CLICK FOR LINKED INDEX OF
ABSTRACTS LISTED BY AUTHOR

TABLE OF CONTENTS LISTED BY TITLE

A SYSTEMATIC APPROACH TO MANAGING CONSTRUCTION AND DEMOLITION WASTE ON A UNIVERSITY CAMPUS

Michelle Smith-Mullarkey
The University of Vermont
Burlington, VT

Abstract

Institutions across the country are experiencing perhaps the largest construction boom since the late 1950's and 1960's. Much has changed in the past 50 years in the construction industry, specifically in regard to the idea of "green building" and the management of construction and demolition waste. This session will provide participants with an overview of a model web-based, systematic approach to managing construction and demolition (C&D) waste reduction program. The model, developed and tested at the University of Vermont with an Environmental Protection Agency grant supporting waste reduction, can be modified to fit the needs of an individual campus. The effort grew out of university staff's experience with LEED™ standards for construction waste management in new buildings, which led them to institutionalize the C&D management and extend it to other campus projects.

Description/Outline

This session will provide participants with an overview of a model web-based C&D waste reduction program, which can be modified to fit their needs.

The program includes sample waste management minimization specifications from the University of Vermont's architectural design standards; a "tool kit" to assist project managers and contractors with C&D waste recovery and training; "lessons learned" from identifying institutional or technical barriers to C&D waste recovery; and benchmark information from the University of Vermont. The C&D program will be tested during the summer of 2007 and the results will be reported at this conference.
The discussion will also describe the use of an Environmental Management System (EMS) framework and environmental indicators. The challenges of implementing a campus-wide tracking program, earning buy-in from the staff, and the successes and failures of the case study will also be reviewed.

Outline

I. C&D Grant Goals
II. Project Team and Work Plan
    a. Structure of Project Team
    b. Student/Community Involvement
    c. Overview of EMS Framework
III. Deliverables
    a. Components of Toolkit
    b. Web-based Submission Forms
IV. Case Study
    a. Challenges, Decisions, and Successes in all aspects of the project

V. Discuss Participants' Relevant Experiences at other Institutions
VI. Questions & Answers

Learning Outcomes

Participants will leave with:

- The importance of influencing the building design and construction process
- An understanding of the Environmental Management System Framework
- A model and "tool kit" to assist project managers and contractors with C&D waste recovery and training
- Strategies for applying similar concepts and techniques on their campuses and for avoiding political or financial pitfalls
- "Lessons Learned" from the case study overview

How Audience Members Will Be Involved

Participants will be asked to provide examples of similar deconstruction/renovations projects on their own campuses. The program will allow them to reflect upon and share their learning experiences and challenges through questions and answers.

ALLEGHENY COLLEGE CLIMATE CHANGE INITIATIVE (ACCCI): CROSS-CAMPUS PARTNERSHIP IS A MODEL FOR MOBILIZING SUPPORT FOR CAMPUS SUSTAINABILITY EFFORTS

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Abstract

Lack of federal leadership on climate change has galvanized individuals across the campus and the community to organize and respond to this global crisis. This urgent situation has brought together partners that have not traditionally sought out one another on campus issues. While many campus sustainability efforts do not typically generate the same sense urgency, promoters can learn from these coalitions by seeking partners across campus and within the community whose interests may overlap but have traditionally not been involved in advocacy for campus sustainability.

The Allegheny College Climate Change Initiative (ACCCI) was initiated in the Fall of 2006 to educate the public and to organize efforts to reduce the regional impacts of climate change. ACCCI's origins can be attributed to a coalescing of disparate organizations and individuals across the campus and community who mobilized around the need to address climate change. College campuses are a natural focal point for education and advocacy on climate change given their dual role as educators and community leaders. Faculty, students, campus life officials, religious life leaders, administrators and community partners all found a common thread that connected them in addressing climate change—through an understanding of a variety of aspects including the ethical dimensions, the scientific underpinnings, the policy-making, and the role of the media in advancing public interest on this topic. The variety of individuals and organizations that have a vested interest in climate change, and by default, in campus sustainability, can provide a broader base leading to improved efforts towards environmental responsibility. Our experience leads us to recommend that colleges and universities look beyond traditional partners on campus in their efforts to strengthen the foundation of support for sustainability initiatives.

AN ETHIC OF PLACE: SUSTAINABILITY, AUTHENTICITY, COMMUNITY

Perry Chapman
Sasaki Associates, Watertown, MA, USA

Abstract

The central hypothesis of the presentation is the place-based higher education institutions in the US can be powerful engines in the creation of an American culture of sustainability. By adopting an ethic of place embodying principles of sustainability, authenticity and community, American campuses can stand as enduring models for a better built environment throughout the country. In this hypothesis, the sustainable campus is authentically expressive of the geography, landscape, climate and culture that constitutes its regional environment, and is reinforced by linking diverse layers of community within and beyond the campus.

The proposition for an ethic of place is drawn from the presenter's 2006 book, *American Places: In Search of the 21st Century Campus*. It is built on three premises:

- The educational and social culture of the institution is dedicated to the values of sustainability, authenticity and community.
- The institution fully adopts "best practices" in ecological stewardship, energy and physical resource conservation and avoidance of detrimental impacts on the environment.
- The place ethic is embedded in the collegiate experience of learners so that it becomes a lifelong model for built places that support life in a healthier, more humane civilized way

The presentation addresses aggregated impact of US campuses on the American environment:

- American campuses, with their ancillary holdings, occupy over 1,500 square miles of land, as much land as is lost in the US to development every two to three years.
- They contain over five billion square feet of building space that has to be heated, cooled, lit and maintained.
- Their 15 million students represent five percent of the country's human "ecological footprint" on any given school day.
- A large public land grant university can emit upward of 320 million pounds of carbon dioxide annually, requiring a forest of 1,500 square mile to fully sequester its carbon emissions.

Acting individually and in the aggregate on the premises that constitute an ethic of place, America's 4000 place-based campuses would have a tangible positive impact on built and natural environments at the local and regional levels. The demonstration effect at the national level would be even more powerful. The proposed paper is consistent with the "philosophy" inherent in the "Greening" conference in three important respects:

- It includes an enumeration of measures in smart growth, energy conservation, local purchase, reduction as emissions, recycling, landscape preservation, alternative transportation policies, and other practices for buildings and grounds that not only contribute to sustainability, but also enhance the sense of regional authenticity and character.
- It enumerates the social and environmental consequences of a campus culture fully vested in the ethic of place
- It reinforces the notion that the practice and culture of sustainability must be integrated with the community-building mission of the institutions.

ASSESSING THE 'LEARNING VALUE' OF CAMPUS GREEN SPACES

David Spooner
The University of Georgia, Athens, GA, USA

Abstract

College campuses serve many purposes. Some suggest the overall purpose is to enhance its academic reputation (Dober, 2000). The idea that the physical design and configuration of campus green spaces contributes to its 'learning value', or ability to elicit and support studying behaviors, has important ramifications as all academic institutions underscore learning in their mission statements. Campus green spaces are often designed around pre-programmed performance criteria that attempt to establish the end-use activities which will occur once a project reaches completion. The design criteria vary from project to project, but often campus green spaces are designed to function academically and serve as gathering places for exchanging ideas and serve as outdoor places where students can read and study.

Identifying how campus design and physical form affect the 'learning value', or ability of campus green spaces to support a studying behavior, is the primary objective of this paper. A secondary objective is to identify and discuss the merits of the assessment tools that allows such a study to occur. Through the use of a post-occupancy evaluation (POE) conducted at The University of Georgia, the 'learning value' of a newly constructed campus green space was determined.

A total of sixty-seven undergraduate students were involved in the POE. Each student was required to complete an eight question written survey and respond to three follow-up interview questions. The written surveys were analyzed for quantitative significance and the interviews served to collect qualitative data to further inform the statistical findings. The quantitative and qualitative findings identify specific physical design configurations, built forms, ratios of enclosure, and object (both natural and man-made) that are influential factors in supporting studying behaviors. The findings also reveal the strengths and weaknesses of Post Occupancy Evaluations as an assessment tool for determining which physical design factors affect specific human behaviors. The conclusions point to the fact that the campus green space can be more than just aesthetic spaces to look upon and instead serve as educational components of the academic setting.

References:

Dober, Richard P. (2000) *Campus Landscape: Functions, Forms, Features*. New York: Wiley and Sons.

BUILDING CAMPUS SUSTAINABILITY ON THE STRENGTHS OF YOUR INSTITUTIONAL AND CULTURAL IDENTITIES: AN EXAMPLE

Janel Curry, Gail Heffner, and Clarence Joldersma
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Abstract

Institutions of higher education are constituted through networks of particular, multiple, overlapping identities. In the paper we focus on the relationship between those identities and the possibilities for institutional change towards bringing sustainability on campus. In particular, we present Calvin College as one example or model of how these identities can provide resources for institutional change with respect to sustainability. For Calvin these identities include: the culture of sustainability of our particular city, Grand Rapids; the tradition of the liberal arts curriculum; valuing pedagogical practices and student learning; a strong institutional tradition and commitment to research; an effective faculty-run organizational structure; and a Reformed (Calvinist) faith tradition. Our premise is that successful institutional change towards sustainability occurs when the new practices resonate with aspects of the overlapping, multiple identities that shape the institution's current structures and practices. In other words, successful change is more than externally-generated organizational finesse and policy setting – it involves the very identities of institutions, including faculty, students, and administrations.

The focus of the paper will be the positive changes towards sustainability at Calvin College over the last ten years. In the process we also highlight some of the 'prehistory,' stretching back to the 1950s when the present physical campus was first envisioned, and to the 1970s and 80s when significant first steps were taken that are now recognizably working towards sustainability. However, we spend more time describing the last ten years, making visible a rich variety of initiatives that have bubbled up from 'rank and file' faculty in response to issues of environmental sustainability. These grassroots initiatives stretch the gamut of education, research, service and operations. However, our paper is written from the perspective of education.

In particular, we will include the following examples of action towards sustainability: (i) With respect to the curriculum, we describe an innovative 'sustainability across the curriculum' initiative called CEAP – Calvin Environmental Assessment Program – where faculty from a wide variety of disciplines embed in their courses modules of actual environmental research, with the campus or the community as its focus. (ii) In regards to service to the community, Calvin has been playing a key role in the Plaster Creek Working Group (PCWG), a partnership between Calvin College, a local environmental action group called West Michigan Environmental Action Coalition (WMEAC), and the Christian Reformed Church (Calvin's religious denominational affiliation). The focus has been on environmental issues associated with a local creek watershed, which drains a significant portion of Grand Rapids (including part of Calvin's campus). (iii) In terms of organizational (governance) structure, we cite the creation of a faculty committee, the Environmental Stewardship Committee, whose mandate is specifically campus environmental issues, and we highlight its comprehensive policy document, the "Statement on Sustainability" which has been adopted by the Faculty Senate. (iv) As an example of an ad hoc environmental action, we describe the student and faculty initiative of negotiating with the administration to save a unique woodlot in the center of campus which was at risk because of a building project. (v) In terms of institutional operation, we describe the conception, planning and building of a LEEDs gold-certified building on campus and we bring up the more recent campus energy audit initiative. (vi) Finally, we mention environmental and sustainability research initiatives. These examples and more portray successful initiatives towards campus sustainability, taken by a variety of faculty, slowly building sustainability into the fabric of institution.

Our thesis is that these grassroots initiatives have bubbled up at Calvin College precisely because of its particular cultural and institutional identities. We argue that the initiation and

successes of these initiatives are the result of drawing deliberately or implicitly on our particular multiple identities: a religious tradition that values "the creation" and a sense of "calling," a scholarly tradition that values research, an egalitarianism that values an effective faculty-run governance structure, a high valuing of teaching and involving students, a city that itself has a robust sustainability agenda, and a long commitment to a broad liberal arts curriculum. We conclude that, from our perspective, it is important to build successful campus sustainability on the particular strengths of one's institutional and cultural identity.

CAMPUS GREENING BY COMMITTEE: TEN YEARS (ALMOST) OF INTERESTING, EXCITING (AND OCCASIONALLY PAINFUL) ECO-LESSONS LEARNED FROM A CAMPUS PRESIDENTIAL ECO-ADVISORY GROUP

Mark J. O'Gorman, PhD
Maryville College, Maryville TN USA

Abstract

Maryville College (MC) formed the Environment and Forestry Advisory Committee (EFAC) in the 1998-1999 academic year. EFAC existed first as informal group, and then formally by the College and its President in 2000, as a primary voice for sustainability. Currently designed to provide advice to the Maryville College President on environmental issues on campus ground and its physical plant, and especially about use issues in the 120-acre Maryville College Woods attached to campus, EFAC has emerged and developed as an important voice on campus greening topics at MC.

The presenter, a past founding member and now returning current faculty chair of EFAC at Maryville College, will discuss the evolution of EFAC from an informal group to its current status as a College/presidential advisory committee. Major projects administered by EFAC, including the creation and reporting of a college/community "guidelines of usage" report for the Maryville College Woods (See below), will be discussed. The presenter will conclude with a series of lessons learned from over eight years of negotiating the political landscape of campus governance, while attempting to foster greater sustainability at the MC campus.

CAMPUS MASTER PLANS AS DRIVERS OF SUSTAINABLE GROWTH

R. Umashankar
Hughes Good O'Leary and Ryan, U.S.A.

Abstract

This talk is part of the organized session, "Pedagogy of the campus experience: Using campus buildings and landscapes to convey lessons of environmental stewardship"

Change is but a constant at all colleges and universities. Campuses continually grow in response to new academic and research goals, enrolment increases and even in simply updating existing facilities. Growth that is managed and balanced with environmental priorities is testament to the institutions' commitment to sustainable development. To this end, the Campus Master Plan is a critical tool. In defining the master plan goals and how these are implemented, the physical setting of the campus becomes yet another medium of expression of the non-classroom curriculum of environmental stewardship.

In exploring the role of a Campus Master Plan toward advancing sustainability, it is also important to acknowledge that master plans are most often driven by the need for growth. A comprehensive Campus Master Plan offers the essential physical framework for preserving the environmental assets of the institution AND provides strategic guidance for future campus development. A Campus Master Plan is in fact the opportunity to celebrate the institutional commitment to sustainability and the mechanism to grow in a sustainable manner.

Most master planning processes are highly visible and collaborative. They engage the campus, community and stakeholders to jointly define the institution's vision. A well orchestrated planning process seeks to actively engage the larger campus community in bringing forward and negotiating environmental values with development priorities. Such a process generates ownership in the institutions environmental choices and makes the larger campus community a vested partner in its future. The participant gains a greater understanding of the multitude of decisions that confront and confound us as stewards of the environment.

Interestingly many a campus settings can be likened to a composite urban unit that emulates a larger community; comprised of built and natural elements that include buildings, open spaces, water bodies, and the regional built and natural setting. Campuses are therefore an ideal testing ground for many new and innovative ideas and strategic approaches to planning that might find future community-wide applications. The unique characteristics of ownership and control of the college or university setting makes it easier to define sustainable planning goals, implement the ideas and measure success.

Today, many Campus Master Plans have also evolved to making strong environmental statements. "A Temple in the Woods", "A Living Laboratory" or "The Campus as an Arboretum" are but only some of these metaphors that have been the guiding force behind master plans and appropriately describe the desired campus landscape. In a more direct approach, some institutions have developed detailed frameworks that assign intrinsic values from restricted to developable to all university lands. "Green" planning also serves to reduce energy use beyond those achieved by "green" buildings. These are expressions of how long term and large scale sustainable planning decisions eventually manifest in the everyday life and pedagogy of the campus setting.

Indeed, the "flavors" of sustainable planning are numerous. The process of education and awareness for environmentally conscientious planning and design through the campus landscape and its physical setting, as facilitated by the Campus Master Plan, is explored through case studies at various institutions.

CAMPUS OF THE FUTURE

Rick Sievertsen

Sebesta Blomberg, Cedar Rapids, USA

Abstract

The "Campus of the Future" will optimize student learning while minimizing energy, water & material inputs and waste outputs. The Campus of the Future will incorporate aggressive utilization of master planning, renewable fuels, sustainable design, and operational optimization, energy and environmental benchmarking, and education and awareness.

A typical campus imports energy, water, food, and materials for its operations and exports waste. Many colleges have embraced energy efficiency and some are also using renewable energy and renewable fuels, but few have implemented a comprehensive approach to sustainability. The Campus of the Future will import much lower levels of energy, water and materials due to sustainable design and operational optimization as well as on-campus production of energy and food and will export much less waste due to conversion of biodegradable waste into usable products such as energy (in the form of steam, electricity, chilled water and/or motor fuels) and fertilizer, which could be used in campus gardens to meet some food needs.

Features of a Campus of the Future include:

- Comprehensive Master Planning to optimize sustainability
- Robust energy procurement, monitoring and data collection programs
- Self-generation of energy from renewable resources
- Sustainable design/LEED certification facilities
- Reduction in energy consumption through retro-commissioning and operational optimization
- Reduction of water use from sustainable building and landscaping with native plants
- Composting of organic waste and recycling of non-organics
- Incorporation of sustainability principles into core curriculum
- Enhanced energy and environmental awareness for students and faculty

The presentation will include case studies of college campuses that have embraced some of the Campus of the Future principles and concrete steps campus facility managers can take to increase sustainability on campus.

CAMPUS SUSTAINABLE LIVING COMPETITIONS: ECO-OLYMPICS, GREEN CUPS, GREEN GAMES

Sam Hummel

Association for the Advancement of Sustainability in Higher Education (AASHE)
Durham, NC, USA

Abstract

Over the years, many schools have used a variety of environmental education programs to promote sustainable living within their campus community. But when it comes to engaging students, one method that has proven especially effective is good-spirited competition. Campus vs. campus competitions, like Recyclemania, and dorm vs. dorm competitions, such as Eco-Olympics, Green Cup and Green Games, consistently inspire participation by a large percentage of the campus population, including many student who wouldn't normally think of themselves as environmentalists. The results are impressive, measurable and long-lasting.

In this presentation, segments will be shown from a new DVD that is designed to (1) help any campus start running such a competition and (2) share ideas between campuses that are already running such a competition. In between the segments, discussion will be held for the audience to ask questions and share best practices.

The DVD that will be shown was produced in 2006 with the original intention of helping Duke put on it Eco-Olympics competition year-after-year. However, the scope of the film was broadened in order to make it applicable to many campuses. The film should be useful both to campuses already running such a competition and those looking to start one.

Learning Objectives:

1. How can students, faculty or staff us good-spirited competition to engage a large percentage of their student body in sustainable living?
2. What are some competition "best practices" used on campuses with a history of putting on such a competition?
3. What are some of the challenges and opportunities for innovation facing schools that have a history of putting on such competition?

Background on Duke's Eco-Olympics:

Since 2002, the Environmental Alliance student group at Duke University has run a dorm vs. dorm energy, waste and water reduction competition. The inspiration came from Yale and Harvard's "Green Cup" competitions but Environmental Alliance calls it the "Eco-Olympics". Dorms win points according to meter readings and their participation rate at various events throughout the competition. On average, 65% of residents participate in at least one event. Some dorms reduce their energy use by as much as 54%, while average dormitory energy use falls between 11 and 15%. Recycling rate rise measurably and the environmental literacy of the undergraduate population improves as well.

"CAN THE CAN" CAMPAIGN

Amy Cockerham, Megan Haley, Barbara McConathy and Dave Kohler
Pacific Lutheran University, Tacoma, WA, USA

Abstract

This presentation will discuss how to successfully execute a sustainability-themed campaign and how to leverage marketing, communication and high-profile supporters to encourage maximum support for and awareness of the cause.

In October 2006, Pacific Lutheran University faculty and staff were challenged to get rid of their trashcans in the "Can the Can" campaign. The campaign was part of the effort to increase the recycling rate at the university. PLU currently recycles approximately 60 percent of its waste. The university recently set a goal to increase the recycling rate to 80 percent within the next five years. "Can the Can" was one small step in that direction by encouraging employees to recycle more.

At the campaign kick-off on Oct. 11, nearly 40 percent of university employees voluntarily traded in their trashcans for small, 1.5-liter green containers. By trading in their trashcans, employees agreed to collect and dispose of their own garbage and recycle the majority of it at bins located across campus. The few items that can't be recycled, such as candy bar wrappers and soiled food containers, go into the small containers. Individuals are responsible for disposing of their non-recyclables in community trashcans during the course of the day.

The campaign targeted faculty and staff members – as opposed to resident students – because employees are only on campus for eight hours a day. As a result, they generate less garbage and can more easily make the adjustment to life without a trashcan.

The campaign included weeks of lead-in publicity, which significantly raised awareness campus-wide regarding the institution's recycling goals, what items can be recycled and how to recycle at PLU. Positive peer pressure became a factor when PLU President Loren Anderson and his executive team all publicly and quite visibly participated in the campaign. Since the campaign kick-off, more than half of PLU faculty and staff have opted to give up their trashcan and recycle more.

