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Chapter 47

Creating and Assessing a Campus Culture of Sustainability: The University of Michigan Experience

Robert W. Marans and Michael Shriberg

Abstract

With the focus on operational campus greening, climate commitments and environmental education, the sustainability in higher education movement has paid limited attention to engendering deep cultural change among university stakeholders. In fact, systematic efforts towards and evaluations of cultural change programs for faculty, staff and students are almost completely absent. To help fill this void, this paper presents an overview of the University of Michigan's (U-M) experience in creating and monitoring a culture of sustainability, with a model and methods that are broadly applicable. The paper begins by describing two key "cultural change" initiatives at U-M: the Planet Blue Ambassadors (a peer-to-peer "EcoReps" program) and "Sustainability & the Campus" (a course that links students and operational staff). It then describes a groundbreaking new program – the Sustainability Cultural Indicators Project (SCIP). The program aims at monitoring U-M's progress in moving towards a culture of sustainability by collecting indicators on understanding (literacy), commitment (motivation/attitudes), and behaviors of students, faculty and staff. The program design – which was developed through a unique collaborative "Integrated Assessment" – includes following a cohort of undergraduate students through their U-M experience as well as annual surveys of graduate students, staff and faculty. The indicators can serve as a model for campuses striving to complete the self-evaluation for AASHE (Association for the Advancement of Sustainability in Higher Education) STARS (Sustainability Tracking, Assessment & Rating System) or other campuses interesting in monitoring progress toward advancing a culture of sustainability.

Introduction

The scientific and technical challenges of sustainability on which universities and colleges, as well as practitioners, have focused the bulk of their efforts represent only part of the necessary intellectual and social transition to a sustainable society. Institutions of higher education play a pivotal role in addressing the more difficult yet powerful part of the sustainability transition. That role is in creating and maintaining a "culture of sustainability" among members of the university community. A culture of sustainability has been defined as "a culture in which individuals are aware of major environmental (and social/economic) challenges, are behaving in sustainable ways, and are committed to a sustainable lifestyle for both the present and future" (Marans et al. 2010). To achieve this ideal state within institutions of higher education, Sharp (2002) calls for a rethinking of organizational action and actors that questions the prevailing assumptions of organizational rationality that stays within the confines of the current systems. Similarly, Senge (2000) stresses the importance of cultivating a "learning organization," rather than a "knowing organization" since change at higher education institutions is a "complex learning and unlearning process for all concerned" (Scott 2004). Therefore, nothing less than a paradigm shift in organizational thinking is needed for colleges and universities to promote cultural transformation.

This organizational transformation is needed in all sectors of society. Yet institutions of higher education can and should be at the forefront with the collective mission of fostering sustainability through our actions and through cultivating future sustainability leaders. To date, however, most campus sustainability efforts stop either at "greening" or at the level of institutional commitments to eco-efficiency, climate (and waste) mitigation and increasing environmental education. Though calls for institutional and cultural transformation are multiplying at a rapid rate, rarely do institutions address the deeper cultural change necessary to transform into sustainable organizations which empower citizens with a sustainability perspective; instead, focus is often on implementing many individual projects, isolated initiatives, or broad commitments (Sharp 2002; 2009). This is partly attributable to the lack of guidance for institutions attempting to follow this more uncertain and uncomfortable path.

In this paper, we hope to fill this void by offering a case study documenting what is happening at the University of Michigan (U-M). Following an overview of the challenge faced by U-M and past achievements, we review two recent cultural change initiatives in the context of their transformative potential. Next, we describe a program aimed at monitoring university progress in moving toward a culture of sustainability. Finally, we discuss the potential for U-M's approach to assessing the culture of sustainability to be replicated in other organizations and institutions of higher education.

A Challenge to Cultural Change and Past Achievements – The U-M Experience

One of the most challenging aspects of cultural change on campuses is size. U-M's Ann Arbor campus is analogous to a diverse and expansive small city. The university has over 80,000 students, faculty, and staff who vary in age, background, and experience. They learn, conduct research, study, and work in more than 450 buildings occupying over 31 million square feet spread across more than 3,000 acres. Although the size and diversity of the population and scale of the campus need to be addressed in creating change in the culture of sustainability on campus, it has not impeded the university's earlier efforts to address environmental concerns.

U-M began to embrace environmental protection more than 40 years ago. For example, the university held the first mass Earth Day celebration in 1970, the same year U-M initiated a campus-wide recycling program. In the early 1960s the university's power plant converted from coal to natural gas cogeneration. These early initiatives were sparked in part by student activism combined with leading environmental education programs. U-M presently offers 10 undergraduate degrees and 11 Master's degrees on some aspect of sustainability with nearly 400 sustainability-oriented courses available to students. Moreover, U-M's School of Natural Resources & Environment is one of the oldest educational and research outlets for sustainability in the US, is internationally well respected, and serves as the hub for the nearly 400 faculty members involved in sustainability-related research.

