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Higher Education: Good for the Planet?

Reports from researchers at institutions of higher education indicate that humans have put our future on Earth at risk. Atmospheric chemists note steady rises in greenhouse gases; soil scientists report that soils in many areas are eroding more rapidly than they are forming; human physiologists cite increases in harmful foreign chemicals in our bodies; ecologists register the impoverishment of ecosystems and the extinction of species; sociologists observe the breakdown of families and deterioration of communities; and philosophers and theologians discuss the dissolution of moral principles and the alienation of humans from the natural world.

It is clear that humans face an urgent challenge to learn how to live in a manner that does not endanger the Earth. Even as universities teach students that the planet's vital signs are in decline, graduates leave college as well-trained consumers who generally contribute to, rather than mitigate, the growing array of environmental and social problems now plaguing the earth. This paper rethinks the university's role in light of our current global dilemma, suggesting a way in which universities can contribute a brighter future.

The antidote: sustainability

We contend that the concept of sustainability (meeting present needs without compromising the ability of future generations to meet their needs) should become a central organizing idea for higher education. Little mentioned by the popular press, a sustainability revolution is simmering below the surface of contemporary life. Examples: new companies offering solar technologies; farmers who commit to sustainable organic farming practices; builders who design highly efficient structures requiring little energy to heat and cool; cities that discourage the use of inefficient forms of transportation while setting a priority to promote forms that are environmentally benign; and businesses that are as concerned with treating their employees justly and protecting the environment as they are with growth and profit maximization.

Sustainability may be understood in reference to five core principles:

- *Respect life.* Avoid actions that harm the integrity, stability, and beauty of the biotic community upon which we all depend.
- *Live within limits.* Recognize that our natural resources are finite endowments to be used with care and prudence at a rate consonant with their capacity for regeneration.
- *Value the local.* Create strong regional economies that respect the natural and cultural components of our local landscape and community.
- *Account for full costs.* Recognize that a product's price should reflect the burden it places on the environment and society. Confine purchases to products that promote sustainable practices.

Table 1. Sustainability principles in the U.S. consumption-based culture.

Principle	Consumption-based culture	Sustainability-based culture
Respect life	Human destiny is to control and dominate the planet; earth regarded as a resource pool to be exploited.	Humans understand themselves as embedded in and interconnected with the earth's ecosystems.
Live within limits	There are no limits to growth and consumption; resource supplies are infinite.	There are limits to growth and consumption; resource supplies are finite.
Value the local	Emphasis on the global economy and mass culture.	Emphasis on the local economy, face-to-face interaction, and community culture.
Account for full costs	Most decisions based on narrow economic concerns; focus on present generation only.	Decisions are based on full-cost accounting; concern for future generations.
Share power	Power and wealth are concentrated; citizenry passive and without significant influence.	Power and wealth are shared; citizenry empowered and active.

• *Share power.* Acknowledge that people, biota, and the physical world are interconnected; problems are best solved when all components of the community are given equal consideration.

The present U.S. consumer-based growth culture violates each of these principles to varying degrees (Table 1). It fails to respect life, often regarding the natural world as raw material for human ends. It fails to live within limits; instead it seems to view resources as infinite and emphasizes ever-increasing consumption. It fails to account for full costs, often selling things for less at the expense of workers' rights, the environment, and future generations. It often damages local economies, traditions, and cultures in the rush for global competitiveness and short-term profits. This culture fails to share power in any meaningful way, generally regarding citizens as mere "consumers" while increasing the centralization of power and decision making.

Although the concept of sustainability may be relatively new, the substance of its principles is already deeply embedded in human values. What is respect for life but an appreciation for the intricacy and diversity of the natural world? Living within limits embodies traditional values of frugality and thrift. Full-cost accounting calls people to remember the value of honesty and complete disclosure. Respect for what is local honors history and traditions, and sharing power should be what democracy is all about.

Sustainable practices at Penn State: a case study

Recently a group of professors and students at Penn State examined their university through the lens of sustainability in an effort to make its ecological and societal impacts more visible. They visited the landfill that receives Penn State's trash, journeyed to open-pit mines that provide Penn State's coal, and walked through the well fields supplying the campus with water. The team looked into dumpsters to see what Penn State was throwing away, traced the sources of the food served in University dining halls, studied land transactions at the county deeds office, conducted botanical surveys on the campus grounds, administered questionnaires to characterize the ecological literacy of graduating seniors, and much more.

The results

• Each Penn Stater (i.e., full-time students, faculty, and staff) consumes about 7,000 pounds of coal per year, resulting in the emissions of about 10 tons of carbon dioxide per person.

• Students use about 60 gallons of water per person per day: 40 in showers, 10 in toilet flushing, 3 in the sink, and 7 in clothes washing.

• The typical Penn Stater uses about 90 pounds of paper per year; a plot of forest measuring about 55 feet on a side would be necessary to sustainably supply each person's paper needs.

