

Sustainability as a Way of Thinking: Tools for Understanding Sustainability as Critical Inquiry and Achieving Integration Across the Higher Education Curriculum

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Abstract

The concept of sustainability is gaining mainstream currency in U.S. higher education. Currently, the meaning of the term is primarily associated with prescribed practices for individuals and campus operations. Although this association is positive, it limits the potential of the concept to integrate broadly across the curriculum. For sustainability to realize its full transformative potential in higher education and society at large it must transcend an association with prescribed practices and even specialized areas of study. Sustainability must become a pedagogical "big idea," capable of complementing and connecting avenues of inquiry across the academic disciplines that organize and prioritize teaching and learning on campus. If sustainability is employed as a method of examining the relationship between environmental limits and the human values, decisions and actions that shape the future, it will transform not only what we do on campus, but also how we think.

Introduction

College and university campuses in the United States are in the midst of the "sustainability revolution" (Edwards, 2005). The concept of sustainability has become part of mainstream parlance on campus and is undergoing rapid incorporation into the institutional structures of higher education. At this moment of ascendance for sustainability it is prudent to ask just what is associated with the term—what does "sustainability" mean on American campuses now? What is missing from the popular meaning of the term? How might the

meaning of the term be strengthened as the sustainability revolution on American campuses unfolds?

In recent years campus sustainability has been the subject of widespread media coverage and the inspiration for numerous professional associations, activities, and institutional commitments. The *Chronicle of Higher Education* (2006), *Inside Higher Ed* (Powers, 2007) and *University Business* (Ezarik, 2006), each devoted an entire issue to sustainability. Likewise, *Time* (Steptoe, 2007), *Newsweek* (Kuchment, 2007), and *U.S. News and World Report* (Cole, 2007), each featured an article on sustainability amidst their annual coverage of higher education. Within the past two years major U.S. newspapers including the *New York Times* (Deutsch, 2007), *Washington Post* (Eilperin, 2005), *Wall Street Journal* (Alsop, 2006), *Chicago News Tribune* (Benderoff, 2007), and *Los Angeles Times* (Eastman, 2007), each featured stories about campus sustainability efforts. Professional associations such as the University Leaders for a Sustainable Future (ULSF), the Council of Environmental Deans and Directors (CEDD), the Higher Education Associations Sustainability Consortium (HEASC) and the Association for the Advancement of Sustainability in Higher Education (AASHE) have emerged to institutionalize sustainability in higher education. Academic journals such as *The International Journal of Sustainability in Higher Education*, *Sustainability: The Journal of Record*, and *Sustainability: Science, Practice and Policy* are now devoted to advancing sustainability studies. National conferences draw representatives from as many as 300 colleges and universities at events such as Ball State's Greening of the Campus Conference, and the AASHE biennial conference. More than 125 U.S. colleges and university presidents have committed to the incorporation of sustainability on campus by signing the Talloires Declaration. More than one third of the signatory colleges and universities made the declaration in the last four years. The American

College and University Presidents Climate Commitment, drafted in December 2006, drew 398 charter signatories in just ten months.

If the concept of “sustainability” is gaining mainstream currency in U.S. higher education, what meanings are attached to the term? Sustainability is distinct from the Earth Day environmentalism of the 1970s, when Senator Edmund S. Muskie identified an “environmental revolution” primarily focused on new regulatory policy targeting oil, chemical, and other polluting industries (Graham, 1999). In contrast, the sustainability revolution is directed inward, cultivating a sense of individual and organization responsibility to adopt prescribed environmentally beneficial practices such as recycling and energy conservation. Sustainability efforts in higher education have primarily focused on transforming campus operations to incur less of an environmental impact.

The association of sustainability with the adoption of prescribed practices for campus operations is certainly positive, but unnecessarily limited by a poorly defined relationship to the primary mission of higher education—teaching and learning. Sustainability is a concept with tremendous opportunities for the kind of pedagogical applications that usher in broad and enduring social changes. For sustainability to assume its full transformative potential in higher education, the concept must become a “big idea”—an avenue of inquiry that critically examines our role in the world. Big ideas are the generative material of all academic disciplines—the building blocks of the university and its curriculum. Sustainability is a rich concept that can offer big ideas complementary to and overlapping with most, if not all, traditional disciplines.