CARBON NEUTRALITY: AN EXAMINATION OF STRATEGIES

Davis Bookhart

Director of Sustainability Initiative,Johns Hopkins University

Abstract

As of this writing, over 60 universities have committed to addressing climate change in a meaningful way – including exploring strategies for becoming climate neutral. Since there is no blueprint for achieving such an aggressive goal, universities are exploring a variety of approaches and varying levels of commitments. Some approaches – like incorporating energy efficiency and green features in new construction – are sensible but conservative. Other approaches – like purchasing large quantities of RECs or other renewable energy services – show more immediate results, but could impede the ability of the university to achieve longer-term carbon goals.

This paper will explore the wide range of carbon reduction strategies employed by universities, and will pay particular attention to the portfolio of options that universities are using to achieve their goals. The paper will also examine the governing philosophies of the university carbon reduction commitments to see if the reasons for committing (i.e., for moral reasons, as a demonstration of leadership, because of student activism, or due to a strong business case) affects the types of strategies employed to reach the goals.

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CLIMATE-RELATED LEGISLATION: IS CAPITOL HILL ADDRESSING THE THREAT OF GLOBAL WARMING?

Lisa Madry
National Wildlife Federation

Abstract

Climate-related Legislation. Is Capitol Hill addressing the threat of global warming? With the topic of global warming in the media and in Hollywood, it's also now getting attention on Capital Hill. This workshop will focus on current climate action legislation, the pros and cons of each, and the status of its success. This workshop will also highlight case studies of successful state climate action plans and policies. Groups will discuss current legislation in their states and local communities and identify how they can get involved.

NWF's Campus Ecology program has supported and recognized college and university sustainability efforts since 1989.

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COASTAL CAROLINA UNIVERSITY'S HABITAT FOR HUMANITY SUSTAINABLE BUILDING AND LIVING PROJECT: AN HONORS PROGRAM SERVICE LEARNING COURSE

Sherer W. Royce, Daniel C. Abel, Tiffany N. Brown, Nicole A Kuenzel, Joy N. Smith, and Lindsay M. Stang

Coastal Carolina University, Conway, USA

Abstract

In 2006, the CCU Campus and Community Sustainability Initiative partnered with Habitat for Humanity in Georgetown County, SC to build the county's first high performance green house. As part of that partnership, the CCU Honors Program offered Hon 332 (Sustainable Communities), a service learning course for Honors students. Students enrolled in this course learned principles of sustainability and how our lifestyles contribute to the planetary environmental crisis. These students also developed and taught a comprehensive sustainability educational program for current and future residents of Habitat for Humanity housing. The program focused on reduction, reuse, and recycling of materials; energy and water conservation; and nutrition and fitness (an especially important topic since Georgetown has one of the nation's highest diabetic amputee rates). The students also volunteered to help build the green house. Students and their faculty advisors will discuss this course, specifically: sustainable features of the house (especially indoor air quality, since the resident has severe respiratory problems), an overview of the curriculum, the pedagogical approach (what worked and what didn't), how students overcame socioeconomic and cultural barriers; what we learned during the course, and what we would do differently the next time the course is offered.

COLLEGE – COMMUNITY PARTNERSHIPS: A MODEL FOR SUSTAINABILITY

Craig R. Mosher, Ph.D.
Luther College, Decorah, Iowa, USA

Abstract

College-community partnerships can be instrumental in developing sustainable communities. This paper develops a model of the college-community partnership process and provides an instrument, based on this model, to assess and strengthen these collaborative relationships toward the purpose of helping communities and colleges become more sustainable.

Colleges and universities are long-lived, resource-rich, innovative institutions that are rooted in host communities (M'Gonigle & Starke 2006), which, in turn, provide important supports to the institution. Rather than the ivory tower model, colleges can be seen as large oak trees, rooted in a forest, that live in interdependent relationships with the rest of the forest. Colleges are also magnets for resources and interesting people, ideas, and projects that can have significant impact on their community's sustainable development efforts.

Elements of the college-community partnership model described in the paper include:

- Resources (financial, cultural, intellectual) a college attracts to a community
- Service activities with mutual benefit such as internships, service learning, research projects, volunteer work
- Collaborative projects like fitness centers, historic preservation, nature preserves
- Civic engagement in community politics and civic affairs
- Cooperative ventures on sustainability projects such as wind power, recycling, bike trails, car pooling, or public transportation
- Buying products and services locally including food, Community Supported Agriculture contracts, construction and maintenance, printing, lawn care
- Participation and connections with other local organizations: schools, churches, government, hospitals, libraries, music and theater groups, civic organizations
- Historical and cultural connections that help root the institution in the community
- Research for local organizations and businesses such as needs assessments
- Holding community activities in campus facilities

All of these elements of the college-community partnership model help a community to become self-reliant and sustainable. When these elements are assessed and better understood through further research, they can be used to enhance sustainable community development efforts.

The paper also addresses challenges to increasing campus – community partnerships for sustainability such as the history and quality of town/gown relationships, the potential loss of diversity when an institution focuses locally, resource allocation and budget decisions, and institutional and community resistance to change . These are also assessed with the instrument.

This paper describes a model of college-community partnership for sustainability and introduces an instrument to measure how colleges and communities can cooperate more effectively to develop sustainable communities.

COMMUNICATING YOUR SUSTAINABILITY MESSAGE AND HOW TO DO IT WELL

Ruth Abramson and Laura Madera

University of British Columbia Sustainability Office

Abstract

Chances are if you're reading this, then you think sustainability is important. But what about your colleagues, manager, and the rest of the University? Do they know how important sustainability is? This session covers the value of professional, clear messaging and design in your sustainability communications. We will discuss social marketing, how to segment your target markets, how to craft key messages for sustainability, navigate the creative process, produce compelling visual materials and get recognition for your efforts. Giving tested examples of strategies that work, we will help you take your sustainability communications to the next level.

COMPLEX CHOICES – THE MANY SHADES OF GREEN

Meredith Elbaum

Sasaki Associates, Watertown, MA, USA

Abstract

"Complex Choices – The Many Shades of Green" discusses the process of specifying environmentally-friendly materials and products for buildings, beyond the single-attribute requirements of LEED. IN the construction and renovation of buildings on college and university campuses, the organization faces many decisions related to materials. With so many new green products, how do they navigate through all the greenwash to select truly sustainable products that meet their aesthetic, performance and cost criteria?

This paper offers a unique, combined perspective of two presenters: an architect and a product manufacturer representative on how to select sustainable products within constraints of reality.

The product manufacturer discusses available Eco-Labels and what they represent, ISO labeling requirements, and how industry standards may offer guidance for product selections. While stepping through each phase of the product life cycle, the audience learns about the potential environmental impacts of each phase and the pertinent questions designers should ask of product manufacturers. She also explains environmental Life Cycle Assessment (LCA) and illustrates how LCA may inform product design and specification.

The architect then discusses the challenges associated with specifying sustainable products when faced with "real world" constraints (i.e. costs, aesthetics, or imperfect information). This paper introduces an Excel-based "Priority Matrix" tool that weighs and ranks product choices across various product attributes. It also includes case studies of colleges and universities where the architect has successfully implemented the "Priority Matrix".

During the presentation, audience members will have an opportunity to practice sustainable product specification with an interactive group exercise.

CONNECTING CAMPUS GREENING WITH THE CLASSROOM

Richard R. Johnson

Rice University, Houston, Texas, USA

Abstract

The Body of the Abstract

Campus sustainability professionals are relatively unique actors in academia in that they function in an interdisciplinary manner across a system that is otherwise often characterized as having rigid disciplinary silos. In fact, the ability of campus sustainability professionals to reorient their institution's practices in a more sustainable direction depends in large part on the ease at which they are able to perform across these boundaries and leverage the efforts of others. One such way that they can cross boundaries and harness the energy of others is to connect the classroom with campus sustainability efforts and use the campus itself as a laboratory to explore environmental issues and their solution.

At Rice University in Houston, Texas, campus greening efforts have been linked to the classroom regularly since 1999. The environmental studies class ENST 302 "Environmental Issues: Rice Into the Future" has served as the focal point for connecting campus greening at Rice to the classroom, though other classes and independent study projects have played a meaningful role too. This paper explores the successes achieved by ENST 302 and related classes, as well as key lessons learned. The experience of ENST 302 has shown that the presence of a campus sustainability professional or a faculty member with an unusually strong set of contacts across administrative departments notably improves the ability of students to successfully implement campus environmental changes through their coursework. Likewise, the experience of the author suggests that connecting with and leveraging students in a classroom setting is essential to succeeding as a campus sustainability professional.

CONNECTING WITH CHURCHES, CARING FOR CREATION

Craig R. Mosher, Ph.D.
Luther College, Decorah, Iowa, USA

Abstract

Throughout the country, the creation care movement is capturing the imagination of church members and enlisting them in the drive toward environmental sustainability. This paper describes the many diverse manifestations of the creation care movement; identifies ways that colleges and universities can partner with churches, synagogues, and mosques to build a sustainable world; gives examples of these partnerships; and provides a specific example of one such effort. Colleges and universities are important community institutions that can bring considerable resources to bear on problems of environmental sustainability (M'Gonigle & Starke 2006).

Some of these college-church partnerships include: 1) education about environmental issues, 2) service learning projects and student internships working with religious organizations, 3) forming coalitions to work with local government and businesses on issues like public transit and car pooling, 4) cooperative buying of locally produced items like food, through joint CSA contracts, and 5) collaborative projects such as cooperative gardening, recycling, and wind power. Diverse examples from around the country will be provided, along with resource links.

One specific example of such a partnership involves Luther College, a small liberal arts, church-related college in northeast Iowa that is a charter signatory to the President's Climate Commitment. Luther is partnering with two church-related environmental advocacy groups to provide training for an ecumenical group of churches on environmental issues. The effort also includes two student interns who will work over the summer with the groups that attend the training, to assist them in their creation care projects, and then report back to other students and faculty on campus in the fall.

Using PowerPoint and color photos the paper will explain how the one day "Greening the Churches" workshop was organized including: identifying an ecumenical audience, building relationships with the ecumenical policy organizations such as Interfaith Power and Light, the choice of Earth Day Weekend, the on campus location on a restored prairie, a lunch of locally grown food, arrangement to encourage car pooling, and Lilly Endowment funding – as well as other funding options.

The section on student interns will explain how they were selected and trained, their role helping facilitate the workshop, and their work with churches during the summer assisting the projects to make operations and buildings more efficient, educate members about changes they can make at home, and advocate for environmental issues.

An evaluation and critique of the internships and workshop will include: data from an instrument and focus group about the workshop, interview data with the interns and each of the churches they work with, color slides of the activities, and a critique of the project's energy and paper use. This will also include discussion of how Luther's church affiliations were used in the project and ways that non-church affiliated institutions can build relationships with religious organizations.

Finally there will be specific suggestions and discussion about how colleges and universities can build on-going working relationships with religious groups to create a sustainable world.

CREATING A SUSTAINABLE LEARNING COMMUNITY: FROM DESIGN THROUGH CONSTRUCTION TO RESIDENTIAL LEARNING

Michelle Smith-Mullarkey and Annie Stevens

The University of Vermont
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Abstract

Global warming, the lack of renewable energy, and our country's dependency on oil are all a call to institutions of higher learning to be actively involved in solving world-wide environmental crises. Colleges and universities must be role models for environmental responsibility and centers of intellectual innovation. This program will provide participants with an overview of how one university embraced that challenge by creating a new residence hall that serves as a living laboratory and demonstration center for ecological learning.

Outline/Description

Colleges across the country are in the process of either renovating residence halls or building new ones. This resurgence has been spurred by enrollment growth or the simple need to upgrade outdated facilities. No matter what the reason, college administrators and residence hall staff have not witnessed this kind physical change to residence hall systems since the late 1950's and 1960's. And much has changed in the past 50 years. Progressive ideas have been noted not only in how to enhance student learning in the residence halls, but also in how to build using ecological design.

This presentation will demonstrate how one university worked collaboratively to design and construct a 400-bed "green" residence hall that also serves as a residential learning community for an environmental curriculum. Participants will be guided through the critical stages and decisions that successfully led to an environmentally responsible residential learning community aptly named "GreenHouse."

The initial part of the program will focus on design and construction highlighting concepts such as LEED (Leadership in Energy and Environmental Design) certification, the costs and benefits of renewable materials, and the creation of demonstration opportunities (such as composting toilets and green roofs).

The next section of the program will focus on curriculum development. An in-depth description of creating the residential learning experience will be provided with the goal of developing an interdisciplinary environmental curriculum for majors and non-majors. A three-tiered model of student engagement will be presented highlighting creative collaboration among faculty, residential life staff, and students.

The final portion of the program will review the challenges endured throughout the entire process, the critical decisions that were made, and the successes and benefits of inclusive collaboration, not only between academic affairs and student affairs, but with architects, construction managers, and landscapers.

Outline

VII. Overview of the Residence Hall Project Goals
VIII. Review Design and Construction Process
   a. Describe "Green Design" through LEED Certification
   b. Provide examples of renewable materials with cost/benefit analysis
   c. Highlight demonstration opportunities implemented throughout the project
IX. Review the Process of Curriculum Development resulting in a Three-Tiered Model for a Residential Learning Community – "GreenHouse"
   a. Student involvement
   b. Faculty/staff collaboration
   c. Comprehensive Description of the "GreenHouse" Program
X. Review Critical Challenges, Decisions, and Successes in all aspects of the project
XI. Discuss Participants' Relevant Experiences at other Institutions
XII. Questions & Answers

Learning Outcomes

Participants will leave with:

- A thorough understanding of what "Green" Design Means
- The importance of influencing the design and construction process for optimum learning
- A model for creating a Residential Learning Community
- Strategies for applying similar concepts and techniques on their campuses and for avoiding political or financial pitfalls

How Audience Members Will Be Involved

Participants will have the opportunity to provide examples of similar construction/renovations projects on their own campuses. The program will also allow them to reflect upon and share their learning experiences and challenges through questions and answers.

CREATING A SUSTAINABLE STUDENT COMMUNITY: THE CHICO EXPERIENCE

Dr. Mark Stemen
CSU, Chico

Abstract

Chico State has quickly become a center of sustainable activity and innovation on the West Coast. Last year, a student run conference, This Way to Sustainability II, attracted over 700 attendees. A dozen student groups now host over 100 sustainability-related events annually, both on and off-campus. Part of the success is due to the conscious efforts of students, faculty and staff to create a community that embraces and empowers its students. My paper will focus on the efforts at CSU, Chico to create a sustainable community of student activists that continues to grow over time. In particular I will describe organizational strategies advisers can use to maintain continuity over the years, and will do so in the context of two annual events that students organize, the previously mentioned conference, and the Sustainability Ball, a gala fundraiser for community members prepared and hosted by students.

CREATING AN ECOVILLAGE WITHIN A GREEN LEARNING COMMUNITY: A TIERED MODEL OF GREEN EDUCATION IN A LEED-CERTIFIED RESIDENCE HALL

David Whiteman

University of South Carolina, Columbia, SC

Abstract

This paper will provide a model for creating a "Green Learning Community" and "Ecovillage" within a large on-campus residence hall. The Green Quad at the University of South Carolina is an experimental residential learning facility, with the mission of exploring how to incorporate green values throughout the daily lives of students. As a 500-student, LEED-certified residence hall, the facility offers many unusual programming opportunities, such as the ability to have students monitor their own resource consumption. Students also participate in the programs of the Green Quad Learning Center, including speakers, films, service projects, special courses and other events.

The challenge within such a residence hall is to create programming that will engage the students in meaningful ways. The model being implemented at the Green Quad creates three tiers of programming: (1) general programming, (2) programming within the Green Learning Community, and (3) programming within the "Ecovillage at USC". Beyond programs in recycling and resource monitoring, the Learning center currently offers general programming in four areas: green media (including a film festival, student media nights, visiting filmmakers), green living (classes in yoga, nutrition, cooking, and sustainable living), green building, and ecovillages.

Students become eligible to participate in the "Green Learning Community" in their second year. First year students are encouraged to prepare for participation by enrolling in a two-course interdisciplinary seminar sequence entitled "Green Explorations/Green Engagements", which is designed to allow them to (1)explore their physical and intellectual environment and then (2) engage with those in their university and local community in creating projects to increase sustainability. Environmental studies is a natural topic for an interdisciplinary approach, since environmental issues transcend traditional disciplinary boundaries, encompassing physical, political, organizational, social, and cultural aspects that affect all humans and other species. The "Green Explorations" seminar allows students new to the university to explore their immediate physical environment as well as explore how the "environment as a concept is used within a broad range of humanities and social science disciplines. The "Green Engagement" seminar allows students to build on these new understandings by undertaking their own research/advocacy project, in collaboration with key stakeholders within university and community organizations. Together the seminars will help provide future citizens with the education and skills necessary to achieve sustainable communities and societies.

When applying to live in the Green Quad students have the option of asking to be participant in the "Green Living Community", a smaller group of 50-60 students who desire the sense of a more cohesive community dedicated to experimenting with "green lifestyles" and group initiatives to promote sustainable living. Applicants who are interested in being part of the Green Learning Community receive priority consideration for living in the Green Quad. Students in the Green Learning Community live on the same floors and have the opportunity to participate in special programs, including occasional community meals, informal meetings with faculty members and visiting scholars and activists, field trips to places and events of interest, a food co-op and community garden, and on-going research projects.

Students who want to participate in the Green Learning Community have the additional option of living in the "Ecovillage at USC", housed in one wing of one floor of the Green Learning Community. The Ecovillage is designed to be a more intensive experiment in green living for 15-20 students who are interested in developing a close-knit community in which

members share meals a few times a week, share their inspirations for sustainable living, and explore what kinds of community structures might contribute to a more sustainable society. Students enroll in a common “Ecovillage at USC” course to reflect on their experiences and place them in context with the experience of ecovillages around the world.

DEVELOPMENT, QUANTIFICATION, AND APPLICATION OF A GREEN UNIVERSITY EVALUATION INDEX SYSTEM IN TAIWAN

Shin-Cheng Yeh[1], Hui-Ching Yu[2], and Chung-Huei Huang[1]

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Abstract

A Green University Evaluation Index System (GUEIS) was developed for evaluating the "extent of greening" of universities in Taiwan. From 2002 to 2004, the framework and key indicators of the GUEIS have been developed through using ad-doc approaches and the Delphi Method. Three components, i.e., "environmental systems", "environmental management", and "environmental education", 13 main indicators, and 42 sub-indicators were included in the 1st phase GUEIS. In 2005 and 2006, these were further examined through several roundtable meetings and two rounds of Delphi surveys to reflect the latest practices and progresses in campus sustainability in Taiwan. The three-component framework was kept while some of the main indicators and corresponding sub-indicators were adjusted. The 2nd phase GUEIS then contains 13 main indicators and 37 sub-indicators. To make the GUEIS applicable as a scoring system so that comparisons can be made among universities, a quantification procedure was carried out. A specified formula was designed with respect to each of the sub-indicators through intensive brainstorms of a working team. The formulas, categorized as "proportional", "standardized", or "strategic", return a score between 0 and 100. The weightings assigned for the components, main indicators, and sub-indicators were then determined based on the experts' opinions in the Delphi Method. Six universities including National Taiwan Normal University, National Chong-Hsin University, National Kaohsiung University, National Kaohsiung Normal University, National Taitung University, and National Kaohsiung Hospitality College were included in a comparative survey. According to the data collected through the help of the administrations of these universities, the scores of the components, main indicators, and sub-indicators were derived. Following analyses were then conducted for understanding the relative performances in different levels for a university or among universities. Generally speaking, the scores for "environmental education" are relatively lower then those for other two components. This revealed that environmental education should be emphasized in university campuses. The sub-indicators with most missing data were also identified through the data collection. This can be referred to in following revision work. The applicability of the GUEIS has been shown through this study and the strategies for further improvement were also suggested.

E3 ENERGY BUREAU – IRISH COLLEGES WORKING TO SAVE ENERGY

Donal McGowan

University College Dublin, Ireland

Abstract

Four Dublin-based colleges – Dublin Institute of Technology, Trinity College Dublin, Dublin City University and University College Dublin – are working together to reduce their energy consumption.

Their goal was to reduce the energy consumed in 30 key buildings by 10% over 3 years. This goal has been exceeded, a reduction of 12% in primary energy having been achieved in 3 years. Total savings from energy management activities exceeded € 1 million and 6,200 tonnes of greenhouse gas. Further savings of > € 1 million were achieved through competitive procurement of electricity and gas.

In 2005 the e3 bureau was the public sector winner of "Coordinated Energy Management Programme" category at the annual SEI Energy Awards.

As the 3 year programme has now come to an end, the colleges are in the process of arranging a second phase. The objective of the second phase will be to maintain energy use in the original 30 buildings, and achieve 10% energy savings in another 36 buildings.

In order to facilitate the monitoring of performance and the identification of waste, each building's electricity and gas current (i.e. realtime) and historical usage is available on the internet for viewing by facilities staff, students and the general public – see www.e3.ie

Sustainable Energy Ireland is providing 50% funding for the initiative under its public sector programme. Energy consultancy and project management services are being delivered by a "bureau service provider" consisting of White Young Green and Power Therm Solutions.

