Catherine Lerza, senior philanthropic adviser with the Tides Foundation. She has worked with nonprofits on environmental, social justice, and women's issues for more than 30 years.

Project Advisor, 2005 AIA COTE Advisory Group Chair

Vivian Loftness, FAIA, is a professor and past department chair at the Carnegie Mellon University School of Architecture. She is an internationally known researcher, author, and educator with more than 30 years of focus on environmental design and sustainability, advanced building systems and systems integration, climate and regionalism in architecture, as well as design for performance in the workplace of the future. She is a key contributor to the development of the Intelligent Workplace, a living laboratory of commercial building innovations for performance, and has authored several publications on international advances in the workplace. She has worked to define the fundamental qualities of building performance, enhance the building delivery process, and inform critical design decision-making.

ELAE Project Originator, Member of Selection Team, and 2003 AIA COTE Advisory Group Chair

Daniel E. Williams, FAIA, is founder of Daniel Williams Architect, a Seattle architecture and planning firm specializing in sustainability. With more than 25 years experience in sustainable design in architecture, he has been appointed to the national advisory group for the U.S. Environmental Protection Agency's National Advisory Committee for Environmental Policy and Technology. He has also served on the United Nations Environment Programme, Sustainable Settlements Council. Mr. Williams was a leader on the urban design team for the Seattle monorail system; is a member of the Sustainable Seattle Advisory Council, a contributing adviser on the National Energy Policy; and was an adviser to the U.S. Green Building Council's LEED certification for site design.

ELAE Project Manager, Report Author, Member of Selection Team, and 2005 AIA COTE Advisory Group Member

Kira Gould, Assoc. AIA, is a senior associate in communications with Gould Evans, a 200-person, eight-office multidisciplinary design firm. She writes about architecture and sustainability for *Metropolis* (where she previously was managing editor), *Architectural Record*, *ArchitectureBoston*, *The Boston Globe*, and other publications. She earned a master's degree in architecture and design criticism from Parsons School of Design and undergraduate degrees in journalism and English from the University of Kansas.

ELAE Project Report Author and Member of Selection Team

Lance Hosey, AIA, LEED AP, is a director with William McDonough + Partners in Charlottesville, Va. His independent design work has been featured in *Metropolis* magazine's "Next Generation" series and *Architectural Record*'s "Emerging Architect" series. His essays on the environmental and social aspects of design have appeared in the *Washington Post*, *Metropolis*, *Architectural Record*, and *Architecture* magazines. With Kira Gould, he is coauthor of *Women in Green: Voices of Sustainable Design* (Ecotone, 2007). He is on the advisory board for EcoBuild America, and currently he is working to found the Just Building Alliance, a nonprofit think tank and advocacy group dedicated to social justice in the construction industry.

ELAE Project Volunteer

Greg Mella, AIA, LEED AP, is a principal with SmithGroup in Washington, D.C. Mr. Mella was the project architect for the Chesapeake Bay Foundation headquarters, which has been called the greenest office building in America and was the first building to earn the LEED platinum rating. The project was named one of the AIA COTE Top Ten Green Projects in 2001 and in the same year honored with a *Business Week/Architectural Record* award. His current projects include the Clemson University Institute for Economic and Community Development, which is targeted for a LEED platinum rating. He authored the Sustainable Design Guidelines for the University of

Connecticut. He has presented seminars on sustainable design at Catholic University, the University of Maryland, Syracuse University, Johns Hopkins University, the University of Arkansas, and Miami University of Ohio. He was a member of the U.S. team in the International Green Building Challenge 2002, an international effort to evaluate and improve the performance of buildings worldwide.

ELAE Project Volunteer

Kathleen Bakewell, LEED AP, is an associate principal at H. M. White Site Architects in New York City. Her design practice and academic work focus on the ecology and natural processes of public and institutional open space and green roofs. Her current projects include the Wildlife Conservation Society's Center for Global Conservation and the Sustainable South Bronx New Roof Demonstration Project, a cool and green roof project incorporating ideas of environmental justice, economic sustainability, public health, and permaculture. She holds a master's degree in landscape architecture from Harvard University and has taught at the New Jersey Institute of Technology's Graduate Architecture School, the Columbia University Graduate School of Architecture, Planning and Preservation, and the Yale School of Architecture.