• The food ingredients consumed in University dining halls travel, on average, almost 1000 miles between the last distribution point and the University. The amount of energy required to process, package, and ship this food is many times greater than the energy contained in the food itself.

• The University produces about 240,000 pounds of hazardous and infectious waste each year (equivalent to seven pounds per student); the burden of this waste is put on distant communities far from PSU's own backyard.

• Forty percent of graduating seniors do not know the world's population to the nearest billion; 63% are unable to name one law that protects the environment; 43% are not aware that acid rain is a common phenomenon in Pennsylvania; 40% are unable to name even two tree types on campus.

The group compiled data for a total of 34 sustainability indicators <www.bio.psu.edu/indicators>. The data often indicated a movement toward or away from sustainable practices. For example, per capita energy use at Penn State is higher today than a decade ago, while the amount of solid waste that is recycled has increased in recent years.

Overall, the study depicted an institution whose performance, measured by sustainability indicators, was merely mediocre. Penn State's practices depart little from the U.S. status quo. For category after category (energy, food, materials, transportation, buildings, decision making), Penn State seemed locked in to the assumption that it can continue with business as usual, growing and consuming without worry. Consequently, its graduates, like those of most other universities, leave with little sense of their ecological identity and are more likely to contribute to the growing planetary crisis than to its solution.

Like Penn State, most universities treat their physical resources with a "frontier" mentality: they seem to imagine that energy and water are forever abundant, goods forever disposable, and land forever available. This conveys a powerful message to students. For example, the prolific consumption of materials teaches that the Earth can supply our needs, no matter how grand. The unrestrained consumption of fossil fuels and resulting release of greenhouse gases implies that the transformation of our atmosphere is really not something to worry much about. Food purchased from all over the world suggests that we need not concern ourselves with how or where our food is produced, or with the loss of farmland at home. Highly manicured campus grounds convey the lesson that we need to control and manage nature. And dumpsters bulging with refuse mistakenly assure students that there is always an "away" where things can be thrown. In sum, our universities reinforce the dominant cultural message that it is sufficient only to learn about ecological deterioration, without having to do anything about it (Orr 1994).

Paradoxically, institutions designed to provide students and faculty with freedom to question prevailing values and practices and to reflect critically on the culture in which they live behave increasingly like corporations: task-oriented, economistic, and focused on generating revenue through growth (Solomons and Solomons 1993). But universities are not businesses. They have a huge advantage over companies. They can, if they choose, act on a vision that is not hobbled by bottom-line thinking. They can, if they exercise vision and courage, leverage society into a sustainable future.

Because their mission is education, some may seek to excuse colleges and universities from the call to embrace a new constitution grounded in citizenship and sustainability. But what is education for, if not to play a fundamental role in how our society moves forward to deal with its many challenges? David Orr puts it this way: "The planetary emergency unfolding around us is, first and foremost ... a crisis of thought, values, perceptions, ideas and judgments. In other words, it is a crisis of mind, which makes it a crisis of those institutions which purport to improve minds."

Integrating sustainability into higher education: first steps

Our contention is that sustainability, a whole-systems framework within which a broad range of environmental, technological, and cultural problems can be researched, addressed, and solved, should be an important central organizing idea for higher education.

During the last several decades, environmental awareness has been slowly spreading through our colleges and universities. Over 250 schools have now signed the Talloires Declaration, a document drafted as part of the 1992 United Nations Earth Summit that pledges signatories to promoting environmental education and ecological literacy. Scores of other schools have committed to their own "greening" initiatives, from environmental audits and the creation of recycling programs to the infusion of sustainabil-ity issues into curricula (Smith 1993, Keniry 1995, Creighton 1998). Here are examples of sustainability initiatives at U.S. colleges and universities:

Energy. Some universities are showing that it is possible to fashion energy systems based on renewable resources and energy conservation. For example, Carleton University in Ottawa, Canada, has launched a $20 million energy conservation program that includes the use of geothermal systems to heat buildings in winter. And the University of Rochester has embarked on a program to reduce energy consumption by more than half without affecting university program delivery. So far, Rochester has been successful in reducing energy consumption despite the addition of two new buildings and more intensive use of existing facilities.

Water. Some universities are making efforts to increase the sustainability of their water systems by reducing water use. For example, California State University/Northridge has adopted a combination of measures—including retrofitting all showers, flush valves, and faucets with water-saving devices, posting water conservation information throughout campus, and using reclaimed water for landscaping purposes—aimed at reducing water consumption by 25% (Smith 1993). Other universities have focused on waste water: Penn State shunts its treated waste water back to the land through a spray irrigation system rather than discharging it into the local coldwater stream.

Food. A sustainable food system has a strong regional orientation and is grounded in sound farming practices. Hendrix College in Arkansas is a pioneer in this regard. Hendrix requires that food served in its cafeterias: (1) be local when possible, (2) be grown using sustainable agricultural methods, (3) use minimal energy, (4) leave marginal land out of production, and (5) involve the humane treatment of animals. Hendrix aims to purchase at least 50% of its food from Arkansas. Following the lead of Hendrix College, both Carleton and Saint Olaf Colleges in Minnesota are also redesigning their food systems. Even in their more northerly latitude, close to half of their food purchases could be local (Bakko and Woodwell 1992).