The proposed paper would outline the strategy used to achieve savings, the technical solutions that have been implemented and the experience gained to date.

ECOLOGICAL MEDICINE AND THE ECOLOGICAL ECONOMICS OF HEALTH CARE

Andrew Jameton and Brady Beecham

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Abstract

In 2002, sponsored by Science and Environmental Health Network and the Commonweal Foundation, a group of scholars developed the concept of "ecological medicine" – "a new field of inquiry and action to reconcile the care and health of ecosystems, populations ,communities, and individuals" (see http://www.sehn.org/ecomedicine.html). The concept suggest that a new economic balance needs to be struck between individual health care, at one end of the spectrum, and the health of the global ecosystem, at the other end of the spectrum.

In order to identify some of the features and scale of this balance, we must think anew about the costs and benefits of health care. If we were to restrict our economic measure to traditional economics, U.S. medicine – although it has problems around high costs and access – nevertheless wins many points as a generator of income, new technology, and desired services. But, if measured by its ecological footprint, U.S. health care is impossibly costly: By footprint measures, if U.S. citizens live on an average level of consumption that it would take 5 or so planets for the whole world to adopt, its health care system functions at twice that level, at an astronomical 10-planet level. A more modest level of environmental consumption must be sought.

In this paper, we essay an "ecological economics" approach to health care. Using some of the tools from ecological economics, we suggest several ways to estimate an ecologically appropriate scale of health care services. We also discuss some of the standard issued of health care – average life expectancy, levels of public health, access to health care, and the like – in terms of some of the standard concerns of ecological economics, such as converging to a sustainable level of energy consumption, coping with increasing environmental disruption, handling the flow of disease organisms in relationship to human organisms, and seeking a 'steady state' in the long run that provides both public health and sustainability.

Since academic medical centers tend to be the seat of medical innovation, and since as academic institutions, they can more readily become involved in the campus greening movement, suggestions will be made for introducing selected ecological economics concerns to clinical and public health curricula.

ECO-REPS PROGRAMS: CONDUCTING PEER OUTREACH IN RESIDENCE HALLS

Christina Erickson[1] and Chris Skoglund[2]

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[2]*University of New Hampshire, Durham, NH, USA*

Abstract

The first Eco-Reps Program started at Tufts University in 2000. Since then, nearly thirty additional programs have followed with additions each year. Despite the steady growth, there is no comprehensive review how these programs are developed, implemented, and evaluated. Our presentation will include an overview of the rationale behind Eco-Reps programs and a discussion of current trends gleaned from a survey and conference calls among other coordinators including issues around assessment and developing indicators. It will also share best practices and lessons learned for the program coordinators and other university personnel such as residential life staff. Using the University of Vermont's established Eco-Reps program and a program under development at the University of New Hampshire as case studies, we will show how Eco-Reps programs are able to achieve their results by connecting student life and operations management departments.

With the goal of educating the residential campus population, Eco-Reps programs empower students to become leaders within their living areas. Through direct instruction, role-modeling, informational bulletin boards, and activities such as trash sorts and CFL swaps, student Eco-Reps advise their peers how they can take action by making simple changes in their lifestyles and create a positive impact on the Earth. Topics addressed include waste reduction, energy conservation and efficiency, water conservation, eating for the environment, transportation, consumption, and climate change.

These programs are able to provide unique learning environments where students can connect real world issues to their daily lives and behaviors, which can result in immediate and long term gains. Potential benefits include individual student learning that can translate into greater stewardship throughout their lives and incorporation into their careers. The programs can also foster community building and create tangible impacts on the residence halls buildings and facilities. For example, resource conservation promotion in the residence hall can significantly reduce utility and operating costs for the university. Eco-Reps are an innovative example of out-of-class learning opportunities in a living setting. By looking at a number of similar programs across the country, we can begin to tease out issues of effectiveness of education and awareness on behavior modification.

EXPAND THE PARTNERSHIPS, EXPAND THE IMPACT: THE QUEEN'S CENTRE AT QUEEN'S UNIVERSITY

David L. Damon[1], AIA, LEED® AP and Blake Anderson, Sustainability Coordinator[2]

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Abstract

This discussion will focus on partnerships and impacts of the Queen's Centre, the development of a central fabric on an urban campus and broadly address campus-wide sustainable initiatives, specifically student contributions.

Faced with the need to double the size of an aging facility that houses the student center, all indoor athletic and recreational sports, and an academic school, the design team created a solution that rethinks the campus fabric, increases the function of exterior space, and blends programs and activities at a new campus crossroads. The design team was convinced that creating a scale of architecture that responded to the scale of the historic campus would yield multiple sustainable benefits:

- Water and energy usage will be reduced.
- A new central chiller plant will be created for future growth within the precinct.
- Lessons from campus-wide lighting retrofits will be adapted to reduce consumption.
- Quality of indoor spaces will be improved through daylight and low VOC materials.
- Quality of exterior spaces will be improved with courtyards that.
- Phased construction will be eased through the use of limited temporary walls and conditions.
- Swing space for 90% of programs will be built as final space, reducing the relocation factor of existing programs.
- Over 50% of the materials specified are local.
- The project will include multiple LEED projects.

With a diverse program came a diverse group of stakeholders that represented needs from student initiatives, academic pedagogies, athletic and recreation programs, the physical plant, campus planning, and constructability. The students will expand their entrepreneurial services, ranging from food services to cultural services to clubs and organizations. Student programs celebrate their commitment to sustainability through a coffee shop with fair trade coffee, sustainable-centric retail shops, and organizations that focus on campus, community, and global contributions.

Bold solutions require bold moves. Success requires diverse contributions. All partnerships must contribute to sustainable solutions. Sustainable solutions have global impacts.

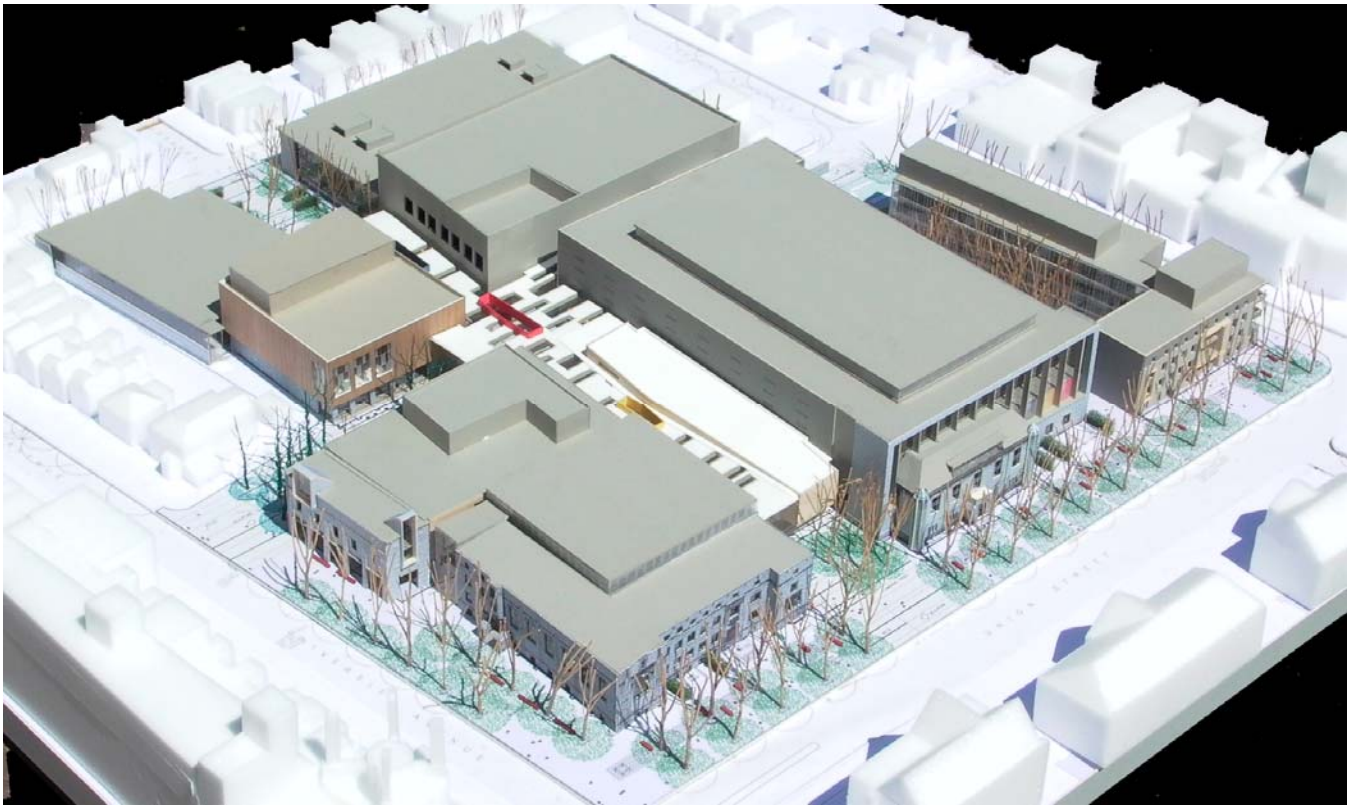

Figure 1. Queen's Centre at Queen's University

Figure 2. Common Ground Coffee House, Queen's University

Figure 3. Campus Crossroads, Indoor Street

Figure 4. Building Reuse with Program Expansion at Queen's Centre

EXPLORING POSITIVE GROWTH: THE SUSTAINABILITY INITIATIVE AT ITHACA COLLEGE

Susan Allen-Gill, Bill Artnik, Marian Brown, Dan carrion, Richard Couture, Mark Darling, Jason Hamilton, Jack Haurin, John Hopple, Robert Mudge, Bonnie Prunty, Jeff Scott, Elan Shapiro, Susan Swensen, et al.

Ithaca College, Ithaca, NY, USA

Abstract

Ithaca College has undertaken a campus-wide sustainability initiative with three major areas of focus: faculty research into related fields of study and active support for curriculum modification to infuse considerations of sustainability into courses across disciplines; campus operational reforms to become more sustainable and to provide a supportive living-learning environment that models the theory and principles presented in our classrooms; and communication within our campus community and outreach to our surrounding community in the region. We will offer a comprehensive poster session that includes presentations and displays form all the various participants involved in the Ithaca College sustainability initiative; this will include (but not be limited to) each of the following related programs and activities:

Curriculum and Research

- Finger Lakes Project – sustainability curriculum development program
- "Science in the Community"—minigrants, sustainability courses with EcoVillage at Ithaca (EVI) faculty
- 3 D Sustainability projects (Earth Café 2050, sustainable building materials display, solar trailer, solar fountain, EVI root cellar, EFI sustainable bus shelter)
- Sustainability research projects (green roofs, alternative transportation brochure, Center for Natural Sciences energy use, sustainable landscaping project, others)
- "Sustaining Our World" course and other specific courses, especially First Year Seminars

Campus Operations

- Recycling (RecycleMania) – Installments
- Composting
- HVAC Upgrades/ "Change Your World"/ "plug load"
- Clean Air – Cool Planet inventory
- Resource and Environmental Management Program
- Ithaca College Comprehensive Environmental Plan
- Sustainability in Dining Services
- Sustainably Conscious Living Community
- Natural Lands Committee and sustainable landscaping
- Sustainable Transportation Committee
- Residential Life sustainability measures
- Green purchasing (Energy Star equipment, 100% recycled content office paper, 100% recycled-content letterhead, recycled product partnership with Staples)
- Campus Building energy display system

Communication and Outreach

- Sustainability @ Ithaca display
- Sustainability @ Ithaca website
- *Positive Growth* sustainability initiative updates
- *Collective Impacts* newsletter

- Talloires Declaration progress reports
- IC Commitment to Sustainability brochure
- President's Climate Commitment – Campus Action Plan
- Student Activist: Students for Sustainability, IC Environmental Society, Student Government Association, Progressive Alliance, Campus Climate Challenge
- ICare Campaign
- Staff/faculty/student participation in regional sustainable development activities; Sustainable Tompkins, Ithaca CarShare, Green Resource Hub, Finger Lakes Buy Green, Tompkins Renewable Energy Education Alliance
- *ICO* and *Ithacan* articles related to sustainability

The broad range of activities represented under the rubric of our campus sustainability initiative should prove inspiring to other campuses. Learn from the session presenters how Ithaca College has achieved success uniting these disparate elements of the campus to both focus their individual efforts and, through strategic partnerships and collaborations, to mutually support one another's work to improve the sustainability of our campus.

EXPRESSIONS OF SUSTAINABILITY: THE CAMPUS AS AN ARBORETUM

Scott Simpson and R. Umashankar
University of Georgia, USA
Hughes Good O'Leary and Ryan, U.S.A.

Abstract

A Campus Master Plan is an essential tool to guide future growth and development and to articulate the fundamental values and desired physical character of a campus. Many master plans identify the environmental features on a campus. However, only a few explicitly address how growth and the environment will be balanced and mutually enhanced. As universities and colleges expand at a record pace, and are increasingly looked upon as models of sustainable development, the need for environmental framework and a "green" ground plane becomes ever more pertinent.

The formal designation of such an environmental framework recognizes the ecological, natural and cultural resource values contributed by the lands owned or managed by the institution. It re-affirms the institution's commitment to protecting and restoring the healthy functioning of these resources. It provides guidance for long-term future land uses and the offers the mechanism to evaluate and balance divergent priorities. Designation of the environmental framework also draws attention to resource constraints and enables the development of shared principles to address complex environmental choices.

The formalizing of this resource framework is a complex but critical exercise that select colleges and universities have advanced. Its nomenclature and articulation on the campus landscape has varied but the general theme of conscientiously preserving natural assets on campus lands has stayed consistent. A range of examples from different institutions nationally are briefly explored, followed by a detailed discussion of the University of Georgia's approach to designating its entire campus as an arboretum.

The University of Georgia campus, comprised of some 605 acres, is home to a wide variety of stately specimen trees. These provide human scale, a sense of place, cooling shade, and tranquility to students, faculty, staff and visitors. To walk this hallowed campus is to sense the pride in its heritage and hope for the future. Over the years, since the school's founding, a variety of significant trees have been planted, creating the foundation for an arboretum. In 1999, through the combined efforts of the school's most beloved football coach, Vince Dooley, and renowned horticulturist, Dr. Michael Dirr, the entire campus was designated as an Arboretum.

Rather than designate a portion of campus for the arboretum, the entire campus, encompassing three distinct areas, North, Central, South, were selected. This not only insures sustained, energetic tree planting and maintenance, but also presents opportunities for studying trees.

Previous arboreta and botanical gardens were developed on campus but succumbed to development. The first, 1833-1854, was located just east of the campus and downtown Athens. The second, on south campus, was started in the early 1900's by T.D. McHatton of the Horticulture Department. The large Quercus dentata, Quercus virginiana and Cedrus deodara are remnants from this effort. The latest, The State Botanical Garden (1968), was sited off campus to protect it from encroachment.

Tree planting and tree diversity will be sustained over time. When older trees perish, young trees will take their place. From a teaching standpoint, the tremendous woody plant diversity serves classes in Botany, Forestry, Ecology, Horticulture and Landscape Architecture. Art and Photography utilize campus as a natural extension of the classroom.

FSEEC-LANDLAB AS RESOURCE-BALANCING DESIGN CAMPUS

John L. Motloch[1] and Timothy Gray[2]

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Abstract

This paper session presents an on-going project that seeks to reconnect the people of the Midwest USA to sustainable use of their regional resources. The project – the Ball State University Land Design Institute's Green Material and Green Technology Demonstration Laboratory or "LandLab" – is located on a University field site in a suburbanizing area of Muncie, IN, near the main campus. The project, first proposed as the "Resource-balancing Design for the Field Station and Environmental Education Center and LandLab: BSU's First Green Building and Green-Built Site" (Motloch, 2002) proposed implementation of the Eco-balance Design Model (Motloch 2001), based on the seminal eco-balance design work of the Center for Maximum Potential Building Systems onto this field site.

The Ball State University LandLab Green Material and Green Technology Demonstration Laboratory is in its initial phases of implementation. These include planning for the "Field Station and Environmental Learning Center Strategic Planning and Charette" (Badger, Brown and Motloch, 2005), funded by the NSF Biological Field Stations and Marine Laboratory grant. They also include construction of Phase I of the LandLab's first integrated built-site – the strawbale built-site – via an EPA-P3 grant entitled "Enhance Sustainability through Straw-Bale Construction: Education-Research Building Demonstrating How to Live Sustainably in the Midwest" (Gray and Motloch). This P3 project is in the built environment category of the National Student Design Competition for Sustainability focusing on People, Prosperity, and the Planet. It is nearing completion of Phase I – the strawbale building component – and is anticipating Phase 2 implementation that includes built-site resources harvesting and regeneration, and integrated building-site monitoring, as an integrated water-wastewater-energy-building-landscape system that facilitates research, education and demonstration.

This paper session also discusses the added international information-flow and technology-exchange potentials of the LandLab that accrue from the University's Global Media Network (GMN); the Land Design Institute's Education for Sustainability network; and the Cooper-Skinner field site wireless system. Together these offer unique capabilities to connect habitat research and monitoring, LandLab built-site research and monitoring, and classroom and computer lab activities of the future Field Site Environmental Education /Building envisioned for the property. This paper also explores the emerging "education for sustainability" potential of the LandLab; and the national and international dimensions added to this potential by the Land Design Institute's Sustainability for the Americas initiative and sustainability consortia.

The session closes with an exploration of the unique potentials offered by the combination of the Eco-balance Design Model (Motloch 2001), figure 1, the Resource-balancing Design of the FSEEC-LandLab (Motloch 2002), the Field Station and Environmental Learning Center Strategic Planning and Charette (Badger, Brown and Motloch, 2005) the EPA-P3 Challenge (People, Planet, Prosperity), and the near-campus location of the Cooper-Skinner field site to address the 2030 Challenge of *carbon neutrality* and the 2010 Initiative for *environmental literacy in higher education* (Mazira, 2007). It speaks to how the current LandLab strawbale built-site pilot project, future LandLab Green Material and Green Technology projects, and the future Field Station Environmental Education Center can address the 2030 Challenge and the 2010 Initiative, and provide a unique laboratory for regenerative planning and design research, education, and demonstration.

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GLOBAL WARMING SOLUTIONS ON CAMPUS

Lisa Madry
National Wildlife Federation

Abstract

Global Warming Solutions on Campus
National Wildlife Federation's Campus Ecology program will host a workshop on global warming solutions on college and university campuses. The workshop will highlight global warming causes and impacts and showcase campus best practices that reduce carbon dioxide emissions on campus. Groups will have the opportunity to discuss steps to develop a climate plan for their individual campuses including how to engage students, how to gain support from the administration, and how to communicate with on and off-campus media.

NWF's Campus Ecology program has supported and recognized college and university sustainability efforts since 1989.

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GRAY WATER SYSTEMS FOR THE URBAN ENVIRONMENT

Anthony W. Brandon P.E., LEED AP
McCracken & Lopez, P.A.

Abstract

This discussion will explore the possibilities of using reclaimed wastewater to defer the deterioration of our local water aquifer. We have an opportunity to reduce the commercial and/or institutional building water demand by upwards of 70% through the use of self-contained reclaimed gray water systems. This potential water reduction will have a trickle down effect from reducing wastewater treatment plant energy consumption to supporting our fragile eco-system.

Our world needs to realize the correlation between the reductions of underground aquifer water levels, surface water levels and associated eco-systems. Our life existence is all interconnected through the water cycle.

Water reclamation systems are only a part of the puzzle to slow the water crises we are facing. Our planet needs to have conversation on the following: (1) maximizing the mandatory water reduction rates above those required by the 1992 energy policy act. (2) Researching water reclamation in regards to manufacturing. (3) Researching irrigation water reduction for agriculture.

"Why have we not actively pursed gray water reclamation systems?" The answer to this question is the available systems are not cost effective, are unreliable and require excessive maintenance. Subsequently, systems that require extensive maintenance will not be sufficiently maintained. This leads to a breakdown of system function, which ultimately leads to increased owner liability based on the risk of contamination due to pathogenic microbes.

We would like to present a system that uses time proven technologies, biological sand filtration and ultra violet light disinfection. Ancient Sanskrit 4000 years old provided guidance toward filtering water through sand for purification. This same ancient text also provided direction of placing water in the sun to reduce turbidity. We now know by the work of Downes and Blunt in 1877 and Marshall Ward in 1892 that it was primarily the ultraviolet portion of the spectrum that reduced this turbidity.

Two of the most complex issues concerning gray water reclamation systems for commercial and institutional buildings are variable wastewater flows and storing large volumes of gray water without the problems of anaerobic biological action.