ELAE Project Volunteer

Elizabeth Vandermark, AIA, LEED AP, is an associate with SmithGroup in Detroit. She has several years experience working in design, architecture, and project management. She received a master's degree in architecture from the University of Michigan and a bachelor's degree from the University of Virginia. Her recent projects include the University of Michigan Molecular, Cellular and Development Biology building and a renovation for Pfizer. Ms. Vandermark has taught integrated design studios at Lawrence Technological University.

ELAE Project Volunteer

Eric Delss earned his bachelor of architecture degree from Virginia Polytechnic Institute and State University and his master of architecture in urban design from Harvard University. During his education, he began to realize the critical impact any built design has on the environment, though there was little emphasis on ecological literacy in his coursework. He believes ecological literacy studies should be integrated into all design curricula. He is currently working at Agoos/Lovera Architects in Philadelphia.

ELAE Project Volunteer: Emerging Professional

Matthew Wolf is in the Intern Development Program. He graduated from Southern Illinois University-Carbondale in 2003 with a bachelor's degree in applied sciences and arts/architectural studies. He works for Melotte Morse Leonatti (MML) Ltd. in Springfield, Ill. He was an undergraduate assistant for Jim Wright (former assistant professor at Southern Illinois University-Carbondale), who studied the pedagogy of sustainable design and the challenges of integrating sustainable design into mainstream architecture education. At MML, Mr. Wolf has worked on an affordable housing project (slated for LEED certification).

ELAE Project Volunteer

Peter Hind, Assoc. AIA, LEED AP, is a partner in an eight-member firm, Studio 951, in Lincoln, Nebr. He was previously director of the museum forum with Leo A. Daly in Omaha. Several of his projects have benefited from a whole systems approach to design and resulted in high performance. A recent project included close collaboration with the Rocky Mountain Institute. He also teaches a graduate-level course at the University of Nebraska, where he serves as visiting critic for foundation classes and a senior studio.

ELAE Project Researcher

Kate Bojsza, Assoc. AIA, holds a bachelor of architecture and bachelor of science degrees in social and cultural history from Carnegie Mellon University. In 2003–2004, she was the national vice president of the American Institute of Architecture Students (AIAS). Ms. Bojsza is employed with Pei Cobb Freed & Partners in New York City and is actively pursuing completion of the Intern Development Program. She also remains involved in the collateral architecture organizations as associate director (2005–2006) for AIA New York Chapter and as director (2004–2006) on the National Architectural Accrediting Board.

ELAE Project Support

John McRae, FAIA, joined the AIA in 2003 as senior director of grants and development, overseeing the Institute Research Agenda and securing sponsorship for Institute projects. Prior to this role, he was vice president for education and training at RTKL Associates. There, he was responsible for development and implementation of a comprehensive program of education and professional development and enrichment for the firm. Mr. McRae served as dean of the School of Architecture at Mississippi State University for 14 years prior to joining RTKL. He earlier served on the teaching faculty and in administrative positions at the College of Architecture at the University of Florida for 20 years. He is a past president of the Association of Collegiate Schools of Architecture. In August 2005, he returned to academia as dean of the College of Architecture and Design at the University of Tennessee.

ELAE Project Support

Vanessa Williamson is a knowledge community director at the AIA. In her role as director, she is responsible for high-level volunteer and resource management, grant project oversight, strategic and programmatic planning, and budget management for 10 knowledge communities, representing thousands of AIA members.

ELAE Project Support

Marsha Garcia is a project manager at the AIA. She provides support for the activities of several knowledge communities, working closely with volunteer leaders to develop knowledge in different areas of architectural specialty.

EDUCATION FOR A SUSTAINABLE FUTURE

The movement to bring ecological literacy into architecture education is occurring within a broader effort to “green” education. Efforts to impact early childhood, elementary, and secondary education have been under way for years through such groups as Fritjof Capra’s Center for Ecoliteracy and the Cloud Institute for Sustainability Education.

