

**AVOIDING THE “LESSON OF HYPOCRISY”:  
THE ROLE OF CAMPUS PRACTICE IN EDUCATION FOR SUSTAINABILITY**

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A university strategy in support of creating a more prosperous and sustainable society should focus on changing the mind-sets of the faculty, staff, students and partners in their research and community service endeavors, and not just the problem-sets in the curriculum. It must take a more comprehensive view of how students and faculty learn to think and behave, and how to promote the changes necessary to educate citizens with the knowledge, commitment and tools to make their communities and the world more sustainable. In this essay we argue that these strategies should reinforce learning in the classroom with discovery in the research laboratory and practice in the management of the campus. Further, we believe that campus-oriented studies and practices are essential to effecting the changes in higher education we desire. The author David Orr, in his book, *Ecological Literacy*, presents an excellent argument for the incorporation of the campus into our educational agenda. He says,

“...students learn that it is sufficient only to learn about injustice and ecological deterioration without having to do much about them, which is to say, the lesson of hypocrisy. They hear that the vital signs of the planet are in decline without learning to question the de facto energy, food, materials, and waste policies of the very institution that presumes to induct them into responsible adulthood.”<sup>(1)</sup>

Our worldviews, or mind-sets, are shaped by what we read, whom we meet, and what we experience in our daily lives. We believe that in order to advance our thinking-and our behavior-towards more sustainable practices, we need to experience them ourselves. Nothing kills a movement like hypocrisy among its leaders; students and faculty know this, and so do our partners in the community. This isn't to say that our university campuses should be perfect; it's part of the mind-set of sustainability that we will evolve towards a more sustainable state.

In this essay we will explore the role of campus practices in education for sustainability by examining the relationship between such practices and behavioral change, and their relevance to the traditional university missions. We will also provide some insight into our experience at Georgia Tech and at selected engineering programs in the United States.

## OUR CONTEXT: THE GEORGIA INSTITUTE OF TECHNOLOGY

The Georgia Institute of Technology was established in 1885 (after the civil war) to provide a technological base and technically trained workforce for the economy in the reconstructed South. Since then Georgia Tech has become a technological university with over 12,000 of approximately 14,000 students majoring in engineering, sciences, computing or architecture. We:

- have the largest engineering school in the U.S. (8,452 students),
- rank 3rd overall nationally at the graduate level, and
- are 2nd behind MIT in research expenditures.

Our entering class of students has the highest average score among public institutions on the standard college entrance examination (Scholastic Aptitude Test). We also graduate more female and minority engineers than anyone else in the United States. We recognize that a sustainable society requires a diverse and technically competent workforce.

As you may have guessed, Georgia Tech is not a place that one would immediately associate with the Age of Aquarius environmental movement. More likely—according to a recent poll on the public perception of engineers—a place like Georgia Tech would be associated with the creation of the problems we face in society. At a recent presentation to newspaper and television journalists, we challenged them to learn and report about the next generation of the environmental movement: a generation of engineers, scientists, and architects who understand their role in creating a more prosperous and sustainable society, and who have the tools to make it happen. This is our vision for Georgia Tech.

Of course, our hope was that this seemingly ironic situation—conservative Georgia Tech engineers leading any environmental movement—would be newsworthy. It certainly is to many of our peer institutions in engineering and, whether we like to admit it or not, is still news to some of our faculty and staff. While we're not expecting CNN to make us one of the day's top stories, we do think that we can use our position in higher education, in particular among our peers in engineering, to draw attention to sustainability.