Sustainability as a ‘Should’—A List of Prescribed Practices

Sustainability is a “should” on U.S. college campuses—the dominant association attached to the term is a list of prescribed practices for individuals, administration and facilities staff to

adopt or feel shame for failing to adopt. These prescribed practices are certainly worthy of encouragement, but they can also constitute an intellectual shortcut around the more complicated and pedagogically rich relationships between natural limits and value systems that underlie human impacts on the environment. One of the functions of higher education is “to remind us of the real meanings of words and the significance of concepts” and to ensure that sustainability does not become so intellectually constrained as to make it a cliché (Cullingford, 2004, p. 18).

Word association exercises conducted with environmental studies students and environmentally committed faculty illustrate the association of prescribed practices with the term sustainability. Students in eight different environmental studies classes (N=107) ranging from introductory courses to capstone seminars at the University of Puget Sound were asked to write the first word or phrase they associated with sustainability. Nearly three quarters of the students (73%) wrote the word “recycling.” Many of the remaining students (17%) wrote a word or phrase indicating another prescribed practice such as “composting,” “buying organic,” or “reusable coffee mug,” while another five percent wrote down an environmental problem like “global warming,” or “loss of biodiversity.” Only five percent of the students wrote down a bigger idea such as “balance,” or “systems,” “economics and environment,” or “future generations.” The identical exercise performed by faculty at workshops (N=48) on sustainability at this university produced similar results, with 86 percent writing “recycling” or another prescribed practice. Only eight percent of the faculty responses indicated associations to a bigger idea such as “conservation,” “systems thinking,” or “precautionary principle.” Each student and faculty respondent was also asked to write freely for one minute about sustainability. The majority of these writings by both students and faculty (86% and 78% respectively) centered

on the problem of how best to implement some set of practices or how to get people on campus to adopt certain practices.

These results are admittedly the product of a small, non-random sample and an unsophisticated instrument. However, they do align with results from survey research that indicate students most frequently articulate sustainability as “light green” actions such as purchasing habits and recycling (Kagawa, 2007). The word association results provide an example of the popular meaning ascribed to the term sustainability in higher education—a list of things one should do. The student and faculty responses do not indicate that sustainability is gaining ground as a way of critically thinking about our individual and collective role in the world, as a way of making visible our impacts on ecological, economic, and social systems, as a way of informing our individual and collective decisions.

It is difficult to see how prescriptive lists of behaviors can integrate into the educational mission of colleges and universities. This is the primary limiting factor to the “sustainability revolution” in higher education. Faculty and administrators at a recent national workshop on greening the curriculum came to the conclusion that the major barrier to the diffusion of sustainability across a broad range of courses and disciplines was the perception that sustainability is not academically rich or rigorous enough to warrant inclusion in course work, and is perhaps best left to student clubs and facilities staff members.ⁱ Preaching to students and others about what they should do—does not fit the way most faculty members define the purpose of their teaching.

Sustainability as a Focus on Campus Operations

The fact that “sustainability” on campus is primarily associated with prescribed practices rather than an academic approach is a reflection of the imbalance between efforts devoted to

campus operations versus those dedicated to greening the curriculum. This imbalance is evident in specialized and popular communications on campus sustainability, topics of study presented at national sustainability conferences, and various indicator schemes designed to measure the implementation of campus sustainability.

Between 2006 and 2007 the AASHE Bulletin, posted a total of 1208 announcements to “publicize campus sustainability news.” Just six percent of these postings dealt with teaching and learning sustainability, of which 89% concerned the creation of specialized institutes or programs on the environment. Only eight postings dealt directly with broad-based curriculum development, course content, teaching or education. The primary news communicated in the postings dealt with campus energy conservation, green buildings, alternative transportation, and recycling. Similarly, when students, faculty and staff share ideas on campus sustainability at national conferences, the primary focus is on campus operations.

Insert Table 1 About Here

As table 1 indicates, the major conferences on sustainability in higher education over the past five years rarely devoted as much as one fifth of the total presentation venues to teaching and learning. Perhaps this imbalance within the campus sustainability community is why stories in the popular press feature operational changes like green power, biodiesel buses, and organic food purchases rather than broad-based curriculum development (Cole, 2007; Deutsch, 2007; Eilpein, 2005; Kuchment, 2007).