Our system highlights the use of constant recirculation technology in conjunction with a biological sand filtration system and an ultra violet light disinfection system. This system addresses the true intent of LEED by offering the following:

- Minimized first cost
- Relatively zero maintenance
- No adverse impacts to the environment
- Minimize energy consumption
- Maximize technology

GREEN PROJECTS AT HARVARD: DIRECT REDUCTION OF RESOURCE CONSUMPTION VS. LONG-TERM PARADIGM SHIFT

Nathan Gauthier

Harvard Green Campus Initiative, Cambridge, MA

Abstract

This talk is part of the organized session, "*Pedagogy of the campus experience: Using campus buildings and landscapes to convey lessons of environmental stewardship*"

Harvard University has 17 LEED Registered or Certified green buildings, with many more on the way. Each of these projects are designed and constructed with a focus on sustainability and reducing environmental footprint. The cumulative effect of these efforts represent a substantial conservation of energy and natural resources, reduced emissions of toxic compounds and climate changing gasses, and drastically improved occupant health, comfort and productivity. In this regard, Harvard's LEED projects have been a tremendous success.

While reducing an individual building's energy or water consumption is a note-worthy achievement, the significance is put in a different context when compared to resource consumption campus-wide, nationally or globally. Predictions given in the IPCC's recent *Climate Change 2007: The Physical Science Basis, Summary for Policymakers* and similar reports suggest the need to bring about a significant change of culture if we hope to slow, stop, or reverse the increase in atmospheric green house gas levels. The greatest impact of designing and constructing green buildings around campus is not the direct reductions in green house gas emissions, but the ability to bring about a paradigm shift in the way future decisions are made. Harvard's built environment, like David Orr's "crystallized pedagogy," becomes a semi-permanent means of educating students, often with lessons that are unintended and undesirable. The institution has been in existence for 371 years and many of its buildings have been influencing students, faculty, staff and visitors for a hundred years or more. It is likely that decisions made in building design today will shape the world's leaders for the next 100 years or longer. Peer institutions, governments, and the private sector will see Harvard's willingness to embrace sustainable design and address global climate change as an impetus to make similar commitments. The indirect environmental benefits of green buildings on campus, if done well, will be much more significant than the immediate direct benefits.

Unfortunately, there is currently a lack of metrics used for assessing a building's effectiveness at educating occupants or for bringing about market transformation. Most attention is focused on the direct environmental impacts and those items that are easiest to measure. Often, the technologies that have the greatest direct reduction in resource consumption are not the technologies with the greatest influence on occupant behaviors. There is also a potential conflict between the institution's desire to embrace the traditional feel of campus and the need to present an updated pedagogy that reflects the importance of global climate change. This session will examine many of the decisions faced by design teams at Harvard and how they have addressed this conflict. Through survey results and a quantitative assessment of most green building technologies used at Harvard, strategies will be ranked according to their direct environmental impact as well as their indirect environmental benefits through occupant education. The session will also describe how Harvard has been able to harvest lessons learned, adopt best practices, and promote continuous improvement across the University. Harvard has recently committed to a set of sustainability principles that include "encouraging environmental inquiry and institutional learning throughout the University community." This session will describe which green building strategies we've found best suited to support this principle.

GREENING FROM GOWN TO TOWN

Sarah Mallory and Todd Matthews
LaGrange College, LaGrange, Georgia, USA

Abstract

LaGrange College has partnered with the City of LaGrange and CIFAL Atlanta (a branch of the United Nations Institute for Training and Research) in hosting workshops to promote the adoption of sustainable practices for local governments throughout the world. The first conference "Leveraging Landfills with Public-Private Partnerships", held in June 2006, provided information needed by government officials to be able to capture landfill methane and provide it to local industries for their energy needs. The second workshop in July, 2007 is bringing together 65 high-level officials from the U.S. and abroad to learn about LEED-standard certification for municipal construction. Along with the first workshop, this event "Green Buildings for Equitable Communities" is designed to assist local governments in achieving U.N. Millennium Development Goals by 2015.

LaGrange College is the site of these conferences and in addition to providing meeting space and meals, is supplying student interns who work on event planning, coordinate services, build the invitation list, and serve as workshop hosts. LaGrange College is in the final planning stages for its first LEED-certified building and will serve as a model for this process for workshop attendees.

This report, produced by the Sustainability Council of LaGrange College, describes the building of the relationship between the College and the City, as well as the subsequent involvement of CIFAL Atlanta. The organization and implementation processes for both workshops will be detailed, as well as information for colleges interested in beginning discussions necessary for developing similar partnerships.

GREENING PACIFIC! A COMMUNITY-BASED SOCIAL MARKETING CAMPAIGN TO GREEN THE OFFICES AT PACIFIC UNIVERSITY

Elaine Jane Cole and Laura Fieselman

Pacific University, Forest Grove, Oregon, USA

Abstract

This study describes a community-based social marketing (CBSM) research project to bring awareness and behavior change related to paper reduction, recycling, and purchasing of environmentally preferred products (EPP) at Pacific University, a small liberal arts university in the Pacific Northwest. A campus wide green office campaign was implemented over the 2007 spring semester. Components of the multiple methods research study were pre-post surveys, office supply purchase tracking, and a recycling characterization. The results will provide insight into the specific community-based social marketing tools that help foster environmental behavior change. Suggestions for future sustainability efforts in other universities using CBSM will be presented.

The basic scope of the green office campaign was:

1. A campus-wide green office campaign kick off media event with the university president signing the Talloires Declaration.
2. A Sustainable Offices Fair held on campus.
3. A two-week sustainable offices pledge drive.
4. Trainings for a Green *Team*, composed of key purchasers, and custodial staff were developed and monthly educational sessions were held.
5. Community-based social marketing tools, resources, and intervention materials were designed and posted throughout campus.

Results will be analyzed over summer of 2007 and will be ready for dissemination at this conference.

GROWING LEADERS: BEST PRACTICES FOR INDIVIDUALS INTERESTED IN EMPOWERING ENVIRONMENTALIST STUDENTS

Lindsay Madeira and Claire Roby

American University, Washington, DC, USA

Abstract

A ground swell of action to infuse sustainability into academia, operations, and student life has been pulsing across campuses nationwide. Concordant with this trend, American University's student sustainability group, Eco-Sense, has actively assisted in advancing sustainability on campus. Over the last year, Eco-Sense has accomplished a seven fold increase in its active membership. Additionally, the group directed a successful clean energy referendum which culminated in a passing vote of 71.2% in support of increasing campus renewable energy purchasing, gaining recognition for the National Wildlife Federation's Campus Ecology Program. The campaigning also raised the group's profile as one of the largest and most active clubs on campus. After last year's success, Eco-Sense has chosen to target campus transportation as its new campaign effort. The group has compiled a comprehensive transportation proposal bearing the name "Bikes & Biodiesel", which was drafted in October, earned a supporting resolution in the Student Government Senate in Early December and, as of January, 2007, awaits review by the administration.

While we are proud of these successes, we attribute much of the group's ability to make an impact in the past and potential to make an impact in the future, to the continued support from university staff members. Despite the plethora of factors that have played and continue to play a pivotal role in advancing sustainability on campus, the supportive partnership between campus administrators, faculty, staff, and student groups continues to be a critical aspect of our ability to achieve sustainability initiatives on campus. Although it is not included within the purview of their job description, countless individuals have found ways to engage students and incorporate their initiatives into the scope of their work and the larger workings of the campus. In turn, this creates a climate that empowers student leaders and includes them as key members of the sustainability strategy team.

This paper will attempt to identify best practices that interested staff and faculty members can use on their campuses to empower and engage student leaders and work to simultaneously achieve both groups' goals and advance overall sustainability on campus. While our experience has largely been in working with Facilities Management personnel, there is potential for cooperation between students and staff from any university department or office. Our paper will also draw from the experiences of other area schools and the organizers of the Camps Climate Challenge in our recommendations.

The paper will be divided into four categories of actions that personnel can take to empower student leaders: (1) communication (2) knowledge sharing (3) resource provision, and (4) expression of respect. Under each of these categories, the paper will provide recommendations for specific actions, which will be supported by examples of successful projects that ensued. For example, one way that staff members can provide much needed resources to students is to allow students to run and harbor the benefits from campus programs. By turning over the campus's ink cartridge and cell phone recycling programs to Eco-Sense, Facilities allowed the club to collect $70 on returns, a substantial sum for underfunded student groups.

Students, staff and the university as a whole can benefit from a productive relationship, and only through their collaboration can we truly infuse sustainability into our campuses. While many personnel have a genuine interest in advancing sustainable initiatives, due to bureaucratic politics, they are often limited in what they can advocate for. On the other hand, students are uniquely positioned to demonstrate a demand for sustainable practices and policies to higher administrators. Beyond concrete policy and operational changes, successful student activities can

bolster university academic programs and draw a more environmentally and socially conscious pool of applicants. Furthermore, student activities can bring the institution national prestige in the form of recognitions such as the *Princeton Review's* designation of AU as "the most politically active school in the United States".

The *Princeton Review's* emphasis on campus political activism highlights the importance of universities as society's centers of innovation. Students have a wealth of energy, creativity, and commitment to contribute to sustainability initiatives. Individual faculty and staff members have the unique ability, and thus responsibility, to empower students to live up to their potential to create a culture of sustainability on campus and beyond.

HEALTH PROFESSIONS STUDENT RESEARCH PROJECTS IN THE ENVIRONMENTAL ASPECTS OF HEALTH CARE EDUCATION

Andrew Jameton[1], Brady Beecham[1], Rick Yoder[2]

[1]*University of Nebraska Medical Center, Omaha, Nebraska*
[2]*University of Nebraska at Omaha, Omaha, Nebraska*

Abstract

One of the more challenging areas of academic greening is that of health care education. Reasons include (a) the high intensity of material and energy consumption in the health care sector, (b) the technological optimism the health professions, and (c) the focus of students on human services as distinguished from broader environmental concerns.

One way to address these obstacles is to involve students in research projects that (a) are relevant to the issues, (b) are achievable in a short period, (c) enhance research skills, and (d) increase opportunity for student publications.

Opportunities are increasing for implementing this strategy at University of Nebraska Medical Center. In medical education, one-month, elective medical student rotations in allow for research projects in the fourth year; in the new College of Public health, public health students "capstone" projects allow somewhat more extensive projects.

For medical students, surveys of the intensity of energy use by medical facilities and procedures are possible, as are background papers on the chemical generation of selected pharmaceuticals. For public health students, work should focus on the ecological footprint and in particular, the energy footprint, of public-health related policies and practices. More specific project designs are described in the full paper.

In the past, projects had to be limited to on-paper, academic sources. However, the web now enhances the ability of students to contact key individuals and to obtain information regarding commercial materials and practices. Because projects must be brief, students will be taught sound, "journalistic" approaches to collecting information and interviewing key individuals, following the methods of David Quammen and Elizabeth Kolbert, for example.

Additional areas of health care professional education will also be identified as suitable areas for student research projects.

INSTITUTIONALIZING SUSTAINABILTY IN CAMPUS MASTER PLANNING

Tavey McDaniel Capps
Duke University, Durham, NC, USA

Abstract

As colleges and universities across the US are expanding to meet growing enrollment pressures, they have the unique opportunity and responsibility to address sustainability in all aspects of new campus development. From the type of buildings and transportation infrastructure to the construction practices and landscaping techniques, development on a college campus has impacts that stretch far beyond their ivory towers.

Unfortunately, much campus development does not truly address these potential impacts. Far too often, buildings are designed, built and maintained to meet the needs of the university without the benefit of viewing the process through the lens of sustainability. Duke University has recognized this need to interject sustainability into all aspects of campus planning and has put theory into practice with our new Central Campus development.

Central Campus, a 200-acre redevelopment project, has attempted to integrate sustainability initiatives into all aspects of the project, from designing a transit-oriented, walkable campus to restoring biological diversity. One of the foundational principles of this development is that "Central Campus should reflect the values of sustainability, environmental stewardship, the presence of green space, and resource conservation." Central Campus will not only provide space for students to learn in the classroom, but will be a "living laboratory" that educates students every day through their environment and the physical campus that surrounds them.

Using Duke's Central Campus as a case study, I would like to discuss the challenges of institutionalizing sustainability into master planning and design process and the methods we have employed on this project.

These include –

- Convening a sustainability review of the Central Campus design process – bringing outside experts to critique and review the planned development
- Developing sustainability metrics to guide our design and review process through establishing targets and goals for all aspects of the project
- Creating a review process for the architects and design team that ensures consideration of sustainability throughout the entire planning process

INTEGRATING CAMPUS SUSTAINABILITY AND EDUCATION

Beth Conlin[1], Steve Lanou[2], Amanda Graham[1], Peter Cooper[3] and Elsa Olivetti[4]

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Abstract

Colleges and universities are emerging as important test beds of institutional response to the challenges of climate change and the need for new energy strategies. Institutions of higher education are not only leveraging their research and educational expertise, but also adopting and developing innovative operational practices that seek to minimize the college's own environmental impacts associated with its growing energy and resource use, practices that can then be disseminated.

MIT has developed an ambitious institute-wide sustainable energy initiative to address the fundamental challenges of today's energy crisis that utilizes a unique framework marrying MIT's core energy research assets with programs to improve sustainability education and reduce greenhouse gas emissions from MIT's own facilities. The MIT Energy Initiative was announced in 2006 by MIT's new president Susan Hockfield and challenges the entire MIT community to forge cross-disciplinary collaborations and solutions for sustainable energy. MIT's Energy Initiative has been designed to engage faculty, students, and staff to find and demonstrate solutions to global energy challenges in basic and applied research, education, and leadership by example.

Workshop presenters will represent the three perspectives of student, administration, and academic staff, and will focus on their role in shaping the "Walking the Talk" component of the Energy Initiative. "Walking the Talk" seeks to reduce MIT's own carbon footprint and in doing so demonstrate the possibilities of new energy generation, efficiency, and behavior change strategies.

The panelists will describe how MIT's Energy Initiative evolved beyond basic and applied research to embrace education and MIT's own institutional obligations to address greenhouse gas emissions in a collaborative fashion, and how the Initiative built upon established grassroots partnerships between students, academic staff, and administration. Faculty and staff built a case for the need and feasibility of a campus-based educational program, while students promoted campus energy and sustainability programs as a vital student service and an important educational opportunity. This experience offers insights into developing mechanisms to leverage and coordinate the rich and diverse perspectives and expertise of a university community and lay the groundwork for high level commitment in campus initiatives.

Workshop presenters will outline practical approaches to develop a greenhouse gas target and strategies to reduce campus emissions; discuss project-based curricula that educate students while simultaneously developing solutions for campus sustainability; and outline effective strategies for organizing student interest and expertise to effect campus change through academic and non-academic projects. Topics include alternative energy, transportation, conservation measures, visioning for the future, integrating sustainability projects across the curriculum, building energy measurement and reporting, sustainable design, innovative financial mechanisms, and behavior change.

The development of MIT's Energy Initiative required the creation of new approaches, strategies, and frameworks for integrating and leveraging diverse student, staff, faculty, and community interests and expertise to collectively create an institution that is a learning laboratory of solutions to energy and climate needs. These lessons and insights are applicable to college campuses world-wide.

INTEGRATING SUSTAINABILITY INTO HIGHER EDUCATION AT ILLINOIS WESLEYAN UNIVERSITY

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Abstract

In May 2006, Illinois Wesleyan University hosted a three-day workshop on "Integrating Environmental Sustainability into Education at IWU" for university faculty, staff and administrators not engaged in environmental work on campus. The workshop was designed to promote sustainability thinking at an institutional level, and came after years of concern among environmental studies faculty over the political difficulties of requiring environmental literacy of all students. More than 40 members of the IWU community participated, including 22 faculty members, representing fifteen academic departments. The keynote address by Dr. Tony Cortese immediately galvanized the group around the idea that **sustainability is about much more than protecting the environment:** it is about understanding the linkages between economic wellbeing, social justice, and environmental and human health; it is about applying systems thinking to our everyday campus practices and teaching pedagogies across the curriculum; and it is about "making the invisible visible." While none of these ideas were of themselves new to environmental studies faculty, the discussions that developed among participants in workshop sessions made clear that articulating sustainability thinking in this way had powerful results that inspired people to take action in ways that simply talking about the immediate environmental impacts of campus actions had not. As part of the workshop, participants were encouraged to identify and develop their own "sustainability project" for inclusion in a course or a campus program for which they were responsible. In total 19 project proposals were submitted.

In this presentation we briefly summarize the workshop approach, describing workshop events and themes, preparatory work, and post-workshop evaluations and activities. We then present three model projects that faculty and staff developed as a result of this workshop, including two projects that revamped existing classes in statistical psychology and mathematical modeling to incorporate sustainability themes and a campus project in the Admissions office to promote paperless applications and to offset carbon emissions from miles accrued while recruiting students.

INTEGRATING SUSTAINABILITY PROGRAMS WITH STUDENT AND COMMUNITY-BASED ORGANIZATIONS

F. Norman Christopher

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Abstract

Background

For the past few years Grand Valley State University (GVSU) has chosen to follow an integrated systems approach to sustainability. This model, adopted from Tony Cortese at Second Nature is interdisciplinary in nature and integrates complementary sustainability initiatives across campus operations, curriculum and faculty, students, and community engagements.

In October 2005 GVSU completed its first baseline indicator report "Sustainability at GSU" (www.gvsu.edu/sustainability), launched at the first ever "Campus Sustainability Day" at GVSU. In 2006, Campus Sustainability Day became "Campus Sustainability Week" with a full range of events for faculty/staff and students. Recently, GVSU signed the Talloires Declaration, which advances education for sustainable development and environmental stewardship.

In addition, GVSU is also a founding member of the Community Sustainability Partnership of Grand Rapids, Michigan (CSP, www.grpartners.org). This organization, which now has over 100 members and partners, seeks to build sustainable communities in West Michigan through improving environmental stewardship, achieving economic prosperity, and fostering social justice. Recently, the CSP and the City of Grand Rapids received the first UN University U.S. designation as a Regional Center for Expertise (RCE) in education for sustainable development.

Proposal

Over the last few years students at GVSU have created a simple action plan for sustainability which includes:

- Create awareness on campus about sustainability
- Using sustainability principles, how can I make a difference in my own life?
- How can I pass sustainability principles on to someone else?

During the 2006 GVSU Campus Sustainability Week, held at several campus locations, included activities and presentations, events, workshops, and demonstrations to help everyone on campus and in the community learn about what sustainability means in our own lives.

This presentation will explore how students with varied interdisciplinary backgrounds, majors, and minors become actively engaged in Community Sustainability Partnership (CSP) programs and projects through internships, independent study, and practicum work. Several examples of key platform projects within the community will be described as well as the value created by student involvement. The student engagement will highlight the "triple bottom line" including environmental stewardship, economic prosperity, social equity and quality of life issues.

LEAN DESIGN TOWARD SUSTAINABLE UNIVERSITY FACILITIES

Wilfred H. Roudebush, Ph.D.
Bowling Green State University, Bowling Green, Ohio, USA

Abstract

Lean Design is a new paradigm for campus facilities planning and design. Two main purposes of Lean Design are the reduction of building project design and construction durations. This reduction is accomplished through reduction or elimination of eight types of waste that include: over-production, over-processing, inventory, motion, transportation, waiting, correction of mistakes/defects, and human intellect.

The paper will consist of two main topics. First, it will present Lean Design and its application to a design firm, a project, and a client. Second, it will describe the process of applying Lean Design to a building project at Bowling Green State University (BGSU) in Bowling Green, Ohio. A Lean Design steering committee is currently working with university administrators and the BGSU Office of Design and Construction on the upcoming BGSU Student Medical Center renovation and expansion. The building project is about to enter the schematic design phase.

Lean Design has the potential to guide a building project toward sustainability through reduction or elimination of the eight types of waste that occur during building design (by the design firm), building construction (by the construction company), and building use (by the client) through the building lifecycle. Outcomes from application of the Lean Design process on the BGSU Student Medical Center renovation and expansion will be presented at the conference.

LEARNING FROM THE GREEN CAMPUS: COMBINING RENEWABLE ENERGY WITH COMPACT DEVELOPMENT TO GUIDE MUNICIPAL SUSTAINABILITY INITIATIVES

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Paper Abstract

Universities have become the vanguards of sustainable design and development within the United States. This paper highlights two distinct trends occurring on campuses that cities should recognize in order to foster collaborative projects and to strengthen their own sustainability goals. As institutions administering significant populations, real estate holdings, and occupiable square footage, campuses themselves are becoming the test laboratories for community-scale sustainable development strategies. Complimenting the ubiquitous emphasis on green building standards, the dual trends of renewable energy purchasing and compact mixed-use development are appreciably lessening the impact of thousands of individual ecological footprints on a campus. I will describe four case studies for both of these strategies, drawing from the campus administration and facilities literature as well as from my direct professional experience in campus planning.

During the past five years several universities quickly became the ascendant consumers of renewable energy within the U.S., thus generating a reliable consumer demand for the wind turbine, photovoltaic, and biomass industries. The University of Pennsylvania and the State University of New York at Buffalo are currently the largest purchasers of renewable energy in their respected states, having entered into long-term contracts with wind power farms within their region. The smaller-sized Unity College in central Maine receives 100% of its energy needs from hydro-electricity and biomass, thus creating a continuous market for regionally-produced renewable power. Iowa Lakes Community College possesses one of the largest on-site wind turbines of any U.S. institution, generating power only a few blocks from the campus.

