

PEGGY F. BARLETT AND GEOFFREY W. CHASE

Curricular Innovation for Sustainability

The Piedmont/Ponderosa Model of Faculty Development

CURRICULAR INNOVATION is at the center of the challenges many colleges and universities face as they seek to help students address more successfully than previous generations the complex, multi-faceted, systemic challenges of global climate change, population growth, loss

of biodiversity, environmental justice,

toxic wastes, and food insecurity. The key to meeting these challenges is to inspire faculty creativity, whether the goal is to broaden an environmental approach with the “triple bottom line” of sustainability (economic and social, as well as environmental dimensions), to create sustainability minors or majors, or to integrate sustainability issues across the curriculum. The Piedmont/Ponderosa model is a successful approach to curricular change that has inspired faculty at dozens of colleges and universities around the country.

The Piedmont/Ponderosa model

The Ponderosa Project began in 1995 at Northern Arizona University (NAU), led by Geoffrey Chase, Paul Rowland, and several of their colleagues. Building on the week-long Tufts Environmental Literacy Institute, Chase and Rowland developed a two-day summer workshop, followed by independent time for syllabus work. Over five years, the Ponderosa Project helped nearly 100 faculty revise over 120 courses, and the university went on to

gain national visibility for its environmental education. With help from NAU leaders, the Piedmont Project began at Emory University in 2001. It is now the country’s longest-running curricular development program in sustainability. Over 180 participants have developed or revised over 200 courses with sustainability-related content. The Piedmont Project networks provided important groundwork for the university’s subsequent adoption of rigorous sustainability commitments and goals.

Each summer, the Piedmont Project offers a curricular development program for twenty faculty from all parts of the university. In response to an email call in January, applicants briefly describe a new course or a revised course module that they would like to develop. Applicants chosen to participate in the project commit to attending the workshop, developing their syllabi over the summer, and taking part in an August fieldtrip that includes lunchtime sharing based on the summer’s intellectual journey. To encourage further reflection and cross-fertilization, the project hosts a follow-up dinner for participants in March. A rotating group of two or three faculty leaders facilitates each program.

The Piedmont workshop, like the Ponderosa workshop that preceded it, has a lively rhythm of short presentations by facilitators and resource people, small group discussions to reflect on possible course connections, outdoor activities that also introduce new materials and new pedagogical approaches, large group discussions, and structured exercises. A website of readings and links offers opportunities before the workshop for faculty to learn more

Workshops based on the Piedmont/Ponderosa model provide time for intellectual engagement and reflection, and they contribute to curricular innovation

PEGGY F. BARLETT is Goodrich C. White Professor of Anthropology at Emory University, and GEOFFREY W. CHASE is dean of undergraduate studies at San Diego State University.



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about definitions and issues related to sustainability. Each participant receives \$1,000 when his or her revised syllabus is submitted at the end of the summer, and all the syllabi are posted on the project website. A parallel one-day workshop is offered for ten to fifteen graduate students.

Because of the success of both the Ponderosa and Piedmont Projects, and in response to multiple requests from other schools to help create similar faculty development programs, we began in 2005 to offer twice-yearly workshops to help campus leaders from around the United States (and, eventually, in nine foreign countries) use the Piedmont/Ponderosa model. Sponsored by the Association for the Advancement of Sustainability in Higher Education (AASHE), these workshops enroll thirty to forty-five participants, and to date over 400 individuals from more than 275 institutions have attended. The range of institutions represented in these workshops is extensive, and their individual missions and needs are varied. Nonetheless, similar programs have been implemented successfully at institutions of all types—large and small, public and private, technical and liberal arts, two-year and four-year. As more schools adopt sustainability commitments, such as the American College and University Presidents’ Climate Commitment, academic leaders recognize the need to support faculty as they integrate environmental and sustainability issues into the curriculum. Unless they are to rely entirely on self-education, some form of curricular development program is necessary to accelerate faculty commitment to renewal and change.