“Green” rankings of U.S. colleges and universities focus almost exclusively on campus operations. *Sierra* magazine profiled ten schools with a total of 36 sustainability accomplishments (Hattam, 2007). Of these, just two addressed teaching and learning. *Grist* magazine recently profiled 20 colleges and universities highlighting 64 campus achievements

(Grist 2007). Of the eight achievements in teaching and learning, only three attempted to integrate sustainability broadly into the curriculum, while the other five were newly created programs in environmental studies. More sophisticated assessment instruments developed to track sustainability implementation consider curriculum development as, at best, just one among scores of indicators. Table 2 displays the small percentage of indicators devoted to teaching in learning on such assessment instruments—not one of instruments devotes as much as ten percent of the indicators to teaching and learning.

Insert Table 2 About Here

To the extent that sustainability is measured in the curriculum at all, it is too often assessed in unsatisfying ways. The Campus Ecology Guide has one of the highest percentage of indicators devoted to teaching and learning, yet just one of the questions on this instrument assesses education outside programs in environmental studies (Smith, 1993). Other approaches even attempt to assess sustainability in the curriculum by simply tallying whether or not students take a sustainability pledge, survey, or environmental literacy test at graduation; and whether or not there is a required course on sustainability.

The point of this analysis is not to disparage efforts to measure, share, or publicize campus sustainability, but to highlight the under representation of broad-based curriculum greening in higher education. If the meaning of sustainability in higher education is a reflection of what is measured, presented at professional conferences, and communicated through specialized and popular media outlets, then the term is predominantly associated with a set of things to do rather than a way to think. “Doing” sustainability with prescribed practices for individuals and campus operations will undoubtedly have a positive environmental impact. As a \$315 billion sector of the economy, colleges and universities will also make a positive impact on

the market for sustainable products and business practices. And, it is important to note that students engaged in the transformation of campus operations will learn applied lessons that may translate into sustainable practices long after graduation. As a recent feature article in *Newsweek* reported, “The university presidents hope that even students who don't pursue increasingly popular majors in environmental studies will learn simply from being on a green campus, living in green buildings, eating sustainable food and absorbing everyday messages of conservation” (Underwood, 2007).

Sustainability as a Specialization

But this hope is not enough. Nor is it enough to inject sustainability into the curriculum solely through specialized programs in environmental studies. If the sustainability efforts in higher education are limited to campus operations and specialized programs, rather than extending broadly into the higher education curriculum, the “sustainability revolution” on campus will miss an opportunity to make its greatest environmental impact on the world. Anthony Cortese (1992) pointed out long ago that “Colleges, universities and professional schools educate most of the people who develop and manage society's institutions and train the teachers who educate children from the kindergarten through high school, vocational schools and community colleges” (p. 1108). Similarly, David Orr (1994) has argued that environmental destruction in recent generations has been largely the result of decisions made by highly educated people. The largest impact of a college or university is through the lives of its graduates. The primary campus operation is education, and the vast majority of this education takes place within traditional academic disciplines. Consequently, a “sustainability revolution” that bypasses teaching and learning broadly in the traditional disciplines will fail to fully transform higher education.

The shortcomings of traditional academic disciplines and “disciplinary thinking” for environmental education have been well chronicled (M’Gonigle & Starke, 2006). While some colleges and universities have eschewed academic disciplines altogether, most have not, and it is foolish to attempt institutional transformation in higher education by ignoring the disciplines or to merely “tack on another outshred to the rambling curricular edifice of Babel and call it ‘environmental studies’” (Orr, 1994, p. 95). Arizona State University President Michael Crow describes the field of “sustainability science” as a “new box,” created “because the old boxes [disciplines] are just too limited.” He has also called for “a course in sustainability for everyone in the university” (Cole, 2007). These are innovative efforts, but they miss the significance of traditional disciplines in two ways. First, the “old boxes” Crow mentions comprise the organizational infrastructure of most colleges and universities. Traditional disciplines, as represented in departments, create the organizational culture and establish the incentives that govern the professional lives of faculty members (Creighton, 1999; Birnbaum, 1988; Tagg, 2003). Second, traditional disciplines organize and prioritize the knowledge and understanding most students experience in higher education. If the goal is to engage as many faculty and students as possible in teaching and learning sustainability it would be best to bring sustainability into all disciplines as a common idea that opens up the “old boxes” to each other. As Cortese wrote “the environment should not be solely a special topic or a subject for professionals who will work on environmental problems. . . . it must be a fully integrated and prominent part of *all* education” (Cortese, 1992, p. 1109).