Buildings. Sustainable buildings are safe, energy efficient, aesthetically pleasing, and relatively harmless in their construction and use. The new residence hall at Northland College in Wisconsin contains community and classroom space, passive solar design, supplemental photovoltaic and wind generators for electricity, composting toilets, low-volume showers, and energy-efficient appliances and lighting (Koziol et al. 1997). Northland is not alone. Oberlin College in Ohio is constructing a "green" environmental science building that will be a net producer of energy (Orr 1997).

Campus grounds. Many universities have begun the process of harmonizing their humanly constructed landscapes with nature. Connecticut College has committed one-third of its property to serve as an arboretum devoted to the propagation of native plants. Besides providing a source of native seeds and plants for regional restoration projects, the arboretum is devoted to developing a regional identity. Nebraska Wesleyan University, also recognizing the value of native vegetation, has begun replanting campus zones disturbed by construction or other activity with native grasses and wildflowers.

Money management. On the investment front, some universities now pass their investment decisions through a "screen" to eliminate companies that treat employees unjustly, produce dangerous products, or pollute the environment, all of which undermine sustainability. For example, Harvard, Johns Hopkins, Tufts, and Northwestern do not invest in companies that manufacture tobacco products. Tufts includes manufacturers of alcoholic beverages in its "screen."

Deep integration: the university as a moral beacon

These examples represent a small beginning, but much more is required. Our universities have the knowledge and moral authority to chart the way to a sustainable future. They could lead the way by making bold commitments to such things as:

- The elimination of fossil fuel use in favor of nonpolluting, renewable energy sources. There is a near consensus among scientists that emissions from the burning of fossil fuels are leading to the warming of the earth, with possible disastrous consequences. The federal government has pledged to reduce U.S. emissions to below 1990 levels over the next decade, but there is little evidence of serious commitment undergirding this pledge. In the absence of national leadership, American universities could set an example by voluntarily reducing their energy use and greenhouse gas emissions. Imagine a university that declared it was deeply committed to achieving total fossil fuel independence, not today or tomorrow, but incrementally, in a relentless sequence of "green" steps over the next 50 years.

- The total elimination of the concept of "waste" from campuses. Exploding consumption has become the defining characteristic of our times. Universities continually receive materials from distant sources, consume these materials, and then shunt enormous quantities of waste to distant landfills and incinerators. Materials move from cradle to grave along linear—nonsustainable—pathways. But imagine a university declaring that its goal was to move, step-by-step, toward becoming a "zero-waste" university. Such a university might begin by announcing that it would, when given the choice, only purchase products from companies that endorse the Valdez Principles (i.e., companies that publicly commit to waste reduction, wise use of energy, sustainable use of natural resources, etc.). Such a model university might also endorse the concept of "Extended Producer Responsibility" by announcing that it would give special preference to companies that assumed responsibility for taking back (and recycling) their products at the end of their useful life. Consider how university students, faculty, and staff would feel, having the privilege to be part of such a sensible and noble endeavor.

- The adoption of "sustainability ethics" in decision making. Imagine a university where administrators and trustees passed all decisions through "sustainability filters" by asking questions such as: Does this decision lead to a respect for the biota and natural processes? Does it account for full costs (or are there subtle forms of environmental and/or human exploitation that are not accounted for)? Does the decision recognize and respect natural limits to growth? Does it enhance civic responsibility and the sharing of power? The use of such "sustainability" filters would help universities to address the ethics of heretofore often ignored issues, such as the appropriateness of military research on campus, or the investment of university monies in corporations with a history of environmental and/or human exploitation.

In sum, our universities are much too timid. They contain enormous brain power, but a dearth of vision, courage, and moral responsibility. By and large, they seem to be more concerned about "training" students to fit into a status quo world that is unraveling, rather than forthrightly addressing the causes of this "unraveling" and offering our young people a sense of hope and purpose. Our universities have great leverage but they fail to use it in creative and exciting ways. This, of course, need not be so.

The ecological crisis is upon us because we never imagined that there were limits to the Earth's bounty and resilience. We now know that such limits exist, and we are faced with a grand challenge: How do we live sustainably? Universities could provide the model by serving as loci of hope and transformation—"do tanks" for thinkers. If ever there was an interdisciplinary problem, this is it. It will require not just our scientists and engineers, but also sociologists, geographers, anthropologists, philosophers, economists, artists, and word-smiths, working across disciplines with students in an ennobling endeavor.

We spent much of the past century showing how clever we could be; we will only flourish in the present century if we can muster great wisdom. At a time when we desperately need our universities to offer vision and serve

as models of integrity and wisdom, may they grasp the opportunity to light the way.

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