**Principles of the
Piedmont/Ponderosa model**

The seven principles described below animate the Piedmont/Ponderosa approach, and their application has proven useful in diverse contexts around the country.

1. Foster creativity. The challenge for sustainability education is to stimulate the desire for change within the broadest possible group of faculty, because top-down administrative mandates often generate faculty resistance. Building intellectual excitement for sustainability education begins with mixing faculty from diverse fields in a context that downplays rank, power, and prestige. Faculty at all career

stages are welcome, and we encourage a range of curricular projects—those centrally and obviously connected to sustainability (such as an environ-

mental ethics course in philosophy, say, or a science lab on “green” chemistry) as well as those further afield (a math course that redesigns ecological footprint calculators, for example, or a nutritional anthropology course that addresses urban food deserts and the impact of HIV).

Workshop presentations make it clear that not only scientific or technological contributions are valued; no one area of the curriculum “owns” sustainability. As a result, creative thinking about different topics or course strategies emerges. To teach finance principles in a business class at Auburn University, for example, the instructor added case examples from sustainability-oriented businesses. New materials can also take the form of new units within an existing course, such as a section on recent trends in environmental rights and rights to livelihood in a political science course on human rights. Chinese language courses at Emory use web-based written and verbal units on wildlife protection and sustainability challenges, and different kinds of writing exercises, from poetry to letter writing, explore the relationship between nature and human society.

2. Emphasize faculty expertise. Unlike workshops that seek to transmit best practices or introduce new materials, the Piedmont/Ponderosa workshops are based on the recognition that the experts in the room are the faculty themselves. Although three to five outside resource people are brought in for half-hour talks to provide new perspectives, the emphasis is on open-ended dialogue with peers, small group discussions, and emerging new connections. Faculty have many years of training, intellectual commitment to teaching, and expertise in their fields, and their experience allows them to discover what will work best for them.

3. Build faculty community. Workshop assignments or small-group tasks also help build new networks and spark new connections. One participant commented, “The intensive contact with other faculty I had never met or knew only vaguely was really powerful and lasting. In fact, knowing that I now know more colleagues on campus is one of the best results of the Piedmont Project.” The peer

learning experiences help faculty establish lasting relationships across the disciplines, which provide opportunities to learn from others beyond the boundaries of the workshop. The experiences also reaffirm that we are all, to some extent, beginners in the process of figuring out how to live more sustainably.

4. *Encourage an interdisciplinary approach.*

Because sustainability cannot be adequately addressed from within a single area of study, the workshops embrace the need for multiple perspectives and collaborative thinking—the very skills our students will need. In this sense, faculty are positioned as both experts and learners. Rather than assuming the instructor is the expert and the sole holder of knowledge, truly interdisciplinary perspectives and interaction across disciplines encourage faculty to embrace the usefulness of bringing together multiple forms and sources of knowledge. An example of the resulting curricular innovations is an agricultural economics course at the University of Idaho that examines ethical questions related to agriculture and natural resource use in the context of different legal frameworks.

While sustainability challenges demand broad linkage among issues and can lead to creative approaches, they can also create some discomfort for faculty who want to have all the answers before they go into the classroom. Education for sustainability often requires that faculty extend their interests into new areas, which can be both rewarding and somewhat disconcerting. A willingness to step outside the “expert” role, into a stance of co-learner with students, is a disposition that must be nurtured and rewarded. Said one faculty member, “One of the best benefits I’ve seen in Piedmont Project is that it provides a forum for people to talk and learn without needing to be ‘the expert.’ It’s a place to actually be safely curious.” Paradoxically, when teachers give up a slice of the expert role, it can support leaps of learning—for both students and faculty.