Paralleling these renewable energy purchases is the uniform interest in building more high-density forms of infill development. From the central city campus of the University of Pennsylvania, the small city setting of the University of Michigan, the inner-ring suburbia of Houston Baptist University, to the bucolic backdrop of the University of Connecticut, campuses both public and private, large and small, are employing urban design principles to establish compact walkable, transit-friendly, and therefore more sustainable, communities.

These two promising trends observed on campuses throughout the country, when combined, provide a compelling model for collaboration with nearby municipalities and provide guidance for other cities pursuing a range of sustainability initiatives such as green building ordinances, mixed-use infill development, and renewable energy use goals.

LIVING GREEN: SUSTAINABLE DIRECTIONS FOR RESIDENTIAL LEARNING COMMUNITIES

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Abstract

Academic institutions signing the Talloires Declaration committed to advancing environmental sustainability in higher education through a range of initiatives spanning teaching, research, operations, and outreach. Promotion of a sustainable lifestyle through housing and residence education is an opportunity to further the Talloires goals by carrying sustainability education beyond the classroom and into the living quarters of college students.

Residential Learning Communities (RLCs) are seamless environments where living and learning center on a specific topic, and thus particularly suited for delivering sustainability education. Despite the growing number of RLCs in college campuses nationwide only a scant number of them aims in this direction; moreover, it appears that there is no commonly accepted definition of sustainable RLCs or set standards for their physical environment and educational programs.

This paper reports on an ongoing exploratory research that benchmarks a range of residential learning communities in US universities and colleges. Its purpose is twofold, to formulate an operational definition of sustainability as applied to RLCs, and then to develop a viable model for a sustainability-oriented RLC for pilot implementation at the University of Florida. Acknowledging that all stakeholders are needed to carry out any sustainability effort, this study is being done by the College of Design, Construction and Planning in partnership with UF's Department of Housing and Residence Education and Office of Sustainability.

Method

The research followed the standard benchmarking process of planning, analysis, and integration to identify comparison issues and peers, determine objectives, collect and analyze data, and establish and communicate performance criteria – the environmental, programmatic, and operational characteristics of a sustainable RLC. Benchmarking criteria addressed institutional sustainability objectives and RLC academic goals. Data was collected as self-reported by academic institutions in their digital and printed publications, and from data presented in trade literature and public-access RLC registries. One case selected from criteria surfaced in the benchmarking process was studied to obtain complementary first-hand information on perceived strengths, weaknesses, opportunities and challenges, and future directions.

Findings

Findings from the integration phase of the benchmarking study led to formulating a model for sustainability-oriented RLCs, comprising desirable physical as well as programmatic features – mission statement and purpose, resident qualifications and requirements criteria, and development activities and academic program templates. In the long term, findings from this study will be the basis for applied research centered on implementation of the model in a retrofitted student housing community at UF. A multi-cultural, 208-unit graduate and family housing village was identified as the site for the future sustainability-oriented RLC.

This research, as part of the larger initiative in which it is inscribed, will contribute to educating different generations of national and international students and their families about the pressing imperative to live sustainably. It will help disseminate pro-environmental values beyond academia to answer the call for universities to become agents of change toward healthier and more survivable culture.

LOYOLA INTERCOLLEGIATE ATHLETIC COMPLEX – PUSHING THE ENVELOPE OF LANDFILL RECLAMATION

Steve Hamwey, Rebecca Verner, and Trey Sasser
Loyola College, Baltimore,Maryland

Abstract

Landfill Reclamation – Beyond Best Practice.

With a conscious commitment towards sustainability, smart growth and campus planning, Loyola College, in Baltimore, Maryland, hired Sasaki Associates to determine the feasibility of a 70 acre site, primarily composed of a 50 acre landfill, for a recreational center. Many US campuses currently find themselves running out of land for future development. This project demonstrates that it is feasible to reclaim landfill. Campuses across the nation can adapt this approach and consider landfills for future expansion regardless of cost, permitting and constraints.

The design challenge for the completed master plan – now under construction – was to integrate green design, reclaim and transform the constrained site, and accommodate the university's athletic program: three championship playing fields, a 6000 spectator stadium, parking and alternative transportation. Finding a way to create a sustainable and buildable design was paramount and would require a high density plan, necessitating major earthwork and a clear and concise strategy for the reclamation of the abandoned and contaminated site. This innovative design rethinks traditional facility construction and operation.

Incorrectly capped and closed to the public, resident continue to use the landfill site endangering themselves. By reclaiming the land and opening it up to the community, Loyola is practicing both campus smart growth and community smart growth which increases public safety. The sustainable design promotes the preservation of high quality stand of mature tree species, reforestation and re-establishment of currently degraded native habitats, management of site stormwater, collection of methane gases, and the proper capping of a landfill.

The complicated task of balancing the needs of the community, city agencies, and the University, revealed a tight limit of disturbance. To accommodate the program, Sasaki's design incorporates many innovative sustainable technologies. The site requires deep dynamic compaction and it is necessary to use reinforced steep slopes to create sizable fields. The significantly sloped edges of the site are supported using a composite of recycled materials and seeded with native grasses. Sculptural landforms crate opportunities for alternative natural grass seat walls along the fields, thus reducing the size of the stadium. Detention ponds on the East and West of the site collect stormwater from the slopes and fields preparing it for potential recycled use.

The systems beneath the playing fields are complicated; a weaving and layering of stormwater control, gas collection reinforced structures, and utilities. The terraced plains of fields create shallow space between the landfill cap and the field surfaces. A uniquely profiled stormwater management system collects and redirects water to detention ponds while strategically intertwining itself with vegetated swales, gas collection, and utility systems.

The goal was to find a parcel of land as close to the main campus as possible for development to avoid sprawl and pollution. At less than one mile form the main campus, the intentionally limited parking lots demand alternative sources of transportation and provide a reduction in carbon emissions.

The Loyola Intercollegiate Athletic Complex project promotes the understanding of new strategies to balance the needs of universities, cities and communities and form consensus, inspires designers to expand best practice ideas to push innovative solutions and transformations for landfills and provides and opportunity to gain an understanding of specific technologies and technological approaches to landfills reclamation.

MAKING LEED A REALITY; ARNOLD SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF SOUTH CAROLINA

Gary R. Lang, AIA, LEED AP; Principal in Charge[1], Matt McNeely, LEED AP[1], Kathryn L. Horne, AIA, LEED AP[1], Charles Jeffcoat, AIA Director of Campus Planning and Construction[2]

[1] The FWA Group Architects, Charlotte, NC
[2]University of South Carolina, Columbia, SC Not confirmed

Abstract

The challenge of moving a university campus toward a sustainable future requires an unprecedented coalition of leaders who have a vision. Designing buildings that will support this vision requires the skills and knowledge of the entire project team, including university administration and facilities staff, faculty, architects, engineers and contractors.

This presentation focuses on the vision, leadership and the process that enable the University of South Carolina to plan, design and construct a project for LEED certification, the Arnold School of Public Health. Through a team-based approach to planning, design and construction that highlighted an integrated, holistic effort, goals for incorporating the principles of sustainability were established and strategies for achieving the goals identified.

The case study highlights the design process and outlines the goals that were established and examines the reality of ensuring that LEED requirements are met during the construction phase. Reduction of water use, including the incorporation of an underground cistern, and reduction of construction waste through recycling are a few of the strategies incorporated in the design. Focus on improving the quality of the indoor environment through the use of daylighting, and reduction of VOC emitting materials, among others are aimed at creating healthy environments that promote the health and sustainability for student, faculty and staff working in the building.

The challenge of ensuring that the design intent becomes a reality through the construction process requires commitment by the University, the Design Team and the Contractor. This presentation will examine the practical requirements of incorporating the sustainable design strategies through development of the materials specifications, partnering with the contractor, review of submittal data during construction and illustrate the importance of vigilance in the field during the day to day construction operations.

Relevance of the proposal to the conference theme

The presentation examines sustainable building practices and their practical application in the design and construction of a new, five story, 104,000 square foot academic and research facility for the University of South Carolina. The University's commitment to sustainable practices including energy and resource use reductions and improvement of the indoor environment for students and faculty were priorities that shaped the design.

The Arnold School of Public Health is the cornerstone of the University's *Innovista* Research campus and includes research laboratories and programs of the departments of exercise science and environmental health sciences, as well as the Prevention Research Center of the Children's Physical Activity Research Group.

MAKING THE CONNECTION BETWEEN THE UNIVERSTIY AND STATE GOVERNMENT

William M. Leahy CEM, CDSM

The Institute for Sustainable Energy
Easter Connecticut State University, Willimantic, CT

Abstract

As an institution dedicated to research and learning in pursuit of a healthy and sustainable future for all societies, Eastern Connecticut State University (ECSU) is positioning itself to address the issue of climate change and environmental sustainability. By incorporating concern for the environment into campus life, Eastern seeks to expand the role universities play in influencing decisions through its Institute for Sustainable Energy and Green Campus Initiative. Eastern has moved from intellectual discourse to direct action as it seeks to influence public policy, and establishes a network between Connecticut universities and government working together toward the common goal of sustainability.

The Board of Trustees of the Connecticut State University System established a Center of Excellence in Sustainable Energy Studies at ECSU in July 2001. In support of the Center, the Board of Trustees established the undergraduate Sustainable Energy Studies Program and Institute for Sustainable Energy to commence programs which promote and improve the awareness and understanding of sustainable energy issues. The Institute for Sustainable Energy was formed to support the development of public policy, provide educational outreach, plus identify and develop practices and technologies vital to achieving a sustainable energy future in Connecticut. The Institute is 100% grant funded, and is staffed by specialists in energy efficiency, education, low-income energy assistance, and demand side energy management. The Institute provides cooperative work experiences for undergraduate student interns. The Institute advises Connecticut's Office of Policy and Management, the Connecticut Clean Energy Fund, the Connecticut Department of Public Utility Control, Connecticut Energy Advisory Board and in 2005 and 2006 was responsible for facilitating the development of Connecticut's State Energy Plan. In 2006, the Institute completed a five-year strategic energy plan for three of the four Connecticut State University campuses. The Institute developed a twelve-step guideline to engage campuses in a comprehensive approach that lowers energy use and cost, reduces greenhouse gases from building systems and transportation, improves water and waste water management, increases recycling and safe hazardous waste disposal, and encourages the procurement of environmentally friendly products. The model uses a team-based approach engaging university administrative staff, students, and faculty and local technical experts.

The Institute has been awarded EPA and DOE's 2004 National Energy Star Partner of the Year Award for excellence in energy education, 2004 and 2005 EPA Regional Environmental Merit Award for Energy Star activities and a 2006 Connecticut Quality Innovation Award.

For outreach to the state, the Institute annually hosts multiple training seminars for local buildings inspectors, focused on technical application information concerning energy related upgrades to the state building code and high performance building design standards. During the winter of 2005-06, Eastern's Facility Management Department and the Institute conducted a biodiesel pilot in which the campus's south heating plant burned B-20 biodiesel in order to collect air emissions data.

Connecticut's Office of Policy and Management has engaged the students at the Institute to conduct benchmarking analysis of 180 office buildings under the control of the CT DPW, including: motor vehicle offices, courthouses, regional technical vocational high schools, DEP Agriculture Laboratories and state police barracks. The project revealed that many recently renovated facilities are approaching eh EnergyStar Award level, but most state buildings were very inefficient. The State has 1400 office buildings and is facing dramatic increases in energy costs. The Institute's interns also utilized benchmarking to assist eight Connecticut communities

to identify inefficient public facilities. ISE has benchmarked over 150 public schools and municipal buildings in order to help communities' with limited capital and maintenance resources identify cost effective energy efficiency improvements. The analysis revealed that Connecticut's public schools are generally inefficient and fall in the lowest benchmarking quartile nationally. Through cost-effective conservation, communities could reduce energy consumption in this sector by 30 to 35 percent. The process encourages communities to participate in utility sponsored conservation programs and to aggregate projects to attract third party performance contractors.

Students at the Institute have developed and provide ongoing support for three websites including the Institute's site at www.sustainenergy.org, a site for High School teachers at www.ctenergyeducation.com and a general energy information site for all states residences at www.ctenergyinfo.com. This last site is used extensively to inform low income households about energy assistance programs and energy efficiency programs.

MODESTY OF SCALE AS A HEALTH PROFESSIONS VALUE

Andrew Jameton
University of Nebraska Medical Center, Omaha, Nebraska

Abstract

This paper briefly reflects on a segment of a larger project – to map salient environmental values into codes and principles of health care ethics, which is often taught as an undergraduate subject in philosophy and pre-professional programs. This segment considers value of material 'modesty' or 'adequacy'.

Part 1

For health care practitioners to adapt to environmental change they need to include a commitment to environmental concerns among their professional values. However, the overlap between these sets of values is slim, and fitness to occupational specialties can be justified. If health professionals are to adopt these additional values, they need to be thinking about their relevance early in their careers, particularly at the undergraduate level where ideas can more easily be explored.

Part 2

An important starting point is to outline those values from environmental ethics that can most readily be applied to health care. Some of those values include 'environmental health', 'respect for life', 'a sense of interconnectedness', and 'modesty of consumption'.

Part 3

In this paper, I focus primarily on just one of these values, "modesty of consumption". Here I explore connections between health care and environmental ethics with reference to such scale-related concepts as 'balance', 'limits', 'adequacy', and in particular 'modesty'. I discuss some of the problems of these scaling concepts as they relate to popular culture and images of these concepts.

Part 4

Concepts of balance and adequacy, or 'environmental efficiency' appeal directly to the infrastructure of consequentialism underlying current ethical challenges facing the health professions,, particularly in disaster planning and public health. I consider how these scaling concerns modify but likely leave unscathed the essential maximizing course of consequentialism.

Regrettably these concepts barely challenge current health-related mores, and language more fundamentally transformational may well be needed. The increasing need to invent ethics in the face of major global change is discussed.

ORAL SESSION: PEDAGOGY OF THE CAMPUS EXPERIENCE: USING CAMPUS BUILDINGS AND LANDSCAPES TO CONVEY LESSONS OF ENVIRONMENTAL STEWARDSHIP

Speakers: John Petersen[1], Cindy Pollock Shea2, Nathan Gauthier[3], R. Umashankar[4]

[1]Oberlin College, Oberlin, OH, USA
[2]University of North Carolina, Chapel Hill, NC, USA
[3]Harvard University, Cambridge, MA, USA
[4]Smith Group JJR, Ann Arbor, MI, USA

Abstract

David Orr has described a "pedagogy of architecture" that to date has played a negative rather than positive role in fostering environmental understanding and stewardship. Most of the existing buildings on college campuses implicitly teach our students that natural resources are cheap and abundant, that place is irrelevant to design and that issues of climate change and biotic impoverishment are disconnected and removed from the realities of the campus experience. This critique can easily be extended to the entire campus experience.

The good news is that during the last decade Colleges and Universities have played a leading role in advancing environmentally sustainable practices. With that said, the pedagogy appears to be lagging behind advances in technology and management. Construction and management practices that increase energy and resource use efficiency, reduce toxicity, foster biodiversity, locally source materials and capture renewable energy are certainly laudable in and of themselves. However, it is crucial to fully recognize and take advantage of the many teaching and learning opportunities associated with these actions. Campus buildings, landscapes and infrastructure are powerful resourced that can and should serve as laboratories for learning in the daily lives of students.

How do the daily experiences that students have interacting with campus buildings and landscape inform their attitudes and behaviors? How can campus and buildings be designed so that these experiences contribute to an ethic of environmental stewardship? This special session will consider a number of different ways in which campus buildings – both existing stock and new "green" buildings – can be integrated into a non-classroom curriculum of environmental stewardship.

PHILOSPHICAL FOUNDATIONS: AM I *NOW* MORALLY OBLIGATED TO NOT REPRODUCE?

Dr. David W. Concepcion
Ball State University, Muncie, IN, USA

Abstract

Insofar as changes in behavior and policy flow from changes in values, it is important to reflect upon our basic values and principles. Al Gore has recently reminded us of two simple equations: "Old habits + old technology = predictable consequences. Old habits + new technologies= dramatically altered consequences."1 In this discussion-based presentation and with the intention of being respectfully but intensely personal, I focus on our old habit of ignoring the environmental impact of our own reproductive decisions (even if we conscientiously recognize that global population pressures and support international policies designed to alleviate them). I wonder: Am I now morally obligated to not reproduce?

While I argue that the answer is "no", while I hold that a person could blamelessly reproduce, I also argue that if there is a right to reproduce it is now limited. I contend that there is a *prima facie* obligation on many currently existing people to reproduce below replacement rate. Indeed, as long as predictable contingencies continue, such as a correlation between high consumption/pollution rates and living in certain countries, some people have a prima facie obligation to not reproduce at all. In defending this sustainability-base criticism of some people who would over-reproduce, a criticism hat has analogies in criticism of people who would over consume, I will illustrate how the existence of this moral obligation need and should not commit us to draconian or eugenic public policy.

PERCEPTIONS OF RECYCLING ON CAMPUS: OPPORTUNITIES FOR COMMUNICATION

Lauren K. Olson

Skunkworks Labs, Michigan State University, East Lansing, USA

Abstract

This study seeks to provide information about how undergraduate students think, act, and behave regarding recycling decisions to better inform the shape of Michigan State University recycling program for dormitory residents. The university plan will require a large investment, as no comprehensive recycling is in place. The role of this behavioral study seeks to understand how students make their decisions using a psychological and quantifiable method of mental models. The models will pinpoint gaps in information and misconceptions to enhance the changes of a successful program.

To understand what information students need to make better decisions, I am using quantifiable sets of exploratory interviews using mental models. Mental models are psychological representations of real or hypothetical situations based on people's perceptions and level of knowledge. Two separate models will result from this study: one being how experts perceive recycling, the other how students conceive recycling. Local experts were drawn from the community, persons such as municipality recycling coordinators, volunteer coordinators and people in the private sector of recycling material management. From the expert interviews conducted, a mental model was created representing the expert view. Using this mental model, an interview protocol will be made for a representative sample of students. The result of these interviews will shape the student mental model. Comparison of the two models will reveal disparities within student knowledge.

In the tradeoff of infrastructure investment by the university, the optimal benefit is increased quality controlled recycling by students. The reach will help create on-point communication efforts to assist students in making well-informed decisions. The final paper will represent an empirical assessment of what students already know, along with a scientific determination of missing information needed for decision-making. Aspects of this study are applicable to a campus considering recycling or a pre-existing recycling program seeking a larger and more quality load.

RETURNING TO THE SOURCE: A COLLABORATIVE EFFORT TO MONITOR WATERSHED QUALITY

Shannon Earhart and Michael Kelrick

Truman State University, Kirksville, Missouri
February 2007

Recent concern about the condition of the water supply in the City of Kirksville's (Missouri) reservoirs resulted in the formation of a Watershed Commission, advisory to the Kirksville City Council. An outgrowth of the Commission's activities has been to advocate for a monitoring regime to measure indicators of water quality in the city's drinking water reservoirs, Forest Lake and Hazel Creek Reservoir. Several members of the Division of Science at Truman State University have taken responsibility for this effort, implementing sample collections and evaluation as part of their research and class activities. This participation represents a significant, unusual and appropriate bridge between the university and the community.

We have been involved in the watershed monitoring program via an interdisciplinary internship – an individualized 5-credit course we proposed. Internship objectives included working with a network of people to assemble a Geographic Information Systems (GIS) database for the two watersheds, creating a framework to which monitoring data can be continuously submitted. Analysis with this database will enable linkages to be made between land features, land use practices and consequences for water quality. The information infrastructure will also be used to monitor future characteristics of the watersheds.

A group of Truman State University faculty members and students from various scientific fields have been and are continuing to assess water quality in the reservoirs themselves, including estimating levels of microbial and chemical contaminants, as well as indicators of sedimentation and watershed erosion. Our internship is also addressing the need for public outreach. In consultation with Watershed Commission members, we are fine tuning a survey to be administered to landowners within the watersheds. By contacting the relevant citizens directly with our survey, we hope to learn about both their land use practices that could influence reservoir water quality, as well as their own recognition of their roles in determining conditions in the reservoirs. Our hope has been that framing the survey effort as an educational undertaking implemented by a student may lower the sense of "threat of regulation" many landowners might feel.

We will be administering the survey in the next several weeks, and then proceeding to add the collected information to the GIS database that has already been under construction since September, 2006. In our presentation, we will describe what we have learned from our efforts, as well as how we intend to maintain the project into the future.

STORMWATER = CAMPUS WATER

Cory Gallo [1] and Larissa Larsen [2]
[1] JJR, LLC, Ann Arbor, MI, USA
[2] University of Michigan, Ann Arbor, MI, USA

Abstract

Background:

The University of Michigan (U of M), like many other institutions around the country, is testing green building technologies for their effectiveness, long-term maintainability and overall usefulness. The LEED registered Ross School of Business, currently under construction, will be an important testing ground for many of these technologies. Specifically unique will be its use of best management practices (BMPs) to reduce the building's watershed footprint. The project will include the first green roof, porous concrete, flow-through planters, and underground infiltration chambers on the U of M campus. Moreover, many of these strategies will be used for the first time in the region, thereby creating the campus as a regional leader which cities and communities will look to for inspiration.