David Orr is one of the best known thinkers and educators behind this movement. His many writings on the topic have inspired many people in this field. Orr has urged educators and administrators to foster campuswide dialogue about how they run their schools: Do four years here make your graduates better planetary citizens or do they make your graduates, in Wendell Berry’s words, ‘itinerant professional vandals’? Does this college contribute to the development of a sustainable regional economy or, in the name of efficiency, to the processes of destruction? He encourages them to examine resource flows on campus and seek ways to find healthier, less damaging energy sources and to “set a goal of ecological literacy for all of your students. No student should graduate from this or any other educational institution without a basic comprehension of the laws of thermodynamics and the basic principles of ecology, carrying

capacity, energetics, least-cost end-use analysis, how to live well in a place, limits of technology, appropriate scale, sustainable agriculture and forestry, steady-state economics, and environmental ethics.”³

The Association of University Leaders for a Sustainable Future (ULSF), a program of the Center for Respect of Life and Environment, proposes to make sustainability a major focus of teaching, research, operations, and outreach at colleges and universities worldwide. Some 300 higher education institutions have signed the Talloires Declaration, committing them to sustainability and environmental literacy in teaching and practice. According to the ULSF, “Higher education is beginning to recognize the need to reflect the reality that humanity is affecting the environment in ways which are historically unprecedented and which are potentially devastating for both natural ecosystems and ourselves. Since colleges and universities are an integral part of the global economy and since they prepare most of the professionals who develop, manage, and teach in society’s public, private, and nongovernmental institutions, they are uniquely positioned to influence the direction we choose to take as a society. As major contributors to the values, health, and well-being of society, higher education has a fundamental responsibility to teach, train, and do research for sustainability.”

Second Nature was founded by Anthony Cortese, John and Teresa Kerry, and others to work toward a just and sustainable future through, among other things, promoting education for sustainability. Until it scaled back operations in 2002, it ran advocacy and outreach programs and a Web site (and curriculum database) and orchestrated workshops, conferences, and other gatherings. Cortese’s work is now primarily with an organization called EFS West and he is working to develop alliances between professional organizations and others on the topic. Second Nature’s mission has been to transform university education across the board although some efforts were directed specifically to architecture education.

But efforts to bring bioclimatic issues and passive solar architecture into the architecture classroom had begun years before. A great deal of important work began in the 1970s by a broad set of thinkers, educators, and authors. One project widely acknowledged as a significant milestone was a study by Harrison Fraker, FAIA, now dean at the University of California–Berkeley’s College of Environmental Design, and Don Prowler, FAIA, an influential teacher who died in 2002. The study was funded by the U.S. Department of Energy and resulted in a framework and course modules for an important shift in architecture based on passive solar design and other environmentally based theories and practices. The volumes documenting this framework were honored in 1983 with a research award from *Progressive Architecture*.

Other organizations, far too many to mention here, have sponsored significant discussions of these topics in recent years. In 1998, Global Possibilities, the Earth Group, and the Cooper-Hewitt National Design Museum hosted the Second Annual Symposium for a Solar Future, Rethinking Design Curriculum: Integrating Solar Energy for a Sustainable Future. The Association of Collegiate Schools of Architecture (ACSA) had a Sustainability Task Force from 2000 to 2003 (after which it became a listserv). The task force held panel discussions at ACSA conferences, worked with the National Architectural Accrediting Board (NAAB) to update its criteria to include reference to sustainability, and hosted a Cranbrook teachers’ seminar in 2003. The Society of Building Science Educators (SBSE), founded in 1982 by G. Z. Brown and Edward

³ Orr, David. 1991, Winter. “What Is Education For? Six Myths about the Foundations of Modern Education and Six New Principles to Replace Them.” *In Context*, p. 52.

Arens to support and connect educators working in this area, sponsors annual retreats and promotes research and pedagogical excellence in the areas of environmental science, building technologies, and design. (More details on several of these efforts can be found in Chapter 3.)

Students have participated in the conversation, too. The American Institute of Architecture Students (AIAS) is an organization of some 6,200 students; it serves as the student voice in decisions made at the AIA, ACSA, and NAAB. The 2002 AIAS conference in Pittsburgh, *Going Beyond Green*, focused on regional efforts, sustainable design, and environmental and quality-of-life initiatives (speakers included Pliny Fisk III, Ken Yeang, and James Wines; more than 800 students attended).