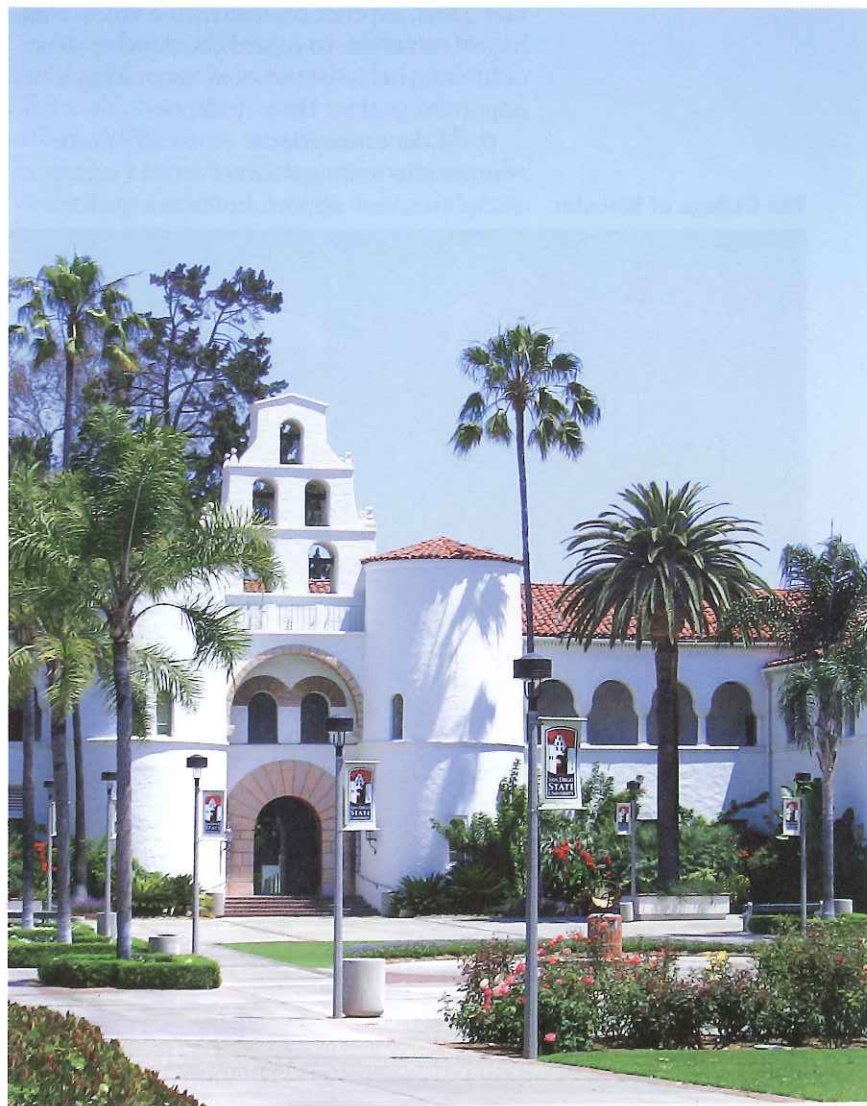
5. *Welcome diverse pedagogical approaches.*

As a result of the workshops, faculty revise their courses in dramatically different ways. Some change content significantly and begin using texts that require students to approach nearly everything in a given course from the perspective of sustainability, while others simply incorporate additional reading assignments. Although changing a few readings in a course

may seem likely to have only a minor impact on learning, experience shows that a few well-chosen readings can galvanize student interest—and lead faculty to add even more readings. Often, faculty who begin by assuming that sustainability issues can be inserted into an existing course ultimately decide to shift the paradigm that orients the course. For instance, in revising the comprehensive nursing curriculum at Emory University, Piedmont Project alumni have integrated an “eco-centric” paradigm, which takes into account the entire environment of health, in place of a curative-medicine, patient-focused, “ego-centric” paradigm.