This is an ambitious goal. Until sustainability is conceptualized as something complex, interesting, and powerful enough to match the educational mission of faculty within their disciplines it will have no place in more than a few specialized courses. Academic disciplines

are not merely constructed around topics. They are designed to “cultivate powers of the mind” that can be applied to any number of topics (Levine, 2006, p. 233), and they coalesce around paradigms with commonly understood methods, concepts, themes or theories, and avenues of inquiry (Kuhn, 1970). Similarly, the best teachers *apply* content and topics to develop transferable skills (Weimer, 2002, p. 51), and cultivate “habits of mind” that enable students to “understand, apply, analyze, synthesize, and evaluate evidence and conclusions” (Bain, 2004, pp. 85 & 115). For sustainability to achieve broad integration with the higher education curriculum it must come to be associated with “big ideas,” rich enough to complement the intellectual priorities within academic disciplines.

Sustainability as a ‘Big Idea’

Big ideas are the concepts, themes, debates, paradoxes, questions, theories, and/or principles that are central to a course of study (Wiggins and McTigue, 2005). They are “linch pins” that meaningfully connect a multitude of “content knowledge” and apply in diverse contexts. To discover the big ideas that shape a course or class session in a discipline, a faculty member need only ask “what is it that I hope my students will remember and be able to apply long after they have forgotten specific bits of factual information?” If sustainability comes to be associated with the big ideas faculty think of when they ask this formative question it will complement and enrich the most important goals of the higher education curriculum as it already exists.

The concept of sustainability is pedagogically rich enough to satisfy this aim. Whether we consider the most general definition of sustainability, the more specialized definitions used in economics, or the definition created by the United Nations Commission on Environment and Development, the term can be broken into two elements—recognition of limits and vision for the

future. Probing these two elements unlocks several big ideas. The military origin of the term “sustainable,” means “capable of being defended” (Senge et al. 2006, 44). There is a vision of the future, with the implication that a defense may be needed and the object to be defended must be determined. There is also recognition of limits beyond which the thing in question can no longer be defended. Later, to be “sustainable” in economic terms was to use a resource without diminishing or permanently damaging its supply. This usage of the term recognizes physical limits affecting stocks of resources, while projecting future values of the resources in question. The most common definition of “sustainable” in environmental circles is drawn from the United Nations Commission on Environment and Development description of sustainable development as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” This definition also recognizes limits affecting the ability to meet certain needs, and projects values for such needs in the future. Edwards’ (2005) content analysis of numerous contemporary statements of mission and principles by organizations working for sustainability identifies seven common themes including respect for limits, and intergenerational perspective, thus representing the elements of limits and future vision. The remaining five themes he identifies each attempt to balance these two fundamental elements of sustainability (p. 128).

The Idea of Limits

The limits element within sustainability is central to big ideas in both the natural and social sciences. For example, the second law of thermodynamics is one of the most important big ideas in natural science. The law recognizes that with each successive energy transfer, less energy is available to do work. The successive loss of energy and disorder is called entropy. This is a fundamental limiting principle in our universe, and therefore also central to an

understanding of sustainability—each use of energy comes with a price, a diminishment of useful energy for the future. Similarly, the principle of conservation of matter is also central to both natural science and sustainability. This principle states that matter is neither created nor destroyed, but transformed and combined in different ways. Matter does not disappear, everything goes somewhere—there is no “away.”

A string of additional ideas in the natural sciences follow from these limiting principles and are inspired by essential questions such as: where do things come from? where do they go to? why? with what do they interact? to what effect? how do processes work? Examinations of energy flow, nutrient cycles, and the properties of biological communities including productivity, abundance, diversity, complexity and connectedness, resilience and stability, community structure and change all follow from these powerful questions at the heart of the natural sciences and sustainability.