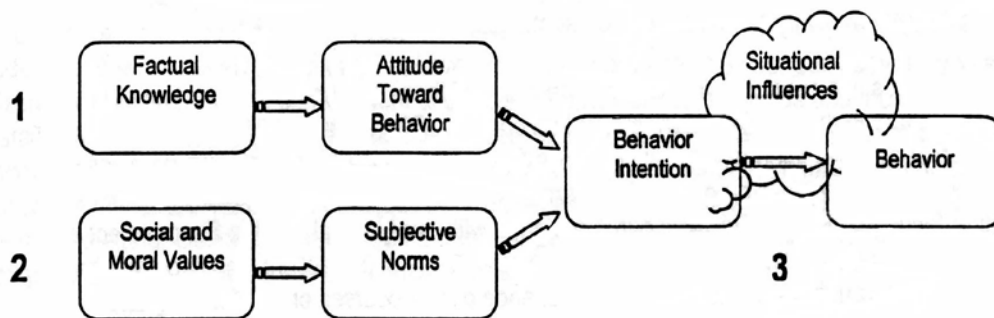
## BASIS FOR A UNIVERSITY STRATEGY IN SUSTAINABILITY: THE THEORY OF REASONED ACTION

At Georgia Tech our goal is that every graduate, and the members of our faculty and staff, understand their roles in creating a more prosperous and sustainable society, and have the tools to make it happen. Our pedagogical objective is to inspire life-long creativity and action, not just knowledge about the facts of sustainable technology and development. Since a commitment to sustainable development is an ethical decision—requiring a conscious choice to provide for the needs of present and future generations—the challenge is to develop a strategy that shapes citizens who recognize and choose to create, as well as demand as consumers, just and ecologically sound technologies and communities. We need a strategy that inspires more sustainable behavior, not just good intentions.

An individual's behavior is influenced by his knowledge of facts and the values and norms of his community. An article written by researchers in Switzerland and Germany provides an excellent overview of the relevant research in environmental psychology and a useful framework for explaining our position that campus practices are essential to our educational agenda.<sup>(2)</sup> The authors use the theory of reasoned action to explain the relationships among the variables associated with "ecological behavior" (Figure 1). The authors extend the theory of reasoned action by including consideration of the "influences on behavior beyond people's control," or situational influences. These situational influences (for example the influence of outside temperature on energy consumption) explain why individuals with strong environmental attitudes and intent may behave inconsistently. After reviewing the literature published over the past 30 years, the authors drew the following conclusions about ecological behavior:

- (1) Environmental knowledge is a significant precondition of behavior intention, which is the immediate antecedent of overt behavior. Factual knowledge alone does not correlate strongly with ecological behavior; however the relationship is stronger when the factual knowledge is about what and how something can be done (the behavior itself) rather than factual knowledge about the environment.
- (2) Environmental values are significant preconditions of behavior intention, which is the immediate antecedent of overt behavior. The strength of a person's normative beliefs (what one is expected to do) affects his motivation or intention to behave ecologically.
- (3) The movement from intention to overt behavior depends on the relative ease or difficulty of the action (situational influences).<sup>(3)</sup>

**Figure 1: The theory of reasoned action adapted from Kaiser et al<sup>(4)</sup>**



## FACTUAL KNOWLEDGE—BEHAVIOR INTENTION

Universities excel at imparting factual knowledge, so it is not surprising that the focus of many universities in the U.S. has been on enhancing the elective courses in the curriculum with facts about sustainable technology and development. Today there are courses on the environment and sustainability throughout the curriculum, the result of incremental responses to the increasing importance of environmental issues in society at-large. A non-profit organization called Second

Nature maintains an excellent web site with profiles of universities and their curriculum for sustainability.<sup>(5)</sup> We'd like to highlight a few examples drawn from our peer institutions in engineering that reflect the various ways the concepts of sustainability appear in the curriculum.<sup>(6)</sup> We will conclude this section with reflections on our progress to date.

Environmental issues (more often than “sustainability” per se) have sprouted up in elective courses on ethics and the practice of engineering, or courses focused on the special needs of the industry sector most closely aligned with a particular engineering discipline (for example, chemical engineering). Some of the more interesting courses are those developed at the interfaces of disciplines. For example, all engineering students at Stanford take electives in Technology in Society; or in mechanical engineering at Carnegie Mellon on “green” product design. Most chemical engineering programs offer courses on environmental regulation, with the program at the University of Texas expanding the regulatory focus to include “Technology and Its Impact on the Environment.”