Experiential learning is a powerful component of sustainability education. Part of what makes experiential learning an enhancement for a workshop is that it produces a shift from an exclusively mental focus to a focus on body

San Diego State University



movement and sensory input. A restorative walk in a nearby garden or woods as part of the workshop experience, for example, can help faculty rediscover the uses of outdoor experiences and empower them to carry out their own fieldtrips. Moreover, spending time in natural settings can open our eyes to the living systems around us and to the effects humans have on them. As one faculty member explained, "Seeing others' reactions of wonder affirmed for me that exposure to the natural environment and means to protect it does inspire others, even well-established scholars, in a way that few other experiences can match." Many faculty have responded to experiential learning in the workshop setting by incorporating such experiences into their courses. Some have even come to regard the development of lifelong habits of personal restoration as an important goal for their students.

6. Make connections. As faculty make connections among themselves and across disciplines, new opportunities emerge for

The College of Wooster



What should a student be able to do with regard to sustainability as a result of his or her academic work at this institution?

team-teaching and guest lectures. Connections are also made between teaching and research, operations, and outreach. Hands-on experience and engagement with outside resource people can help students understand sustainability from new per-

spectives. One Emory course, for example, introduced students to a local Watershed Alliance leader who embodied the scientific knowledge, political savvy, personal persistence, and effectiveness in leadership that the students had read about in class. Students in the class reported that engagement in a creek cleanup had opened their eyes to the local landscape and to the recreational side of community service.

It is also important to give faculty a concrete introduction to the social issues connected to sustainability, a component that is often not well understood. At Northern Arizona University, a geologist discussed predictions that a plan to relieve congestion and expand visitor facilities at the Grand Canyon National Park would cause a downstream waterfall to dry up. The waterfall, he explained, is regarded as sacred by local Native Americans who practice important religious rituals there. This example illustrated the often complex trade-offs of sustainability and led to an open discussion of the dilemmas associated with the plan. Many undergraduate courses use geographic information system mapping to explore toxic waste sites and landfills, thereby adding environmental justice dimensions to course content.

Local and international connections also inform faculty teaching. At the College of the Menominee Nation in Wisconsin, for example, nearly half of all students take an introductory course on sustainable development. The students, whose own tribal commitments include protecting the land, are troubled by accounts of the Ogoni people in Nigeria who struggle with environmental impacts of oil extraction, poverty, and human rights violations. They come to recognize a connection between their personal tank of gas and the suffering of groups in other parts of the world.

7. Focus on learning outcomes. An important part of the workshop's second day is an exercise in which groups of faculty seek common ground in response to the following question: what should a student be able to do

with regard to sustainability as a result of his or her academic work at this institution? The attention to learning outcomes helps shift the focus from an individual teacher's course to the curriculum as a whole. By placing what students can do—not what teachers know—at the center of the educational experience, while also considering sustainability as a complex paradigm that connects to the entire curriculum, we encourage faculty to step outside the boundaries of their own work and to consider the broader purposes of higher education. Typically, workshop participants reach consensus on the view that students, regardless of major or career goals, should have the skills and abilities to take leadership roles in bringing about a more sustainable future. The ensuing discussions reflect an almost palpable sense of relief at being able to talk about the larger purposes of higher education.

Long-term impact

The long-term impact of faculty development programs is rarely measured, but the Piedmont/Ponderosa model has benefited from several longitudinal studies based on interviews and surveys (Barlett 2005, 2008; Barlett and Rapaport 2009). The 2009 survey, conducted five to sixteen years after sustainability-related course development at Tufts and Emory Universities, found that between two and four teaching innovations (new readings, laboratories, assignments, research projects, units or modules, or new course paradigms around sustainability) continued to be adopted by 47 percent of faculty at Emory and 61 percent at Tufts. According to one respondent, the workshop experience “gave me the confidence to create a student project that tasks the students with identifying and then taking concrete action to address some environmental problem.”