For some universities, the shift toward sustainability is almost nonexistent in the architecture classroom, but is happening in the campus physical plant—itself another “classroom” for students, faculty, and staff. The green campus movement has grown significantly in the last decade. An early leader, Ball State University hosted its sixth green campus conference in 2005. The Society for College and University Planning (SCUP) hosts an annual campus sustainability day. Orr has been an inspiration on this front, eloquently noting that architecture serves a pedagogical function. His work with William McDonough + Partners on the Adam Joseph Lewis Center for Environmental Studies at Oberlin was modeled on these ideas. A recent article in the *Washington Post* noted a sense of competition among leading universities to be most sustainable.

The media has a role, too. Mainstream media tends to report environmental issues only when a disaster has occurred, and then only in narrow terms. Coverage of climate issues, when it happens, rarely includes architecture and building—small wonder, given that American architecture and design media have been somewhat slow to seriously address sustainable design and rarely, if ever, address the subject of sustainability in design education. *Metropolis* magazine has embraced it more than most, with an ongoing interest in the state of design education across the disciplines and has used sustainability as a lens on contemporary design in general since the early 1990s. The magazine’s 2003 survey of deans, educators, and students had 67 percent of respondents calling sustainability “relevant” to their design curricula, yet only 14 percent said their institutions were developing programs to address this. The year before, 70 percent of respondents in a *Metropolis* survey of practitioners said they believed they were “not equipped” to do a sustainable design job.

Within the profession of architecture, the importance of sustainability was clear to some as early as the 1970s and 1980s, when building research at the AIA focused on energy and related issues. But that focus shifted, and it wasn’t until the 1990s that it would be embraced again. A report commissioned by such architecture organizations as the AIA, AIAS, NAAB, ACSA, and the National Council of Architectural Registration Boards was released in 1996. *Building Community: A New Future for Architecture Education and Practice* is usually referred to as the Boyer Report in honor of Ernest Boyer, the leading educational thinker who authored much of the text. Carnegie Senior Fellow Lee Mitgang coauthored the document and presented it to the profession at the AIA national convention. The document articulated seven goals, three of which relate directly to issues of ecological literacy:

An Enriched Mission: “We recommend that schools of architecture should embrace, as their primary objectives, the education of future practitioners trained and dedicated to promoting the value of beauty in our society; the rebirth and preservation of our cities; the need to build for human needs and happiness; and the creation of a healthier, more environmentally sustainable architecture that respects precious resources . . . [W]e urge schools of architecture to prepare future practitioners capable not only of creating beauty, but also able to

communicate, clearly and convincingly, its value to the public. . . The profession, schools, and students should expand their knowledge, for example, of energy, the use of renewable resources, the recycling process, the use of carcinogenic materials, and the safe disposal of waste.”

A Connected Curriculum: “A connected curriculum would encourage the integration, application, and discovery of knowledge within and outside the architecture discipline, while effectively making the connections between architectural knowledge and the changing needs of the profession, clients, communities, and society as a whole. . . The need for a liberal architecture curriculum is particularly urgent for students who begin their professional programs directly from high school. . . Making the connections, both within the architecture curriculum and between architecture and other disciplines on campus, is, we believe, the single most important challenge confronting architectural programs.”

Service to the Nation: “To realize this last goal for renewal, schools should help increase the storehouse of new knowledge to build spaces that enrich communities, prepare architects to communicate more effectively the value of their knowledge and their craft to society, and practice their profession at all times with the highest ethical standards . . . Students and faculty alike should regard civic activism as an essential part of scholarship. . . For students to recognize the professional and ethical importance of civic engagement in their own lives, such behavior ought to govern the day-to-day conduct of each faculty member and the school as a whole.”

Many of the sustainability-related goals outlined in the Boyer Report have not been met, nearly 10 years after its release. The profession is not a leader in interdisciplinary excellence and there is a long way to go toward understanding global climatic issues. But progress has been made in several areas. Broader interest in sustainable design has begun to change some schools of architecture in the same way it has begun to change many architecture firms and the process by which they work. There is demand for interdisciplinary collaboration, systems thinking, and an ability to think in nesting scales of responsibility. New courses, programs, schools, and institutes are cropping up to meet the need, even as some who have been teaching bioclimatic design since the 1970s are still doing so at some of the same or nearby institutions. It’s a fertile and important moment for the academy and the profession, and the challenges to both are many.