Engineering programs focus on the environmental aspects of systems of technologies as well. Particularly encouraging are those that focus on vital infrastructure systems such as energy or the system of commerce. One of the best power and energy systems courses can be found at Virginia Tech. In this course students learn about all sources of energy (fossil-fuel based, nuclear and renewable energy) and the issues associated with their implementation, including ecological aspects associated with generation and end-use, conservation and sustainable development. At MIT, engineering faculty are working with the Sloan School of Management to develop programs focused on sustainability in business and industry. In addition to the traditional engineering and technology issues, the programs address the business issues associated with self-regulation, responses to governmental regulation, and managing future growth. If you agree with the author Paul Hawken—that business is the largest, most pervasive and powerful institution capable of creating a more sustainable society<sup>(7)</sup>—then you may agree that the collaboration between engineering and management schools, with a focus on sustainability, is encouraging,

While we've made progress, we cannot claim victory since many of these courses are offered as electives, or are viewed as secondary to the required, core curriculum courses. Often, these courses are team-taught, engaging engineering and social science faculty who divide the course content into their own domains of expertise. Such interaction can lead to on-going curriculum innovation within the each faculty member's respective discipline-focused courses. This was our experience with our General Electric Fund project in the early 1990s. Over a four-year period, we created a large community of professors who explored the concepts of sustainability through the deployment of a sequence of four courses on engineering and sustainability. Since then we've seen the emergence of the concepts into some of the mainstream courses in the curriculum and a focus on sustainability in several of the required senior design projects.

But what is missing is the connection to the campus. The fodder for many enhancements to the curriculum is in our own backyards, our campuses. To quote David Orr once again,

“Every educational institution processes not only ideas and students but resources... The sources ... and sinks ... are the least-discussed places in the contemporary curriculum. For the most part, these flows occur out of sight and mind of both students

and faculty. Yet they are the most tangible connections between the campus and the world beyond. The study of resource flows transcends disciplinary boundaries; it connects the foreground of experience with the background of larger issues and more distant places...”<sup>(8)</sup>

In order to achieve our vision we have to move the concepts of sustainability into the core of the curriculum, into the required courses so that students’ understanding of sustainability evolves with their understanding of their discipline. Remember the findings in environmental psychology on the importance of knowing what to do and how to do it, in addition to knowing the facts about the outcomes. The courses should draw on the local context for exercises, data, and design projects, building a base of relevant knowledge that connects local action to global concerns. We emphasize the required courses in the curriculum because we don’t want to give the impression that sustainability is something one can elect to do, nor that it’s something that someone else should do, which would happen if we created a new degree program in sustainable engineering. There’s an expression in higher education, that “it’s easier to change the course of history than it is to change a history course.” Nonetheless, universities must commit to a long-term effort to transform the core curriculum.

#### VALUES AND NORMS—BEHAVIOR INTENTION

We began this essay with a quote from David Orr, on the “lesson of hypocrisy” drawn from the contradictory messages the students receive in their classes and on the campus. Our built environments, and our practices for using and maintaining them, reflect our values and accepted norms. Langdon Winner, a political scientist at Renselaer Polytechnic Institute, argued that artifacts do in fact have politics—meaning that they embody the values and attitudes of those who design them and perhaps even those who deploy them.<sup>(9)</sup> He illustrated his point using the designs of bridges in the New York City area; bridges designed to limit access of public buses and their passengers to the beaches and parks of the wealthy suburbs. With respect to the topic of this essay, the physical manifestation of our commitment to sustainable development plays an important role in our educational strategy. The types of technologies and practices we implement on our campuses represent our values and norms. These in turn shape the views of our students and faculty on acceptable ways to behave.