Roughly half of the faculty in both survey groups reported changing their courses in order to enable students to go outdoors for research, reflection, observation, or fieldtrips. Many faculty begin with a commitment to change only one course, but find themselves drawn to change other courses as well. The impact on research is also important. Overall, 62 percent of the Emory participants surveyed and 76 percent of the Tufts participants said their research interests had been affected by growing awareness of environmental and sustainability issues.

Adaptation and spread of the model

Many colleges and universities have adapted the Piedmont/Ponderosa model to fit their own unique circumstances. At the University of Southern Maine, for example, the Maine Watersheds Project is in its eighth year, and nearly one-quarter of the faculty have integrated sustainability into their courses, reaching over five thousand students per year. Faculty receive a \$500 stipend as well as home inspections to help reduce energy bills, and they are also eligible for financial support for home insulation. Faculty from nearby colleges are welcomed into the project, and it has benefited from grant support from a Swedish climate change foundation, whose policy experts visit to support the two faculty project chairs. Good connections with statewide journalists have fostered regular media coverage of efforts to “green” the curriculum.

At Auburn University in Alabama, the Fall Line Project is in its fifth year, and sixty-six faculty have now found ways to bring sustainability issues into their courses. For example, a freshman composition course asks students to explore the relationship between human ambition and environmental awareness, drawing upon the film *An Inconvenient Truth* and perspectives from Thomas Jefferson, Ralph Waldo Emerson, Henry David Thoreau, and Edward Abbey. In the art department, a sculpture professor asks students to “create a sculpture that addresses the theme and/or practice of sustainability,” building on essays from a 2005 exhibition at the University of Chicago called “Beyond Green.” The course syllabus presents three different precedents for sustainable art: (1) art that engages with the land or landscape by altering the landscape, placing forms in the landscape, working with processes found in nature, or reclaiming sites; (2) art that incorporates sustainable practices such as recycling; and (3) art that responds to social issues through the production of objects or discourse.

A long-running project at St. Olaf College in Minnesota has partnered with other schools and organizations, sometimes with neighboring Carleton College and also with Luther College and the Associated Colleges of the Midwest conference of schools. In 2012, when it was held in conjunction with the conference of the Upper Midwest Association for Campus Sustainability, the faculty development program

Liberal learning is as important for faculty as it is for students

reflected the further maturation of the sustainability movement nationally. Leaders from St. Olaf and Luther have also led multi-campus workshops for faculty at the University of Wisconsin–River Falls. As at many schools, St. Olaf's efforts have extended to education within the residence halls. Beginning in the fall of 2012, a new program called "SustainAbilities" supports student sustainability representatives in each dorm; sponsors monthly games, talks, and activities; and encourages individual and institutional action for sustainable living on campus—and after graduation.

At Santa Clara University, the Penstemon Project emerged after twenty years of quiet work by a few individuals. With a renewed university-wide commitment to sustainability, the project began to offer annual faculty workshops. The twenty participants in the first year added sustainability components to forty-seven courses. The Penstemon Project then experimented with three one-day workshops, with the goal of reaching fifteen faculty apiece. The initial offer of a stipend of \$500 per day proved to be an inadequate incentive, so project organizers instead offered free iPads to all attendees for a "paper-free" workshop. Ironically, the iPads cost only \$499 each, but they generated more interest than the cash stipends had. A letter from the president invited all faculty to participate, and sixty-seven applied. This group included a much higher percentage of senior faculty, including several department chairs and the president of the faculty senate, and greater participation from the professional colleges (business, engineering, and law). An outgrowth of the Penstemon Project is the Sustainable Living Undergraduate Research Project (SLURP) in which faculty supervise students in directed research related to some aspect of sustainability on campus. SLURP students live together on the same floor of a residence hall, which helps align academic life and residence life.

At the University of Florida, the Prairie Project expanded almost immediately to a parallel program for graduate students, but budget cuts in 2012 shifted attention away from workshops and toward grants for course-related projects. In Idaho, the Palouse Project also shifted from the workshop format to offer "Greening the Curriculum" grants. By the spring of

2011, over fifty courses involving more than forty faculty on four Idaho campuses had received \$57,000 to support curricular development for sustainability.