This paper will explore what would be the large-scale impacts if these strategies and others could be implemented across the entire campus.

Goals and Conclusions:

The goals of this paper will be threefold. First it will highlight the specific BMPs being implemented at the Ross School of Business and how they were adapted to the specific context of the project. Second, if it were possible to implement these strategies across the entire Central Campus of U of M, how much of an impact would they have on reducing the campuses watershed footprint? And third, looking more broadly at the campuses use of water for landscape, the paper will question if the campus could use rainwater harvesting for all of its irrigation needs thereby saving the University millions of gallons of potable water use every year.

Reducing the Campus Watershed Footprint. Due to development of impervious surfaces, changes in soil compaction and removal of native plant species, water that falls on the campus moves across and may leave the site in ways than are very different from the natural conditions. The implementation of BMPs can greatly lessen these negative impacts by promoting infiltration and bio-retention as close to where the rain fell as possible. If it were possible to retrofit the existing U of M campus with strategies similar to those being used at the School of Business, the campus' watershed could closely resemble its natural state. By using the existing campus as the baseline, this paper will explore and quantify how various strategies would reduce the campus' watershed footprint

Reducing Potable Water Demand for Irrigation. Universities are often stuck in a sustainable conundrum when considering the great lawn. Historically, most North American campuses have included expansive areas of pristine, green lawn. However, the green lawn is a landscape of consumption, requiring massive amounts of irrigation through the harsh summer. Universities can often offset irrigation demand through the use of precipitation and evapo-transpiration sensors to minimize water use to the critical times, or by replacing some lawn areas with native or adapted species. However, the image of a freshman playing Frisbee through a thicket of wetland plants will probably never grace the cover of a marketing brochure. By looking at stormwater as an asset we have the opportunity to change the water use regimes while maintaining this cultural collegiate aesthetic. Instead of sending rain away in one pipe, only to treat it and bring it back in another pipe, it can be used to irrigate and eventually infiltrate or evaporate where it originally fell, thereby maintaining the campuses natural hydrologic state.

Cisterns are used extensively throughout the country, but rarely on the scale of a campus. The paper will use the U of M's existing demand for potable water to explore the feasibility of adapting the campus to an irrigation system that uses solely harvested rain water and measure potable water reductions and decreased stormwater run-off.

Supporting Graphics:

Flow-through planters and infiltration chambers (under lawn) being implemented at the Ross School of Business.

Illustration by: KPF

Green roofs being implemented at the Ross School of Business.

Illustrations by: KPF and JJR

Spreadsheet used to calculate irrigation demand and cistern sizing.

	Drought Risk:	0.250	months			**Notes:**					
	Catchment Size:	50.000	ac.			1. Place large number in cistern size (1,000,000).					
	Effective Rain:	0.800	Note: safety factor			2. Input Irrigation data on second tab.					
	Weighted Runoff Coefficient:	0.700	Note: calculate for all areas feeding cistern			3. Input catchment data on this tab.					
						4. Increase catchment area until there are all positives					
	Gallons per cu.ft.:	7.48051945	Gallons			5. Decrease cistern size keeping all numbers positive.					
	Gallons per Acre inch	27,154	Gallons			Do not go below minimum size.					
	Acre Converter:		sq.ft.								
		0.000	ac.						Cubic feet:	66,840.28	
									Cubed dimension:	40.58	feet
									Minimum Size	**544,026.28**	
	Water Inputs				**24,280,591.28**	**Water Outputs**	**-8,985,293.38**		**Cistern Size**	**500,000.00**	
	Rainfall (in)	**Effective Rainfall (in)**	**Catchable Rainfall (in)**	**1 ac. Catchment (gal)**	**On-site Catchment (gal)**	**Irrigation Demand (gal)**	**Total Demand (gal)**		**Water Balance**	**Cistern Balance**	
January	1.89	1.51	1.06	28,709.38	1,435,469.06	0.00	0.00		1,435,469.06	500,000.00	
February	1.71	1.37	0.96	25,998.11	1,299,905.43	0.00	0.00		1,299,905.43	500,000.00	
March	2.55	2.04	1.43	38,782.31	1,939,115.73	0.00	0.00		1,939,115.73	500,000.00	
April	3.12	2.49	1.75	47,383.97	2,369,198.31	-760,581.85	-760,581.85		1,608,616.45	500,000.00	
May	3.47	2.78	1.94	52,749.65	2,637,482.31	-1,410,946.34	-1,410,946.34		1,226,535.97	500,000.00	
June	3.32	2.66	1.86	50,486.27	2,524,313.42	-1,887,543.41	-1,887,543.41		636,770.01	500,000.00	
July	2.95	2.36	1.65	44,861.48	2,243,074.00	-2,176,105.10	-2,176,105.10		66,968.90	500,000.00	
August	2.90	2.32	1.62	44,114.82	2,205,741.14	-1,558,903.38	-1,558,903.38		646,837.76	500,000.00	
September	2.93	2.34	1.64	44,482.17	2,224,108.56	-849,412.31	-849,412.31		1,374,696.24	500,000.00	
October	2.39	1.91	1.34	36,354.00	1,817,700.07	-341,800.98	-341,800.98		1,475,899.10	500,000.00	
November	2.49	1.99	1.39	37,847.86	1,892,393.05	0.00	0.00		1,892,393.05	500,000.00	
December	2.23	1.78	1.25	33,841.80	1,692,090.20	0.00	0.00		1,692,090.20	500,000.00	

STORMWATER MANAGEMENT FOR URBAN ENVIRONMENTS

Charles R. Taylor
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Abstract

This paper describes the planning, design and construction of a permeable pavement system as a practical demonstration of a post structural BMP for a college campus in Illinois. The paper addresses the use of a permeable pavement as a parking lot improvement for a dormitory expansion that will allow stormwater run-off to be collected, filtered, detained and retained, and returned to either the city storm system or the soil for natural ground- water recharge.

Management of the quantity and quality of urban stormwater run-off is a major concern for government authorities. NPDES Phase II rule is emphasizing the treatment for improving the quality of stormwater run-off and permeable pavement systems have proven a superior ability to accomplish this task while providing facilities with low maintenance costs and long – term durability. In addition, better land utilization is demonstrated with this urban environment where there is no land available for university expansion and future growth is a concern for all learning centers.

This paper will address issues of structural design of the pavement to carry vehicular traffic and the hydraulic design of the pavement that will allow the capture of the storm events, control of water quality at the source and the reduction of the volume of stormwater discharge rate. Factors influencing the choice of paver and pavement materials are discussed and the construction procedures are described including in-situ assessments of base course permeability. The project is in service and is being monitored on a long-term basis by the college and graduate students as a campus based research project in a learning environment. The paper presents preliminary assessments of the impacts and utility of the project for future facilities planning, utility savings, energy renewal and campus enhancement.

STUDENTS FOR SUSTAINABLE LIVING – USING COMMUNITY-BASED SOCIAL MARKETING TO INFLUENCE BEHAVIOR

Tavey McDaniel Capps
Duke University, Durham, NC, USA

Abstract

Since the beginning of the environmental movement, supporters of sustainability have been struggling with the challenge of how to make people be more aware of their impact on the natural world. Many efforts have focused on public education and the idea that if there was better understanding of environmental issues than people would begin to make more sustainable choices in their everyday lives. However, it has been found that often simple awareness does not always translate into action or behavior change.

Many universities have developed programs over the past several years that engage students in peer-to-peer education. Programs like the Eco-Reps operate on the premise that students can educate and influence their peers in ways that can be more effective in changing behavior. Duke University has expanded on this model to form our Students for Sustainable Living (SSL) program that utilized the tools of community-based social marketing to influence behavior among the entire campus community.

The SSL program employs approximately 15-20 students every semester that work in direct contact with the university community. They work on many different sustainability issues such as transportation, green dining, recycling, energy use, etc. The projects range from offering samples of fresh, local food to encourage students to visit the new "green" dining facility on campus to handing our information in the morning to campus commuters regarding vanpooling options. All projects are designed to provide a concrete example of how the audience can make a sustainable decision. For ex. If you are worried about transportation issues at Duke, then call this number to find coworkers that live near you and start a carpool. SSL expands the awareness piece of environmental education into action. The program allows students to engage all members of the campus in fostering sustainable behavior.

STUDENTS LEADING THE GREENING OF CASTLETON STATE COLLEGE

Paul Derby and Sarah O'Neill
Castleton State College, Vermont, Castleton, USA

Abstract

The Body of the Abstract

Student "Green" Interns and their professor will do a workshop to demonstrate how student-led initiatives evolved into an institutionalized program of sustainability at Castleton State College, Vermont. The workshop examines how large-scale civic participation by students was a crucial element in "selling" the program to college administrators, and in the ongoing success and development of sustainability projects. The presentation also shares methods to measure the progress of sustainability and related student learning through "Green" civic engagement activities.

In 2005 students in the Anthropology and the Environment class chose a service-learning project to determine the feasibility of creating a comprehensive recycling program at the college. The final product of the students' research was a multiple phase plan that over four years would implement not only a recycling program but also reduce energy use, create a composting program, and implement responsible purchasing practices. A key element of the students' plan included wide-ranging opportunities for student participation in the development and ongoing implementation of the plan. Students presented their detailed proposal to the President's Cabinet, which adopted it and committed the necessary resources to institutionalize it as the Green Campus Initiative.

Although many colleges and universities have sustainability programs, Castleton's is distinctive in the breadth of active participation by its students. For example, in the first two years all first-year students and many clubs, sports teams, members of the student government, and residence life staff have participated as Green Monday recyclers. In addition, students in service-learning classes are collaborating with our dining service on a food waste reduction and composting program, and another class will perform a greenhouse gas inventory. As well, a group of students has created a Sustainability Club to foster student awareness and to engage in sustainability projects such as the production of biodiesel fuel to power campus machinery. Another step to increase student involvement was to offer "Green Internships," where students earn college credit and stipends for overseeing sustainability projects. In spring 2007 student interns are working on a local foods program, building an organic garden, managing the recycling program, and writing a user's guide for biodiesel fuel production.

Measuring the progress of sustainability and student learning outcomes has been built into each "Green" project and program. For example, the first year of recycling removed more than 21 tons of materials from our waste stream, and light bulb exchanges replaced more than 500 bulbs in the residence halls. Numbers of student participants and their reflections upon their experiences have also been assessed. In only two years, approximately 75% of the student body has participated in some aspect of the Green Campus Initiative. In the first year 68% stated that participation in sustainability projects was a meaningful learning experience; in the second year that number increased to 76%. As well, student "green" interns will give presentations to the campus community at the

end of the semester to demonstrate their work and keep self-assessment and task journals to reflect upon their experiential learning projects. We believe that empowering students in the development of the Green Campus Initiative will give them the knowledge and skills to become responsible world citizens and advance a culture of sustainability at Castleton.

SUSTAINABILITY AT PRINCETON UNIVERSITY: ART, SCIENCE, AND EDUCATION

Shana Weber, Ph.D.
Princeton University, Princeton, NJ, USA

Abstract

Sustainability is not strictly an environmental field; it is one that considers social, economic, technological, political, environmental, ethical, justice and educational issues. It is one that considers the direction of our global civilization and how well this generation will serve future ones. In its current state, the sustainability movement is exciting and challenging. There is tremendous momentum building behind a sense of profound urgency, and no wonder. Scientific consensus shows we have little time to take action to curb the worst effects of global climate disruption. Ethical considerations demand we, in the most resource-demanding nation on Earth, take a leadership role. The excitement is that we have a chance to create the framework for something that fosters prosperity for all people, while caring responsibly for global resources. Sustainability is a sound investment, as many endeavors are beginning to demonstrate.

What responsibility do institutions of higher education carry? Institutions of higher education are the heartbeat of the American intellect and innovative spirit, and are uniquely situated within the social fabric of the nation to influence public opinion, policy, and national identity. If higher education does not take a leadership role in addressing climate disruption it may indeed no longer deserve that standing, and will have missed the opportunity to bring its intellectual and financial resources to bear on the defining issue of our time.

Princeton enjoys one of the world's largest endowments among institutions of higher education, and its research prestige is impressive to say the least. What are we doing to focus those formidable resources on sustainability, both in theory and in practice? This story is an interesting one, given the number of possible paths to sustainability.

In this paper I will share the story of Princeton's approach. The story is, of course, a continuing one. My role as Princeton's first Sustainability Manager begins a chapter of rapid acceleration in sustainability efforts, the foundations of which were laid in the years prior to my arrival.

Princeton University is addressing sustainability holistically, with initiatives in education, research, service and operations. I will share details in the full paper. Indeed sustainability must be addressed holistically for the necessary broad institutional cultural shifts to occur. Along the same vein sustainability professionals are called upon to carry a wide array of talents to be fluent in the various environments in which we work. In my view it is important for sustainability professionals to also be teachers, public speakers, writers, strategic thinkers, enthusiastic collaborators, as well as technically proficient. In the ideal scenario, we would also be researchers contributing to a new body of knowledge, and reporting to both operations and academic leadership. This professional field is just beginning to show its potential, along with more sophisticated approaches to planning for a "decarbonized" culture.

SUSTAINABILITY FOR THE REST OF US: LESSONS FROM A NON-PRIVATE, NON-FLAGSHIP, UNDERFUNDED SOUTHEASTERN UNIVERSITY

Daniel C. Abel and Marissa Mitzner

Coastal Carolina University, Conway, USA

Abstract

Located in Conway, SC, Coastal Carolina University (CCU) is a public, mid-sized (<7000 undergraduate students), comprehensive liberal arts institution. *U.S. News and World Reports* ranks CCU in the "fourth tier" of liberal arts colleges.

In 2006, the CCU Campus and Community Sustainability Initiative was launched. The Initiative's goals mirrored others around the country: (1) Transform the institution into a sustainable university (2) Promote the inclusion of sustainability across the curriculum, and (3) Work with the surrounding community to transform it.

With an endowment of under $15 million, relatively low tuition, and less than 13 percent of its budget from the state, CCU struggles to maintain its academic and athletic programs and its operations. It is thus atypical of the first wave of institutions of higher learning striving to become sustainable.

This talk, equal parts didactic lecture, discussion, plea for help, and support group, chronicles the setbacks, successes, and contradictions of the Sustainability Initiative. The include: an all-LEED policy (but no LEED buildings yet), a *Better Site Design* Initiative (that is routinely ignored), a real budget (but only a one-course reduction for the director), an energy-saving Brownfield renovation (which unfortunately moved several departments and classes to a mostly-windowless warehouse in a stark, treeless industrial park),implementation of a shuttle system (using aged buses that routinely leak oil), an Arbor Day tree planting (followed by a surreptitious competition to mow them down) a *Sustainability as if it were Football* fundraising initiative, a 16kW solar demonstration project, and a very successful sustainable building and living outreach efforts to Habitat for Humanity and the YMCA.

SUSTAINING TOMORROW TODAY PROJECT: CONNECTING PEDAGOGY WITH COMMUNITY OUTREACH

John H. Fitch

Environmental Studies Program. Florida Gulf Coast University, Ft. Myers, Florida

Abstract

In this paper, the author describes the development of an exciting project for empowering sustainability community outreach through academic interdisciplinary collaboration. In this project, both undergraduate and graduate students are involved with faculty on an interdisciplinary basis working together to accomplish cutting edge sustainability outreach projects in communities near Florida Gulf Coast University (FGCU). The *Sustaining Tomorrow Today Project* (*STTP*) is directed by the author at FGCU.

The author will discuss two case studies of the project illustrating opportunities to connect sustainability pedagogy and community outreach: 1) the Cocohatchee Estuary Guardian Fellowship study, and 2) the Bonita Springs Green Affordable Housing study. Both studies are designed to empower local communities to build sustainable futures while giving students and faculty at FGCU interdisciplinary opportunities to work on important interrelated environmental, economic, and societal issues.

In the case of the Cocohatchee Estuary study, a local nonprofit organization, the Estuary Conservation Association (ESA) was established to bring boater, development, fishing and environmental interests together in a local communities to work together on building a sustainable future for the Cochohatchee Watershed and Estuary. ESA has established a graduate fellowship program in cooperation with the *STTP* at FGCU in order to provide scientific monitoring and information on the estuary, education and volunteer monitoring opportunities for its members, and liaison with government agencies. The graduate fellowship is funding a Masters candidate within the graduate Environmental Science Program at FGCU. An undergraduate internship will be funded beginning in Fall 2007. In this paper, the interdisciplinary opportunities for faculty and students are discussed along with benefits to the Cocohatchee estuary and its ecological and human communities.

In the case of the Bonita Springs study, the *STTP* received a small grant from the Bonita Springs Area Housing Corporation (BSAHC) to "green" an affordable housing community to be built in Bonita Springs, Florida. This study soon expanded to include sustainable buildings and yards designs, education of residents and their children in sustainable buildings and yards, translation of resident buildings and yards "operating manuals" into English and Spanish for adults and children, environmental monitoring of sustainable buildings and yards inputs and outputs, and an ethnographic study of the community. The sustainability pedagogy opportunities to FGCU students and faculty, and benefits to the Bonita Springs community are described in this paper.

In conclusion, the *Sustaining Tomorrow Today Project* approach has allowed students and faculty at FGCU to work on "real life, real time, cutting edge" studies in their

respective fields that are of real benefit to communities. In addition, this project has been enlivened and improved by the ongoing communication of students and faculty within and across disciplines and with the local residents and experts of the communities in which they are working. The benefits of these types of communication and the overall advantages in connecting sustainability pedagogy and community outreach are outlined in the conclusions.

TEACHING SUSTAINABILTIY OUTSIDE THE CLASSROOM

Cindy Pollack Shea, et al
University of North Carolina at Chapel Hill

Abstract

This talk is part of the session, "Pedagogy of the campus experience: Using campus buildings and landscapes to convey lessons of environmental stewardship"

Campus infrastructure and business practices can teach sustainable stewardship principles.

At the University of North Carolina at Chapel Hill, a wide range of mediums are employed to educate the campus community about sustainability. Traditional means to convey information include newspaper articles, websites, reports, brochures, listservs, and the campus television network. Special events, including films, lectures, conferences, and celebrations are additional methods to reach targeted audiences. Each of the above methods essentially requires the recipient to seek this information.

Conveying sustainability messages to members of the campus community as they go about their everyday tasks is perhaps a more elegant approach to information dissemination. Waterfree urinals and dual flush toilets, for example, come with signage that instructs users about the water saving features of the fixture. Reusable campus mailer envelopes printed with our sustainability logo and the tagline to "Act today without compromising tomorrow" circulate into every office on campus. In the new addition to the Nursing School, tasteful signage points out the earth-friendly features of the structure.

When our students voted to raise their fees to invest in renewable energy, they specified that the fees be used to install renewable energy infrastructure directly on campus. They felt that enabling students to see the technologies at work would better educate the campus community about the market readiness of renewables. As a result, solar panels now provide hot water to 800 students in the renovated Morrison Residence Hall. Geothermal wells and a photovoltaic array are under construction at the Botanical Garden Visitor Education Center. And a solar hot water system may heat the new hydrotherapy facility in the recreation center. Students also funded the incremental cost of the first year of biodiesel use in the point-to-point bus system before the expense was absorbed in the transit fee. Bumper stickers alert bus riders and passersby that the vehicles run on biodiesel fuel.

Even these more tangible outreach efforts, however, are static. Over time, signs blend into the background. People who pass them everyday stop paying attention.

Long-term behavioral change requires feedback. Even the most invested individuals become less committed over time unless they are shown that their actions make a difference. In the recently renovated Morrison Residence Hall, students see their energy consumption in real time, as well as historically, via user friendly graphics on a website and a kiosk in the lobby. Electricity consumption is metered at the suite level. Chilled water and steam consumption is metered in twelve zones throughout the building. Sustainability themed housing, including an academic link and special programming, will reinforce the importance and impact of efficient behaviors.

A recently completed upgrade to the Energy Management Control System may soon offer similar capabilities in buildings throughout campus. Automated metering already provides real time steam and electricity consumption, but in a format that is virtually unintelligible to the average person. Automated electricity meters will be installed in the near future. The Energy Management Control System, with its standard "gateway" into the building automation system in each building, may be the linchpin that provides real time, user friendly energy consumption information to the entire campus community. With this information, building occupants would be able to see the results of their behavioral changes on energy consumption in real time. The possibilities for outreach, analysis, recognition, and meaningful incentives are only starting to be understood.

TEACHING SUSTAINABILITY USING CRITICAL THINKING AND SIMPLE MATH

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Abstract

As teachers, we grew impatient with a style centered on the faculty member as "lecturer" and expert and the student as "scribe" and novice. Moreover, we observed that students were increasingly innumerate and unable to evaluate important environmental issues. We thus co-authored the textbook *Environmental Issues: Measuring, Analyzing, and Evaluating* in 1997 to address these problems. The first edition was an interactive text that used elementary math, and provided students with the knowledge and intellectual standards necessary to apply critical thinking to environmental issues without being a weighty compendium of facts. We recently thoroughly revised and expanded the second edition (2002) to include a major focus on sustainability, and renamed the third edition of the book *Environmental Issues: An Introduction to Sustainability*. IN this interactive session, we will present some of the issues, demonstrate how we use them, ask for your comments, and provide you with a method to create your own Issues.