In the social sciences, economics is most often associated with limits. Many economic texts boil the discipline down to the idea that “there is no such thing as a free lunch.” However, the dominant focus of limits in economics has been on scarcity of resources, and the realization that scarcity can be “overcome” with the market driven development of new technology and/or replacement resources, allowing economic growth to continue indefinitely in an open system. Yet the big ideas from natural science mentioned above reveal limits besides scarcity that ensure the economists’ lunch is never free. The second law of thermodynamics and the principle of conservation of matter describe a closed system where each energy transfer comes at a cost and each transformation of matter must occupy a space. Big ideas associated with the properties of ecosystems highlight the fact that resources (and their use) do not stand in isolation, but are instead engaged in dynamic interactions. If one is to comprehensively examine the costs and

benefits of resource use, the examination must extend beyond the stock of the resource in question. This interesting collision between limiting principles in the natural sciences and economics reveals that there are also limits inherent in the application of various forms of social, economic, and political organization, ripe with pedagogical opportunities in disciplines ranging from history, anthropology and geology to political science and sociology. An examination of the way in which organizational principles within cultures, societies, and states shape and are shaped by limits in the physical environment would not be new territory in any of these fields—thus there is a bridge between sustainability and avenues of inquiry already prioritized in these disciplines.

The Idea of a Future Vision Integrated with Limits

The future element within sustainability is value laden. As Egan *et al.* (2004) write “the meaning of the term is a function of the values of the social actors who deploy the term” (p. 1). This is what makes sustainability a contestable concept (Jacobs, 1991). One that Norton (2005) argues can at best be defined “schematically,” with a “broad commitment to future-oriented living,” but must be further specified when communities “choose what is important to protect” (pp. 360 & 364). The examination of contests over values is central to the humanities and social sciences. The contestable future vision of sustainability engages normative academic approaches with questions such as: what should be sustained? how should we value and treat the environment? what meaning should we ascribe to terms like “environment,” “nature,” “wilderness,” “health,” and “justice” and what do these meanings say about our human experience? what qualifies as an environmental “good” or “bad,” and how should these be distributed? What is environmentally just? Questions such as these share avenues of inquiry with philosophy, religious studies, literature and the arts (Egan *et al.* 2004).

Descriptive and explanatory approaches also help to engage the future element within sustainability by posing questions such as: how have past values regarding the environment shaped human behavior, societies and environmental changes over time? how do values and behaviors regarding the environment compare across cultures and to what effect? how do competing values shape individual environmental behavior? how and why are individual and collective decisions affecting the environment made and what are the implications? How might one influence individual and/or collective values, decisions and actions affecting the environment? These questions complement areas of inquiry within numerous disciplines including: history, as the examination of factors causing changes in human experience over time; anthropology and sociology as the comparative study of cultures and societies; economics, as the critical appraisal of value tradeoffs; psychology, as the study of human behavior and mental processes; and political science, as the study of the authoritative allocation of values.

Ideally, the two elements of sustainability are brought together revealing the biggest idea—interconnectedness across space and time. Understanding sustainability as a big idea involves the study of what matters for the future. Such a study necessitates an understanding of the limiting context shaping that future and the interaction of those limits with the normative choices regarding what matters, the human portrayal of what matters, the measurement and assessment of what matters, and strategies to protect what matters. This is a higher education suitable for adoption across the disciplines from the natural sciences to the humanities, social sciences and applied disciplines such as business, education, law and engineering. Disciplines in all of these fields work to understand temporal and/or spatial scale—how actions in one place and time affect conditions and actions in other places and times. The best teachers in higher

education aim to instill in their students the necessary skills to trace processes in and across systems, and to examine, explain, reflect, and act on the implications of what they find.

Inspiring faculty to engage sustainability as a big idea can be as simple as the completion of a short planning exercise. At a summer workshop, faculty in ten different disciplinary teams at the University of Puget Sound completed the following three-step exercise in two hours: 1. identify some big ideas in a discipline or class within the discipline, 2. identify a linkage between one or more of these ideas with the elements of sustainability, 3. design a class component (reading, assignment, discussion, project, or entire class) that integrates the discipline with sustainability.