Institutional structures of support also can emerge from these faculty development efforts—such as the Center for Sustainability Education at Dickinson College, which emerged from the college's Valley and Ridge Project. Many schools have developed minors in sustainability that provide students with a credential on their transcripts. Majors and advanced degrees are also emerging at a few pioneer schools, such as Arizona State University. Especially significant for liberal education is the integration of sustainability into general education, but equally important is the degree to which sustainability supports liberal learning more broadly. At the University of Wisconsin–Oshkosh, the Winnebago Project, an adaptation of the Piedmont/Ponderosa model, continued for four years (from 2008 to 2011) before morphing in response to a general education overhaul. Sustainability is now one of three signature questions that anchor a required fifteen-credit sequence of courses. The approach taken by the Winnebago Project now also guides the workshops that coach faculty from across the university to create new courses for the general education program.

Conclusion

Workshops based on the Piedmont/Ponderosa model offer colleges and universities important opportunities to provide time for intellectual engagement and reflection, and they contribute to curricular innovation. Through such workshops, faculty can reconsider their own teaching and scholarship, their roles in relation to colleagues from other disciplines, and their connections to a larger sense of common purpose. Across the country, at schools large and small, faculty report that this work is deeply meaningful to them.

One of the lessons we have learned from these projects as they have been implemented successfully on multiple campuses is the degree to which liberal learning is as important for faculty as it is for students. Sustainability presents unprecedented challenges—challenges that cannot be met from only one perspective or solved by one set of technological innovations. Instead, sustainability requires an integrative

capacity from all of us. These workshops are powerful reminders that the very same lessons that inform our teaching need to inform workshops for faculty development. Engaging problems, working with others from diverse backgrounds, making connections, and creative thinking are as critical to providing the space for faculty to develop their own approaches to sustainability education as they are to preparing students for the twenty-first century. □

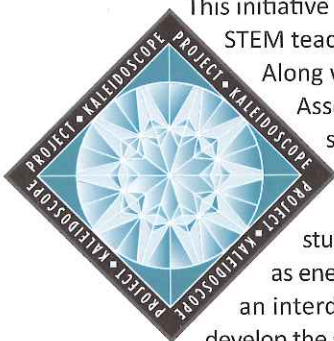
To respond to this article, e-mail liberaled@aacu.org, with the authors' names on the subject line.

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PKAL INITIATIVE

Sustainability Improves Student Learning in STEM (SISL in STEM)



This initiative leverages the professional voices of STEM disciplinary societies to contextualize STEM teaching and learning in terms of twenty-first-century sustainability challenges. Along with Mobilizing STEM Education for a Sustainable Future and the Disciplinary Associations Network for Sustainability, Project Kaleidoscope (PKAL) is enabling and supporting the partner societies in using sustainability to underpin their programs, policies, and member activities. The ultimate aim of this initiative is to build a community of professional societies that are working together to better prepare students for real-world, twenty-first-century "Big Questions" that relate to challenges such as energy, air and water quality, and climate change. Our urgent sustainability challenges offer an interdisciplinary lens through which to engage students in learning while helping them develop the skills they need to contribute to a better society. With funding from the Department of Education's Fund for the Improvement of Postsecondary Education, the initiative will host a convocation at the National Academies in 2013 to widen the circle of involved societies beyond STEM and to plan for sustaining this work in the long term. Following are the initial disciplinary society partners:

- American Association of Physics Teachers
- American Chemical Society
- American Institute of Biological Sciences
- American Psychological Association
- American Society for Engineering Education
- Association for Career and Technical Education
- Mathematical Association of America
- National Association of Biology Teachers
- National Association of Geoscience Teachers
- National Numeracy Network
- Special Interest Group on Computer Science Education

For additional information about the SISL in STEM initiative, please visit www.aacu.org/pkal/sisl.