There are numerous examples of how universities are becoming “greener.” In the U.S., the National Wildlife Federation and its Campus Ecology program have compiled extensive case studies on campus action.<sup>(10)</sup> Some campus stewardship programs are comprehensive, embracing a suite of activities from procurement to recycling, from energy conservation to renewable energy. Other campuses succeed in a few key areas, such as pollution prevention or transportation management. Our facilities themselves reinforce our commitment. The new environmental studies building at Oberlin College reflects innovative sustainable design, generating more energy than it uses. At Georgia Tech, the design of our new research facilities focus on fostering interdisciplinary interactions by co-locating faculty from different departments who share an interest in a particular research area. We call them research neighborhoods. In our Environmental Science and Technology building, we will have chemical and environmental engineers, chemists, biologists, geophysical scientists, and social scientists all working together and having direct contact with private sector partners.

The values and norms of the university with respect to sustainability must be articulated and implemented in its long-term strategic plan and campus master plan. Such plans start with the vision statement for the university, which lends legitimacy to the sustainability agenda in the larger context of the university mission. Our formal sustainability program began in 1992 and after several years of exploration, our President (equivalent to Lund University's Vice Chancellor) established a new vision statement in 1995:

“Georgia Tech will be a leader among those few technological universities whose students, alumni, faculty, and staff define and expand the frontiers of knowledge and innovation. Georgia Tech seeks to create an enriched, more prosperous and sustainable society for the citizens of Georgia, the nation, and the world.”

Following this strong statement of institutional commitment, we created mechanisms to develop a university-wide strategy for incorporating sustainability into the curriculum, research programs, and management of the campus. The result was the creation of the Sustainability Task Force, led by senior faculty in key positions, which met monthly for over one year. Their recommendations, delivered in December 1997, reflect a vision that was developed from the top-down and the bottom-up. The full report with their recommendations can be found on our web site.<sup>(11)</sup> Many of the Task Force members also participated in developing the campus master plan, a 15-year guide for the evolution of our built environment, which was completed in 1998. The “overarching vision” of the plan is that the Georgia Tech campus “should be a sustainable environment within which the use of land, design of facilities and methods of operation are conducted within established principles of sustainability.”

The incorporation of commitments to sustainability in the vision statements, strategic plans and master plans of the university are essential first steps in our overall agenda. To our faculty, staff and students, they represent Georgia Tech's intention to promote the creation of a more prosperous and sustainable society. While we know that the development of factual knowledge and articulation of values and norms are important preconditions for intentions to behave more sustainably, they don't necessarily translate into action. A strategy is hollow without the commitment of resources. The university must make its commitment a priority in its internal funding decisions. In short, universities must demonstrate true leadership to overcome numerous barriers and situational influences that bias our intentions towards maintaining the status quo.

## MOVING FROM GOOD INTENTIONS TO MORE SUSTAINABLE BEHAVIOR

We stated at the outset that universities need a strategy that shapes citizens who recognize and choose to create, as well as demand as consumers, sustainable technologies and communities. The move from intention to action, to making, implementing and monitoring the outcomes of more sustainable decisions, presents a learning opportunity for the entire campus community. Orr concludes his essay on the campus as a living laboratory for sustainability by tying together the education and campus management functions. As a research university, we would add the participation and contributions from our research programs. He says,

“By engaging the entire campus community in the study of resource flows, debate about the possible meanings of sustainability, the design of campus resource policies, and curriculum innovation, the process carries with it the potential to enliven the educational process.”<sup>(12)</sup>

Universities must develop programs that support collaboration among students and their class projects, faculty and their research projects, and campus managers with their “real-world” projects. Within the guidelines of a master plan, the team would develop new knowledge on the current state of affairs and options for more sustainable practices. Working with the bureaucrats in the decision-making system, they would discover the situational influences and potential barriers to change. Hopefully, they can devise strategies for overcoming them. In this context, we will find the real lessons about sustainability, lessons about tolerance, compromise, and determination. The third dimension of an educational strategy for sustainability is the creation of collaborative decision making processes that build upon the research, education, and campus stewardship missions of the university. We will conclude this essay with a discussion of a specific application of our integrated strategy for sustainability: education and research programs contributing to factual knowledge about options, university policies and goals reflecting values and norms, and a collaborative decision making framework that creates opportunities to learn.