Environmental Issues: An Introduction to Sustainability is meant to be the basis for an issues-oriented introductory, seminar, upper-level or laboratory course in environmental science or studies. In addition, the third edition is appropriate as a stand-alone text for courses in sustainability or sustainable development or as a supplement to traditional texts in environmental science, geology, biology, and other natural sciences.

The issues, 30 in all, include such topics as Global Population Growth: Is it Sustainable?, Greenhouse Gases and Climate Change, Coal, Soils and Sustainable Societies, Global Water Supplies: Are they Sustainable?, Coastal Development, Mining: Is it Sustainable?, Sustainable Buildings and Housing, Sustainable Diet, The Sustainable Campus, and Restoration Ecology. Using the newest most reliable data, along with elementary math and principles of critical thinking, we address such questions as: Can the U.S. transition to a sustainable energy mix? What are the limitations to wind power? Are hybrid vehicles the answer to transportation sustainability? How is waste consistent with sustainable principles? What is the state of the marine environment, and what is its prognosis? What role does global trade play in a sustainable society? How can global climate change be addressed? Can diets be made sustainable? And Is population growth consistent with sustainability?

THE DEVELOPMENT OF UNE'S ENVIRONMENTAL COUNCIL

Jeff Denoncour

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Poster

Abstract

Sitting on the mouth of the Saco River, UNE rests on ecologically fragile land. For years UNE went without an advisory Board regarding environmental issues. It wasn't until students and faculty started UNE SEAS (School wide Environmental Awareness System) that a stronger initiative arose to create a sustainable campus. This eventually led to the formation of UNE's environmental council (E.C). As ideas of sustainability circulated throughout students, student government, planning boards, faculty, colleges, and facilities popularity for the creation of the council began to grow. In 2005 the two UNE campuses formed the E.C., which would act as advisory board to the vice presidents office as well as work with many constituents campus wide regarding environmental issues.

The first year of the E.C. was spent creating bylaws, mission statements, meeting times, getting known, and getting to know key players, but most importantly outlying why we felt the council's creation was important. Getting a solid foundation within the school has been and still is a learning process, filled with progress and digression. Changes in key faculty members, lack of overall student participation, money, and the realties of institutional growth have slowed dramatic change at UNE. But it's not all setbacks we face. The development of the council has led to many breakthroughs, especially, in regards to increasing environmental awareness of the different stakeholders, and parties on campus. Instead of they're being no body for any member of the university community to express and deal with environmental concerns there now is. When I was a freshman 4 years ago, there was no upper level body in which I could express ideas of sustainability on campus. Now, the E.C. has formed a green sheet, where any member of the community can type a proposal for a green project they would like to see on campus. The lists of accomplishment are constantly evolving and devolving. The creation of the E.C. has marked a landmark for the university, it will provide a stable body, which, as the school grows and develops the E.C. will too. We hope that that E.C. will be a constant reminder fragile ecosystem UNE rests on and the schools part in global issues confronting our world.

I would like to present a poster at the BSU Campus greening conference. This poster would describe the formation of newly appointed E.C. on UNE's campus. In it I would like to describe the barriers and progress the E.C has had, and through this bring out the importance of getting an upper level institutional body when dealing with dealing with Environmental issues and sustainable campuses.

THE GREENING OF AN ARCHITECTURAL CURRICULUM (ARCHITECTURE EDUCATION & CURRICULAR TRANSFORMATION)

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Abstract

In the twenty-first century with the acknowledgement, importance and implementation of "Green technologies" and "Sustainability Strategies" in the built environment, potential design professionals need to be re-educated in interdisciplinary knowledge domains that affect architecture. As a result of these changes, Architecture education at our Universities and College is in a transitory stage. What will the architecture curriculum of today look like in the future? The National Architecture Accreditation Board (NAAB), the American Institute of Architects (AIA), and the Association of Collegiate Schools of Architecture (ACSA) have also acknowledged these educational changes. For example, NAAB has reorganized and rewritten the student performance criterion, which is the basis for architectural programs receiving and maintaining their accreditation, to respond to current trends in the built environment that affect architectural practice such as globalization, outsourcing, project delivery, expanding practice setting and diversity. The AIA has also acknowledged the importance of "Sustainability" in the built environment by organizing a conference on Sustainability in Architecture and Higher Education. The conference's main purpose is to advance the breadth and depth of sustainability in architectural education and ultimately the practice of architecture. In December of 2005 the National AIA also formed a Sustainability Task force.

This paper focuses on the emerging environmental curricula in an architectural program at an Evangelical University that has embraced environmental stewardship as a vision and mission emphasis. We will be discussing the architecture curriculum at this University as a chronological case study for the development of a model program curriculum for other interested ACSA programs. We will be analyzing how this new knowledge of sustainability gets implemented and taught in architectural education and show sample curricula and student performance matrices.

Our system of inquiry in studying this phenomenon will be from a qualitative research methodology using an interpretive/ heurtics strategy. Data will be collected from interviews, observations and archival documents. An example follows of a student performance matrix that will be discussed.

Primary Coverage of NAAB Student Performance Criteria			
BA in Architectural Studies / Master of Architecture Curriculum			
	NAAB Criteria	**Required Coursework**	**Studio Components**
1	Speaking & Writing Skills	Arc 331, 656	Arc 652, 682
2	Critical Thinking Skills	Arc 331, 656	Arc 652, 682
3	Graphics Skills	Des 231/Arc 310	Des 121, 122, Arc 251
4	Research Skills	Arc 321, 421	Arc 681
5	Formal Ordering	Art 111, 211	Des 121, 122

	Systems		
6	Fund. Design Skills	Art 111, 211	Des 121, 122
7	Collaborative Skills	Arc 321	Arc 351, 352
8	Western Traditions	Arc 232, 331	Arc 451, 452
9	Non-Western Traditions	Arc 231, 332	Arc 451, 452
10	Nat. and Reg. Traditions	Arc 332	Arc 352
11	Use of Precedents	Arc 231	Arc 251
12	Human Behavior	Arc 332	Arc 352
13	Human Diversity	Arc 332	Arc 352
14	Accessibility	Arc 375/575	Arc 452
15	Sustainable Design	Arc 375/575	Arc 452
16	Program Preparation	Arc 580	Arc 452, 681
17	Site Conditions	Arc 421	Arc 351, 451
18	Structural System	Arc 342, 343	Arc 351, 352
19	Environmental Systems	Arc 421, 422	Arc 452
20	Life Safety	Arc 322	Arc 452
21	Building Env. System	Arc 421	Arc 452
22	Building Service System	Arc 422	Arc 452
23	Building Systems Int	Arc 321	Arc 452
24	Building Mat. & Assemblies	Arc 222,322	Arc 452
25	Construction Cost Control	Arc 580	Arc 452
26	Technical Documentation	Arc 322, 656	Arc 452
27	Client Role in Architecture	Arc 656	Arc 451
28	Comprehensive Design	----------	Arc 452
29	Architect's Admin. Roles	Arc 656	
30	Architectural Practice	Arc 556, 656	
31	Professional Development	Arc 580	
32	Leadership	Arc 556, 656	
33	Legal Responsibilities	Arc 556, 656	Arc 651. 652
34	Ethics & Prof. Judgment	Arc 556, 656	Arc 651, 652, 681, 682

THE POLITICS OF SUSTAINABILITY – A WORKSHOP

David Orr[1], Debra Rowe[2], and Terry Link[3]
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[2] U.S Partnership, Washington, DC
[3] Michigan State University, East Lansing, MI

Abstract

For most citizens, involvement in governing is mostly a spectator sport, save for the annual or biannual trip to the voting booth. Civics, as taught and nurtured through the dominant forces in our culture, is more an exercise in studying a process out there, separate from us. The purpose of the workshop is to motivate, train, and involve members of higher education institutions to become effective citizens in nurturing sustainability in their communities.

The workshop will begin with a review of the need, with a specific look at the issue of climate change. An introduction to various proposals that are being considered at various levels of government – city, county, state, federal and how they affect change in higher education will be discussed. A summary of current higher education related policy options will be covered. Opportunities for involvement will be highlighted. Attendees will consider a range of approaches for becoming involved in effecting policy changes at various levels of government. A toolkit for change agents skills will be introduced.

Finally, workshop registrants will develop both personal and community action plans to become involved in setting climate change policy agendas in their communities and institutions. Workshop facilitators will return action plans to attendees with suggestions before they leave the conference.

THE REPRESENTATION OF AGENCY IN UNIVERSITIES' DOCUMENTS ABOUT ENVIRONMENTAL RESPONSIBILITY

Mai Kuha

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Abstract

Who is responsible for environmental problems? Who is responsible for finding and implementing solutions? Complex, systemic relationships between cause and results underlie the answers to these questions. The words and linguistic structures we choose to express these relationships can influence who or what we highlight as the agent that carries out an action: do we mention the agent al all? If so, do we present the agent as an individual, an unspecified group of people, an institution, a process, or a force of nature? These ways of constructing agency, together with other aspects of discourse, might affect what solutions to environmental problems occur to us.

As is well known, the linguistic resources that influence how agency is constructed include nominalization and passive voice. Nominalization expresses actions or processes as nouns. For example, the action in "Acme Company destroyed the rainforest" can be expressed as a noun: "the destruction of rainforest". Similarly, we can refer to "the extinction of species" when it is less relevant to focus on who is responsible for species having become extinct. Passive voice also allows writers to omit the agent. For example, when George W. Bush said "[N]o once can say with any certainty what constitutes a dangerous level of warming, and therefore what level must be avoided in a speech on global warming in June 2001, listeners did not know who must avoid dangerous levels of warming.

Halliday and Martin(1993) argued that processes and participants are more clearly identified when writers avoid nominalizations. The most obvious potential problem in the use of agentless discourse is that the parties responsible for unethical actions may be hidden. Schleppegrell (2001) also noted a less obvious potential risk: responsibility may be "diffused" to a generic "we", blaming individuals inappropriately for systemic problems caused primarily by institutions. In fact, Gerbig (1993) found that certain industry writings have the function of shifting responsibility from institutions to individual consumers. In her study of middle-school pedagogical materials on environmental topics, Schleppegrell (1996) showed that, when faced with agentless discourse in their textbooks, students supply "we" or "people" as agents in their own writing. On the other hand, Goatly (2001) took the opposite view, arguing that some forms of agentless discourse "emphasize the primacy of process" appropriately, in a way that fits our current understanding of the interconnectedness of entities and processes, replacing the previous simplistic view of situations as involving an agent acing upon an object.

This paper reviews how agency is represented in a selection of campus environmental policies and other documents, such as mission statements and strategic plans, in which universities take a stance on environmental issues. Agentless discourse is not inherently harmful; for example, the Talloires Declaration contains an average of more than two nominalizations per sentence, while making the clearest claims possible about agency and responsibility. The purpose of this review is to raise awareness about relevant discourse mechanisms in order to give readers more tools for distinguishing helpful and unhelpful attempts to highlight or background agents in environmental discourse.

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THE RIVER RUNS THROUGH IT: PLANNING FOR THE OTTAWA RIVER, UNIVERSITY OF TOLEDO

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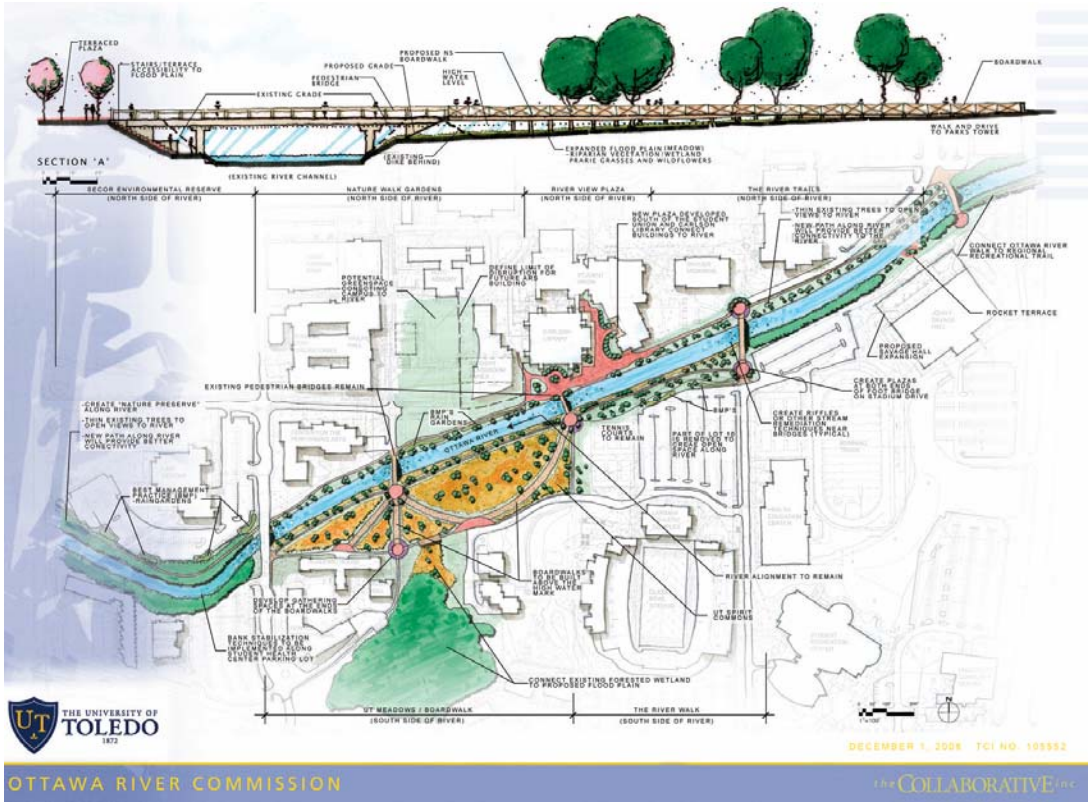
Abstract

In 2005 University of Toledo President Dan Johnson established the President's Commission on the River. A primary goal of the Commission was to engage faculty, students, staff and community members in the planning efforts and to solicit ideas and proposals from those stakeholders for maximizing the beauty, leisure-time use, scientific exploration and environmental features of the river. The Commission began its work in March 2005, creating three work teams and holding monthly meetings. As part of its work effort, the Commission reached out to stakeholders through a planning charette conducted in April 2006. A local architectural firm that had conducted a previous study of the river in 1982, The Collaborative, was engaged to assist the Commission with the charette and subsequent design concepts. The primary result of the charette was the creation of three design concepts that incorporated ideas from the charette participants and from the on-going work of the Commission's three work teams. The ultimate goal was to develop a single, concept design that would include important elements of each of the three initial designs and achieved the impact the Commission desired.

Beginning in September 2006, the Commission began to focus its work on the single concept and continued to reach out to stakeholders by conducting a series of classroom-based student focus groups in September and a campus-community forum in October. The Commission was especially pleased with the results of the student focus groups, with written responses from more than 400 students in nine different classroom settings. Student input exceeded our expectations and weighed heavily on the final recommendations and concept that is presented in this report.

The Commission is recommending the administration to move forward and create the "UT Meadow/Boardwalk" concept. The major elements of this plan include:

- Lowering the existing dike between the bridge adjacent to the Law College and the Stadium Drive Bridge (near Snyder Memorial and the HHS building) creating a meadows-like area extending between these bridges to the east and west and south from the river towards the Academic House;
- Developing a series of boardwalks that would cross through the meadows as well as strategic gathering areas located at key pedestrian crossing points;
- Establishing a River View Plaza on the north side of the river that would extend from the southwest corner of Carlson Library, the area between Carlson and the Student Union and to the eastern corner of the Student Union;
- Establishing a nature preserve incorporating a series of rain gardens (bio-swales) that trap and transform storm water runoff;
- Removing invasive plants and trees and selective thinning of trees to enhance view of the river;
- Stabilizing the banks of the river where needed;
- Developing riffles and other stream habitat restoration practices downstream of the bridges;
- Removing a small portion of the north side of Lot 10 to create open space adjacent to the river;
- Establishing a River Demonstration Display west of the Stadium View Drive bridge;
- Developing a nature walk garden adjacent to the proposed ARS building and new river paths/walkways along the river connecting to the proposed Rails to Trails bikeway, and;
- Developing opportunities for the Savage Hall renovation project to engage the river.


SECTION 'A'
EXISTING GRADE
PROPOSED GRADE
EXISTING RIVER CHANNEL
EXPANDED FLOOD PLAIN (MEADOW)
RIPARIAN VEGETATION/WETLAND
PRAIRIE GRASSES AND WILDFLOWERS
BOARDWALK
SECOR ENVIRONMENTAL RESERVE
(NORTH SIDE OF RIVER)
NATURE WALK GARDENS
(NORTH SIDE OF RIVER)
RIVER VIEW PLAZA
(NORTH SIDE OF RIVER)
THE RIVER TRAILS
(NORTH SIDE OF RIVER)
ROCKET TERRACE
EXISTING PEDESTRIAN BRIDGES REMAIN
OTTAWA RIVER
RIVER ALIGNMENT TO REMAIN
UT MEADOWS / BOARDWALK
(SOUTH SIDE OF RIVER)
THE RIVER WALK
(SOUTH SIDE OF RIVER)
THE UNIVERSITY OF TOLEDO
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DECEMBER 1, 2006 TCI NO. 105552
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the COLLABORATIVE inc


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THE SUSTAINABLE DINING EXPERIENCE

Meredith Elbaum

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Abstract

This paper presents a case study of the sustainable dining experience. It first explores the traditional dining experience and then looks at how Bates College is accomplishing the alternative with both its sustainable operations and its new facility.

The college dining experience has a significant environmental impact. Traditionally, colleges purchase food that travels hundreds of miles to reach the campus. It is often grown with petrochemical based pesticides and herbicides and uses significant water resources. The farmers and producers show little concern for the natural environment or social and economic equity for its workers. The traditional college dining facility sends an enormous amount of waste to the landfill. This includes both pre-consumer and post-consumer food, cooking oil, packaging, and paper goods. In addition, conventional dish washing practices send large volumes of hot water down the drain. The traditional dining facility is an energy hog. It exhausts enormous quantities of conditioned air at the cooking stations and uses a lot of energy for lighting. Often the kitchen is a dark and hot working environment.

Bates College Dining Services is committed to the sustainable dining experience. As a member of the Green Restaurant Association, Bates pays close attention to everything it purchases. It supports local farmers and Farm Fresh. It encourages its vendors to use bulk packaging and requests environmentally preferable cleaning supplies. The college uses recycled products and has an extensive recycling program including composting and pellets for pigs.

Bates College's New Dining Facility, currently under construction, will further enhance the sustainable dining experience. The New Dining Facility was designed to support the college's environmental mission. When finished, the building will use 25% less energy than other dining facilities. It will be primarily day-lit and naturally ventilated. It will be made of local materials and have ceilings made from salvaged wood. It will have extra storage to accommodate storing more local produce. It will have a recycling room for the college to farm recycling program. It will not have a trash compactor since there will be so little trash leaving the site. It will reuse materials from the existing dining facility and all new materials will be environmentally preferable. The administration and the design team included students in the design process from the start of the project.

When completed in January 2008 the Bates Dining Facility will be a great example of sustainable dining. Students will learn first hand about sustainable building and dining. The school will benefit from cost savings and global citizenship and the environment will be healthier.

GOC_2007 – The 7th Ball State University Greening of the Campus Conference,
Muncie, Indiana, 6-8 September 2007

THE THEORY AND PRACTICE OF GREEN PURCHASING

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Abstract

Most purchasing departments evaluate suppliers on the four competitive dimensions of value: quality, dependability, flexibility and cost. Now suppliers are being evaluated on another dimension: environmental responsibility, commonly known as green purchasing. As time progressed, purchasing evolved into new responsibilities; duties expanded from not only the acquisition of materials and inputs, but also responsibility for inbound logistics, quality management, and continuous improvement. Furthermore, purchasing became integral in marketing and management decisions.

The motivation for green purchasing comes from concerns about how environmental issues relate to the quality and future of people's lives. At the administrative level, however, green purchasing comes from a need to increase efficiency: reducing operational expenses, reducing demand for natural resources, and lessening environmental impact. We should make informed recommendations about purchasing goods and services that conserve energy, minimize pollution and packaging, eliminate negative disposal impacts, and encourage reduction and reuse.

Because purchasing departments are required to negotiate and award all contracts, they can become the center for screening the environmental impact of all future goods and services, and the possibilities for outgoing waste. An environmentally sensitive contract should place an obligation, through the competitive bidding process, for sustainability with the contractor. Purchasing sustainable goods and services gives encouragement to producers with minimal environmental impact, and passively discourages producers with lesser regard to environmental impact.

Green purchasing can have a greatly reduced environmental impact with the change in purchase of paper and office supplies; computers, appliances, and other electronics; architecture, construction, and building materials; bathrooms, kitchens, and other high-use locations of water and plumbing; furnishings; chemistry classes; and other categories.