Examples of Curriculum Planning for Sustainability

Two hours of work by the disciplinary teams produced some promising results. The history team connected sustainability to a study of how the concept of “American” has been contested and changed since 1877. Students compare the oral history of a Sioux medicine man and his relationship to the environment, with the writings of Andrew Carnegie and John D. Rockefeller on industrialism and capitalism. The readings are used to foster a discussion about how competing values shape individual environmental behavior. This discussion then informs a study of the environmental, economic, and social hardships of the Dust Bowl and Great Depression, examining the interaction of human values and actions with the environment. The English team brought sustainability into an examination of how writing and interpreting texts is shaped by interpretive lenses and a particular context. These professors built a class component around a number of texts on sustainability from various media outlets to examine how “what matters,” or what should be sustained is interpreted, portrayed, and provided meaning. The biology team developed a class project in an introductory class that engages the students in a

critical analysis of fisheries policy and seafood consumption as they relate to life cycles and diversity. The business team developed a class module that helps students apply principles of marketing to encourage the adoption of sustainable practices. There are now demonstration class components such as these for nearly half of the disciplines on campus. Each summer a faculty workshop is held to expand applications of sustainability to ever more disciplines.

Many promising initiatives such as this are working to integrate sustainability broadly with the higher education curriculum. The Curriculum for the Bioregion project in Washington State is working with biology and English professors in the Pacific Northwest to match big ideas in these disciplines with sustainability in ways that can be incorporated into general education courses. This project is also hosting a training institute for teams of faculty members from different colleges and universities to develop curriculum greening strategies. AASHE offers “sustainability across the curriculum leadership workshops” for faculty interested in learning from the curriculum development successes of Emory and Northern Arizona University (Barlett, 2004; Chase and Rowland, 2004). Green Mountain College and St. Olaf College have worked sustainability into the core curriculum as a central theme on which all disciplines can draw. The World Resources Institute is working to incorporate sustainability into business school curricula by publishing curriculum ideas and offering faculty training events (Bunch, 2002). Similar efforts are underway for engineering programs (Chau, 2007). The Disciplinary Associations Network for Sustainability has convened meetings of more than twenty disciplinary associations ranging from the American Academy of Religion to the American Chemical Society to explore how each discipline can integrate sustainability into curricula, standards, and tenure requirements. Debra Rowe, President of the U.S. Partnership for Education for Sustainable

Development is leading an ambitious campaign to encourage publishers to incorporate sustainability into textbooks (Rowe, 2007).

Conclusion

U.S. colleges and universities have made great strides in sparking improvements to the environmental impacts of campus operations and familiarizing all campus users with the term sustainability. However, the dominant meanings associated with this term have unnecessarily limited its transformative potential. Sustainability on campus must come to mean more than a list of prescribed practices for individuals and campus operations or a newly specialized area of study, if it is to be broadly integrated with the higher education curriculum. Sustainability must become a big idea on campus, associated with the concepts, themes, debates, paradoxes, questions, theories, and/or principles that complement and connect the overarching avenues of inquiry of the traditional academic disciplines, which organize and prioritize knowledge in higher education. Sustainability can be an exploration of the interaction between environmental limits, and the values undergirding human visions for the future. In this way the sustainability revolution will not only transform what we do on campus, but also how we think.

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Tables

Table 1: Percentage of Conference Presentations Devoted to Teaching and Learning

Sustainability Conference	Total Number of Presentation Venues	Percentage Devoted to Teaching and Learning
AASHE 2006	268	20
Greening the Campus 2007	74	18
North American Conference on Sustainability in Higher Education 2004	174	18
Greening the Campus 2005	83	17
Greening the Campus 2003	89	16

Table 2: Percentage of Indicators Devoted to Teaching and Learning in Campus Sustainability Assessment Instruments

Assessment Instrument	Total Number of Indicators or Fields	Percent Devoted to Teaching and Learning
Campus Ecology Guide	88	9
Sustainability Assessment Questionnaire	55	9
Campus Sustainability Assessment Project	130	6
Comparative Sustainability Assessment Framework	343	6
Sustainability Pathways Toolkit	40	5

Endnotes

ⁱ This observation was made by a small group working together at the AASHE “Sustainability Across the Curriculum Leadership Workshop,” held at San Diego State University” 12-13 July 2007.