#### CASE STUDY: THE UNIVERSITY AND GLOBAL CLIMATE CHANGE

We believe that a focus on global climate change will help universities and other public institutions develop a common goal and indicator for their sustainability efforts. We acknowledge that an American university talking about our obligation to address global climate change may seem a bit ironic. The actions in Europe under Agenda 21 planning, and in Sweden in particular and its goal to achieve sustainable development in one generation, are both inspirational and humbling.<sup>(13)</sup> Nonetheless, even in the absence of a national commitment to the Kyoto Treaty, corporations, government agencies and universities are engaging in open discussions about voluntary initiatives to support the international agenda.<sup>(14)</sup>

A commitment to quantifiable goals in energy and global climate change indicators poses a significant challenge for our sustainability agenda. It also provides the opportunity for true leadership and vision. It isn't that we lack the will to make it happen, per se. A 15-year master plan is big; it has a lot of detail. The team of managers and staff responsible for implementing this plan are overwhelmed with our “success.” For example, over the next 15 years we will be adding the equivalent of one major research building (around 100,000sf every year). This is in addition to a 10-year renovation plan for all of our residence halls, restoration of green space and pedestrian corridors, and the list goes on and on. The Georgia Tech campus is a land-locked urban campus in a city in non-attainment status with national air quality standards (for ground-level ozone and soon, particulate matter) and a congested transportation system that rivals Los Angeles. We lead the world in vehicle miles traveled per day. The situational influences and barriers to change are significant. We are at risk of not seeing the forest for the trees.

This is where the global climate change issue, and its associated indicators such as greenhouse gases, can focus our efforts. It isn't the only indicator for sustainability, but we believe that it suits our immediate needs better than most. Climate change indicators are integrative, allowing

for a wide range of creative options across the campus; they're relevant to our regional context, where energy and transportation lie at the heart of our region's economic development woes; and they're relevant to our particular context. With so many renovation and construction projects on the books, we have tremendous opportunities to improve our performance.

We propose that Georgia Tech consider two types of energy goals over the 15-year period of the master plan. First, future growth in our campus should be accomplished within a quantifiable goal for greenhouse gas emission levels. This goal should fall somewhere between the Kyoto standard of 7% below 1990 levels and "climate neutral." We can offset the energy requirements for the new facilities through energy conservation measures in existing structures and operations, energy efficient design in the new structures, incorporation of renewable energy into our energy portfolio, restoration of the urban forest and investments in other carbon offsets.

Our second goal should push the incorporation of renewable sources of energy into our campus energy portfolio by setting a numeric goal for the percentage of total energy contributed by renewable sources. As the U.S. energy industry moves toward a distributed market, we believe that the percentage contribution of renewable energy to our campus should at least reflect the relative amount of renewable energy available in the U.S. market. We have one of the largest rooftop photovoltaic arrays in the world. It was built on the roof of the Olympic natatorium as a research site for our National Center of Excellence in Photovoltaics. It is inconceivable that we would have this national asset in solar energy research and not include a commitment to solar energy in our master plan.

The work required to construct the baseline data and evaluate options is particularly suited to the research and educational missions at a university. We are developing college-level strategic plans to move the concepts of sustainable technology and development into the core curriculum and design projects. Our initial plan is to focus on those courses and research programs that can address our immediate management need to define our quantifiable energy goals and short and long-term policy and technology options for the campus. In addition, we will be structuring our general education and awareness-raising activities around Georgia Tech's overall commitment to creating a more prosperous and sustainable society, and to the specific agenda to develop an energy strategy.

A campus global climate change initiative "connects the foreground of experience with the background of larger issues and more distant places" and fits with our belief that campus-oriented studies and practices are essential to shaping the views of citizens who will recognize and choose to create a more sustainable society.

## NOTES

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