UNDERSTANDING ENERGY ON UNIVERSITY CAMPUSES: A TUTORIAL FOR SUSTAINABILITY ADVOCATES

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Madison, WI

Abstract

The Body of the Abstract

To improve the energy efficiency of large universities, students and campus sustainability advocates must have a fundamental understanding of the unique aspects of campus energy distribution, conversion, and consumption. The intent of this workshop is to provide people without a technical background an overview and basic tutorial on the unusual and complex aspects of university energy systems and consumption patterns.

Relevant topics will include:

- Energy consumption signatures of common campus building types.
- Daily, weekly, and annual variations in energy consumption
- Energy sources, conversion, distribution, and metering methods
- Central plants – types, efficiencies, why they are used, how they work
- Making cold from heat – absorption chillers
- How campus energy cost and consumption depend on where you measure
- Obscure campus energy units of measure
- Campus energy organizational strengths and weaknesses

Energy data from the University of Illinois at Urbana-Champaign and the University of Wisconsin-Madison will be used in examples to illustrate the concepts.

USING BUILDINGS TO TEACH ENVIRONMENTAL STEWARDSHIP: REAL-TIME DISPLAY OF ENVIRONMENTAL PERFORMANCE AS A MECHANISM FOR EDUCATING, MOTIVATING AND EMPOWERING THE STUDENT BODY

John Petersen[1], Michael E. Murray[2], Gavin Platt[2], and Vladislav Shunturov[2]

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Abstract

This talk is part of an organized session, "Pedagogy of the campus experience: Using campus buildings and landscapes to convey lessons of environmental stewardship".

Residential and commercial buildings account for two-thirds of the electricity used in the U.S., 36% of U.S. greenhouse gasses, 9% of world greenhouse emissions, and 12% of U.S. fresh water consumption. Buildings dominate the ecological footprints of institutions of higher education. For example, greater than 90% of Oberlin College's greenhouse gas emissions are attributable to activities that take place in campus buildings. Faculty, administrators and students are beginning to recognize that campus buildings are not just places in which learning occurs. The story of profligate resource use that is embodied (but generally also hidden) in our buildings provides a lesson that is fundamentally inconsistent with the ethic of environmental stewardship that our institutions are now striving to foster. How might we transform students' daily experience with the built environment such that it conveys lessons of environmental stewardship? One mechanism is to provide students with clearer feedback.

How would student attitude and behavior be altered if they could immediately see the environmental consequences of flows of matter and energy through the campus environment? In 2000 this question lead a group of students and faculty at Oberlin College to develop a system for monitoring and displaying the ecological performance of the many green technologies incorporated into the Adam Joseph Lewis Center for Environmental Studies (www.oberlin.edu/ajlc). Then in '05 the group built on this experience by initiating development of the "Campus Resource Monitoring System", a system designed to provide students with real-time, environmentally contextualized feedback on their resource use in dormitories (www.oberlin.edu/dormenergy). Evidence gathered so far suggest that the invisible flows of energy and matter through buildings can be made visible and easily accessible to a non-technical audience in real-time. Presented well, these data provide a powerful mechanism for educating, motivating and empowering behavioral change. For example, in response to a two week energy reduction competition conducted at Oberlin, students in two dorms with prototype real-time monitoring systems exhibiting 56% reductions in electricity use. As of the writing of this abstract, an expanded Campus Resource Monitoring System now provides real-time feedback on electricity consumption to over 80% of dormitory residents at Oberlin. Psychology and Environmental Studies faculty and students are working together to quantify how experience with this technology alters students' feelings of connectedness with nature as well as their behavior.

The work at Oberlin spawned the formation of Lucid Design Group in '04, a company that has developed "Building Dashboard" software and hardware specifically designed to render the environmental performance of campus buildings easily accessible and teachable to a non-technical audience. Projects completed and in process include systems designed to stimulate learning in K-12 schools and environmental centers as well as at Colleges and Universities. Experience suggests that real-time feedback technology provides an excellent mechanism for exposing the functioning of the photovoltaic, geothermal, water conservation and other technologies incorporated into the many "green" buildings now being constructed on campuses. However, it has become equally apparent that installing feedback systems in environmentally

"brown" dormitories – buildings that possess little in the way of sustainable technology – provides powerful teaching and learning opportunities. Indeed, because of the opportunity for dorm residents to learn by teaching themselves how to conserve resources, learning opportunities may, in fact, be at a maximum in this residential context.

UWM AS A ZERO-DISCHARGE ZONE: A STORMWATER MASTERPLANNING STUDY FOR THE UWM CAMPUS

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Abstract

In 2004 and 2005, the Milwaukee Metropolitan Sewerage District partnered with the P.I. and an interdisciplinary faculty and student research team at the University of Wisconsin-Milwaukee on two projects: A masterplanning study aimed at demonstrating the potential for UWM's 90 acre urban campus to be transformed into a landscape that captures and retains stormwater as it would have before European settlement, and the detailed design and engineering of a demonstration project testing that framework.

This paper reports on the masterplanning project, which has created a comprehensive inventory of design opportunities to transform the UWM campus into a living laboratory for urban stormwater best management practices, with an ultimate goal of achieving a 100 year/ zero-discharge rate of 0.5cfs/acre for the campus as a whole. The study has catalogued the potentials on campus for green roof retrofits, downspout disconnections, and the redesign of both pedestrian and vehicular hardscaped areas. We have also catalogued design opportunities related to 'daylighting' stormwater once it has entered the campus storm sewer system; a somewhat novel expansion of the concept of 'daylighting' of urban streams to include capturing water from within buildings and directing it to the landscape in sculpturally engaging ways.

As a whole, the study proves the physical potential to achieve such an aggressive standard. It is also possible to see emergent patterns of potential in the landscape; areas where many specific best management strategies converge to create significant stormwater features in an otherwise densely built urban campus.

CLICK FOR LINKED
TABLE OF CONTENTS LISTED BY TITLE

ABSTRACTS LISTED BY AUTHOR

Cole, Elaine
- GREENING PACIFIC! A COMMUNITY-BASED SOCIAL MARKETING CAMPAIGN TO GREEN THE OFFICES AT PACIFIC UNIVERSITY

Concepcion, David
- PHILOSPHICAL FOUNDATIONS: AM I *NOW* MORALLY OBLIGATED TO NOT REPRODUCE?

Conlin, Beth
- INTEGRATING CAMPUS SUSTAINABILITY AND EDUCATION

Cooper, Peter
- INTEGRATING CAMPUS SUSTAINABILITY AND EDUCATION

Coutour, Richard
- EXPLORING POSITIVE GROWTH: THE SUSTAINABILITY INITIATIVE AT ITHACA COLLEGE

Curry, Janel
- BUILDING CAMPUS SUSTAINABILITY ON THE STRENGTHS OF YOUR INSTITUTIONAL AND CULTURAL IDENTITIES: AN EXAMPLE

Damon, David
- EXPAND THE PARTNERSHIPS, EXPAND THE IMPACT: THE QUEEN'S CENTRE AT QUEEN'S UNIVERSITY

Darling, Mark
- EXPLORING POSITIVE GROWTH: THE SUSTAINABILITY INITIATIVE AT ITHACA COLLEGE

DeBaille, Lee
- UNDERSTANDING ENERGY ON UNIVERSITY CAMPUSES: A TUTORIAL FOR SUSTAINABILITY ADVOCATES

DeHart, Jennifer
- ALLEGHENY COLLEGE CLIMATE CHANGE INITIATIVE (ACCCI): CROSS-CAMPUS PARTNERSHIP IS A MODEL FOR MOBILIZING SUPPORT FOR CAMPUS SUSTAINABILITY EFFORTS

Denoncour, Jeff
- THE DEVELOPMENT OF UNE'S ENVIRONMENTAL COUNCIL

Derby, Paul
- STUDENTS LEADING THE GREENING OF CASTLETON STATE COLLEGE

Drici, Zahia
- INTEGRATING SUSTAINABILITY INTO HIGHER EDUCATION AT ILLINOIS WESLEYAN UNIVERSITY

Dunkel, Norbert
- LIVING GREEN: SUSTAINABLE DIRECTIONS FOR RESIDENTIAL LEARNING COMMUNITIES

Earhart, Shannon
- RETURNING TO THE SOURCE: A COLLABORATIVE EFFORT TO MONITOR WATERSHED QUALITY

Elbaum, Meredith
- COMPLEX CHOICES – THE MANY SHADES OF GREEN
- THE SUSTAINABLE DINING EXPERIENCE

Erickson, Christina
- ECO-REPS PROGRAMS: CONDUCTING PEER OUTREACH IN RESIDENCE HALLS

Fieselman, Laura
- GREENING PACIFIC! A COMMUNITY-BASED SOCIAL MARKETING CAMPAIGN TO GREEN THE OFFICES AT PACIFIC UNIVERSITY

Fitch, John
- SUSTAINING TOMORROW TODAY PROJECT: CONNECTING PEDAGOGY WITH COMMUNITY OUTREACH

Gallo, Cory
- STORMWATER = CAMPUS WATER

Gauthier, Nathan
- GREEN PROJECTS AT HARVARD: DIRECT REDUCTION OF RESOURCE CONSUMPTION VS. LONG-TERM PARADIGM SHIFT
- *ORAL SESSION*: PEDAGOGY OF THE CAMPUS EXPERIENCE: USING CAMPUS BUILDINGS AND LANDSCAPES TO CONVEY LESSONS OF ENVIRONMENTAL STEWARDSHIP

Geffen, Amara
- ALLEGHENY COLLEGE CLIMATE CHANGE INITIATIVE (ACCCI): CROSS-CAMPUS PARTNERSHIP IS A MODEL FOR MOBILIZING SUPPORT FOR CAMPUS SUSTAINABILITY EFFORTS

Graham, Amanda
- INTEGRATING CAMPUS SUSTAINABILITY AND EDUCATION

Gray, Timothy
- FSEEC-LANDLAB AS RESOURCE-BALANCING DESIGN CAMPUS

Greely, Kathy
- ALLEGHENY COLLEGE CLIMATE CHANGE INITIATIVE (ACCCI): CROSS-CAMPUS PARTNERSHIP IS A MODEL FOR MOBILIZING SUPPORT FOR CAMPUS SUSTAINABILITY EFFORTS

Haley, Megan
- "CAN THE CAN" CAMPAIGN

Hamilton, Jason
- EXPLORING POSITIVE GROWTH: THE SUSTAINABILITY INITIATIVE AT ITHACA COLLEGE

Hamwey, Steve
- LOYOLA INTERCOLLEGIATE ATHLETIC COMPLEX – PUSHING THE ENVELOPE OF LANDFILL RECLAMATION

Harper, Given
- INTEGRATING SUSTAINABILITY INTO HIGHER EDUCATION AT ILLINOIS WESLEYAN UNIVERSITY

Haurin, Jack
- EXPLORING POSITIVE GROWTH: THE SUSTAINABILITY INITIATIVE AT ITHACA COLLEGE

Heffner, Gail
- BUILDING CAMPUS SUSTAINABILITY ON THE STRENGTHS OF YOUR INSTITUTIONAL AND CULTURAL IDENTITIES: AN EXAMPLE

Hoffman, Stephen
- INTEGRATING SUSTAINABILITY INTO HIGHER EDUCATION AT ILLINOIS WESLEYAN UNIVERSITY

Hopple, John
- EXPLORING POSITIVE GROWTH: THE SUSTAINABILITY INITIATIVE AT ITHACA COLLEGE

Horne, Kathryn
- MAKING LEED A REALITY; ARNOLD SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF SOUTH CAROLINA

Huang, Chung-Huei
- DEVELOPMENT, QUANTIFICATION, AND APPLICATION OF A GREEN UNIVERSITY EVALUATION INDEX SYSTEM IN TAIWAN

Hummel, Sam
- CAMPUS SUSTAINABLE LIVING COMPETITIONS: ECO-OLYMPICS, GREEN CUPS, GREEN GAMES

Jahiel, Abigail
- INTEGRATING SUSTAINABILITY INTO HIGHER EDUCATION AT ILLINOIS WESLEYAN UNIVERSITY

James, Lindsay
- COMPLEX CHOICES – THE MANY SHADES OF GREEN

Jameton, Andrew
- ECOLOGICAL MEDICINE AND THE ECOLOGICAL ECONOMICS OF HEALTH CARE
- HEALTH PROFESSIONS STUDENT RESEARCH PROJECTS IN THE ENVIRONMENTAL ASPECTS OF HEALTH CARE EDUCATION
- MODESTY OF SCALE AS A HEALTH PROFESSIONS VALUE

Jeffcoat, Charles
- MAKING LEED A REALITY; ARNOLD SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF SOUTH CAROLINA

Johnson, Richard
- CONNECTING CAMPUS GREENING WITH THE CLASSROOM

Joldersman, Clarence
- BUILDING CAMPUS SUSTAINABILITY ON THE STRENGTHS OF YOUR INSTITUTIONAL AND CULTURAL IDENTITIES: AN EXAMPLE

Kawakita, Chris
- INTEGRATING SUSTAINABILITY INTO HIGHER EDUCATION AT ILLINOIS WESLEYAN UNIVERSITY

Kelrick, Michael
- RETURNING TO THE SOURCE: A COLLABORATIVE EFFORT TO MONITOR WATERSHED QUALITY

Kirk, Erin
- ALLEGHENY COLLEGE CLIMATE CHANGE INITIATIVE (ACCCI): CROSS-CAMPUS PARTNERSHIP IS A MODEL FOR MOBILIZING SUPPORT FOR CAMPUS SUSTAINABILITY EFFORTS

Kohler, Dave
- "CAN THE CAN" CAMPAIGN

Kuenzel, Nicole
- COASTAL CAROLINA UNIVERSITY'S HABITAT FOR HUMANITY SUSTAINABLE BUILDING AND LIVING PROJECT: AN HONORS PROGRAM SERVICE LEARNING COURSE

Kuha, Mai
- THE REPRESENTATION OF AGENCY IN UNIVERSITIES' DOCUMENTS ABOUT ENVIRONMENTAL RESPONSIBILITY

Kunce, Linda
- INTEGRATING SUSTAINABILITY INTO HIGHER EDUCATION AT ILLINOIS WESLEYAN UNIVERSITY

Lang, Gary
- MAKING LEED A REALITY; ARNOLD SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF SOUTH CAROLINA

Lanou, Steve
- INTEGRATING CAMPUS SUSTAINABILITY AND EDUCATION

Larsen, Larissa
- STORMWATER = CAMPUS WATER

Lawrence, Patrick
- THE RIVER RUNS THROUGH IT: PLANNING FOR THE OTTAWA RIVER, UNIVERSITY OF TOLEDO

Leahy, William
- MAKING THE CONNECTION BETWEEN THE UNIVERSTIY AND STATE GOVERNMENT

Link, Terry
- THE POLITICS OF SUSTAINABILITY – A WORKSHOP

Madeira, Lindsay
- GROWING LEADERS: BEST PRACTICES FOR INDIVIDUALS INTERESTED IN EMPOWERING ENVIRONMENTALIST STUDENTS

Madera, Laura
- COMMUNICATING YOUR SUSTAINABILITY MESSAGE AND HOW TO DO IT WELL

Madry, Lisa
- CLIMATE-RELATED LEGISLATION: IS CAPITOL HILL ADDRESSING THE THREAT OF GLOBAL WARMING?
- GLOBAL WARMING SOLUTIONS ON CAMPUS

Mallory, Sarah
- GREENING FROM GOWN TO TOWN

Matthews, Todd
- GREENING FROM GOWN TO TOWN

McConathy, Barbara
- "CAN THE CAN" CAMPAIGN

McConnell, Robert
- TEACHING SUSTAINABILITY USING CRITICAL THINKING AND SIMPLE MATH

McDaniel Capps, Tavey
- INSTITUTIONALIZING SUSTAINABILTY IN CAMPUS MASTER PLANNING
- STUDENTS FOR SUSTAINABLE LIVING – USING COMMUNITY-BASED SOCIAL MARKETING TO INFLUENCE BEHAVIOR

McGowan, Donal
- E3 ENERGY BUREAU – IRISH COLLEGES WORKING TO SAVE ENERGY

McNeely, Matt
- MAKING LEED A REALITY; ARNOLD SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF SOUTH CAROLINA

Miller, Van
- INTEGRATING SUSTAINABILITY INTO HIGHER EDUCATION AT ILLINOIS WESLEYAN UNIVERSITY

Mitzner, Marissa
- SUSTAINABILITY FOR THE REST OF US: LESSONS FROM A NON-PRIVATE, NON-FLAGSHIP, UNDERFUNDED SOUTHEASTERN UNIVERSITY

Mosher, Craig
- COLLEGE – COMMUNITY PARTNERSHIPS: A MODEL FOR SUSTAINABILITY
- CONNECTING WITH CHURCHES, CARING FOR CREATION

Motloch, John
- FSEEC-LANDLAB AS RESOURCE-BALANCING DESIGN CAMPUS

Mudge, Robert
- EXPLORING POSITIVE GROWTH: THE SUSTAINABILITY INITIATIVE AT ITHACA COLLEGE

Murray, Michael
- USING BUILDINGS TO TEACH ENVIRONMENTAL STEWARDSHIP: REAL-TIME DISPLAY OF ENVIRONMENTAL PERFORMANCE AS A MECHANISM FOR EDUCATING, MOTIVATING AND EMPOWERING THE STUDENT BODY

Nickell, Janel
- ALLEGHENY COLLEGE CLIMATE CHANGE INITIATIVE (ACCCI): CROSS-CAMPUS PARTNERSHIP IS A MODEL FOR MOBILIZING SUPPORT FOR CAMPUS SUSTAINABILITY EFFORTS

O'Brien, Rachel
- ALLEGHENY COLLEGE CLIMATE CHANGE INITIATIVE (ACCCI): CROSS-CAMPUS PARTNERSHIP IS A MODEL FOR MOBILIZING SUPPORT FOR CAMPUS SUSTAINABILITY EFFORTS

Scott, Jeff
- EXPLORING POSITIVE GROWTH: THE SUSTAINABILITY INITIATIVE AT ITHACA COLLEGE

Shapiro, Elan
- EXPLORING POSITIVE GROWTH: THE SUSTAINABILITY INITIATIVE AT ITHACA COLLEGE

Shunturov, Vladislav
- USING BUILDINGS TO TEACH ENVIRONMENTAL STEWARDSHIP: REAL-TIME DISPLAY OF ENVIRONMENTAL PERFORMANCE AS A MECHANISM FOR EDUCATING, MOTIVATING AND EMPOWERING THE STUDENT BODY

Sievertsen, Rick
- CAMPUS OF THE FUTURE

Simpson, Scott
- EXPRESSIONS OF SUSTAINABILITY: THE CAMPUS AS AN ARBORETUM

Skoglund, Chris
- ECO-REPS PROGRAMS: CONDUCTING PEER OUTREACH IN RESIDENCE HALLS

Smargon, Adam
- THE THEORY AND PRACTICE OF GREEN PURCHASING

Smith, Joy
- COASTAL CAROLINA UNIVERSITY'S HABITAT FOR HUMANITY SUSTAINABLE BUILDING AND LIVING PROJECT: AN HONORS PROGRAM SERVICE LEARNING COURSE

Smith-Mullarkey, Michelle
- A SYSTEMATIC APPROACH TO MANAGING CONSTRUCTION AND DEMOLITION WASTE ON A UNIVERSITY CAMPUS
- CREATING A SUSTAINABLE LEARNING COMMUNITY: FROM DESIGN THROUGH CONSTRUCTION TO RESIDENTIAL LEARNING

Spooner, David
- ASSESSING THE 'LEARNING VALUE' OF CAMPUS GREEN SPACES

Stang, Lindsay
- COASTAL CAROLINA UNIVERSITY'S HABITAT FOR HUMANITY SUSTAINABLE BUILDING AND LIVING PROJECT: AN HONORS PROGRAM SERVICE LEARNING COURSE

Stemen, Mark
- CREATING A SUSTAINABLE STUDENT COMMUNITY: THE CHICO EXPERIENCE

Swense, Susan
- EXPLORING POSITIVE GROWTH: THE SUSTAINABILITY INITIATIVE AT ITHACA COLLEGE

Taylor, Charles
- STORMWATER MANAGEMENT FOR URBAN ENVIRONMENTS

Torres-Antonini, Maruja
- LIVING GREEN: SUSTAINABLE DIRECTIONS FOR RESIDENTIAL LEARNING COMMUNITIES

Umashankar, R.
- CAMPUS MASTER PLANS AS DRIVERS OF SUSTAINABLE GROWTH
- EXPRESSIONS OF SUSTAINABILITY: THE CAMPUS AS AN ARBORETUM
- *ORAL SESSION*: PEDAGOGY OF THE CAMPUS EXPERIENCE: USING CAMPUS BUILDINGS AND LANDSCAPES TO CONVEY LESSONS OF ENVIRONMENTAL STEWARDSHIP

Verner, Rebecca
- LOYOLA INTERCOLLEGIATE ATHLETIC COMPLEX – PUSHING THE ENVELOPE OF LANDFILL RECLAMATION