Currently, U-M continues to advance its operational sustainability efforts. For example, the university maintains the largest fleet of alternative fuels vehicles amongst US universities; its hybrid busses are amongst those offering free service to over nine million riders per year. U-M's energy efficiency efforts are headlined by a "Planet Blue" program that decreased overall energy usage by 12% annually in 71 buildings, with an energy cost avoidance of nearly US$3.7 million each year.[1] The university has also adopted a LEED Silver building standard for major new non-clinical building construction and renovation projects.

1 Plant Blue was launched in 2008 as a way of engaging building occupants along with operational personnel in reducing building energy costs and increasing recycling. In 2011, Planet Blue became part of

In fall 2011, President Mary Sue Coleman launched a Presidential Initiative in order to further U-M's commitment to environmental protection to sustainability. At the core of the initiative is a series of goals described later in the paper (see also Table 1). In her public address, President Coleman stated: "Today we begin an important new chapter – one that will alter the face of our campus and, more important, the character of our teaching, research and impact as a global leader" and "Sustainability defines the University of Michigan ... A great university such as ours does not blink when presented with difficult challenges."[2] An underlying priority that runs throughout the presidential initiative is the goal of creating a culture of sustainability among U-M's students, faculty and staff. Among the many campus activities aimed at establishing this goal are the Planet Blue Ambassadors program and an undergraduate course, 'Sustainability & the Campus'.

Planet Blue Ambassadors program

Perhaps the most direct efforts to create a culture of sustainability at institutions of higher education come from "Eco-Rep" programs (Erickson 2010). These programs typically rely on peer-to-peer methodologies and use social-based marketing to promote sustainable practices and lifestyles. U-M's version of this emerging model is called the "Planet Blue Ambassadors" program, which operates under the following mission: "Through hands-on learning and peer-to-peer engagement, the Planet Blue Ambassadors (PBA) program fosters environmentally and socially responsible thinking and action to advance a campus-wide culture of sustainability." The program was launched in 2011 as part of the presidential initiative. It includes 25 undergraduate students living in the residence halls as well as 15 staff volunteers from throughout the university.

The backbone of the PBA program is a seminar designed to provide the operational skills and intellectual framework for students and staff to be effective in cultural change initiatives. Through a series of workshops, the seminar provides PBAs with tools to create their own methods for inducing behavioral change for sustainability. Faculty and staff serve as guides for PBAs, helping to bring appropriate resources, models and contacts to students while playing a mentorship rather than a traditional teaching role. PBAs are encouraged to learn from each other, with a particular emphasis on the McKenzie-Mohr "Fostering Sustainability Behavior" model (2011). Students meet for four hours per month, while staff members meet for two hours each month, including a joint session with students. In this way, students and staff co-learn through their experiences and insights.

The activities that PBAs engage in include organizing sustainability programs, auditing living and work environments for sustainability, conducting focus groups in connection with the monitoring effort described later, planning social activities to build "community", engaging in informal and formal discussions, establishing and tracking of a personal sustainability goal, and preparing self-reflective papers on leadership development and sustainability transformations. Moreover, the students and staff are jointly proposing a sustainability certification program – one for students in residence halls and one for staff in office environments. While the full results are yet to be determined (though they are being tracked and monitored closely), the initial enthusiasm for the program and receptivity of other U-M stakeholders holds strong promise for beginning to fulfill the cultural transformation mission.

U-M's overall sustainability initiative. For a discussion of the Plant Blue program and its origins, see: http://opsteams.plantops.umich.edu/ and Marans and Edelstein (2010).

2 For the complete text of President Coleman's sustainability address, see: http://sustainability.umich.edu/news/going-green-staying-blue-sustainability-michigan.

"Sustainability & the Campus" course

"Sustainability & the Campus" aims to create a culture of sustainability on campus by linking faculty, students, and staff in a shared mission through a project-based course. Initiated in 2001, the course is currently offered every semester to approximately 40 undergraduate students. "Sustainability & the Campus" is project-focused, directly linked with operational units that submit project proposals to have groups of four to six students work with them. These projects are complemented by lectures and activities on organizational change and leadership from the instructor as well as guest lecturers from operational units. Using the campus as a living-learning laboratory, the students also engage in site visits and other means of "hands-on" learning.[3]

An extensive review of the course was recently conducted using focus groups, interviews, or surveys with current or former students and with project sponsors (Shriberg and Harris 2012). While most of the comments were directed at specific outcomes – such as the professional skills and relationships that the course engendered – or fond memories of hard work and project success, one striking finding dealt with the impact of the course on the culture of sustainability on campus. This outcome emerged organically from a combination of joint investment in the work (it was mostly voluntary from all parties) and an unusually close mixing of students and staff, with faculty providing guidance and expertise. Students and staff learned that they have complementary needs and skills which could be brought together effectively with the right structure and time commitment, helping to create a "culture of sustainability". Students, staff and faculty live in very different cultural worlds at U-M. Often termed "loose coupling of organizational systems", and particularly prevalent on large or decentralized campuses, the problem is that, for example, the inner workings of the philosophy department are only loosely connected to those of the power plant operators. This separation can lead to a dynamic of competition or, at least, lack of understanding that deters the cultural transformations necessary for deep organizational changes. "Sustainability & the Campus" helps break this barrier through close collaboration with students and staff, often exposing mutual needs and a shared sense of purpose.

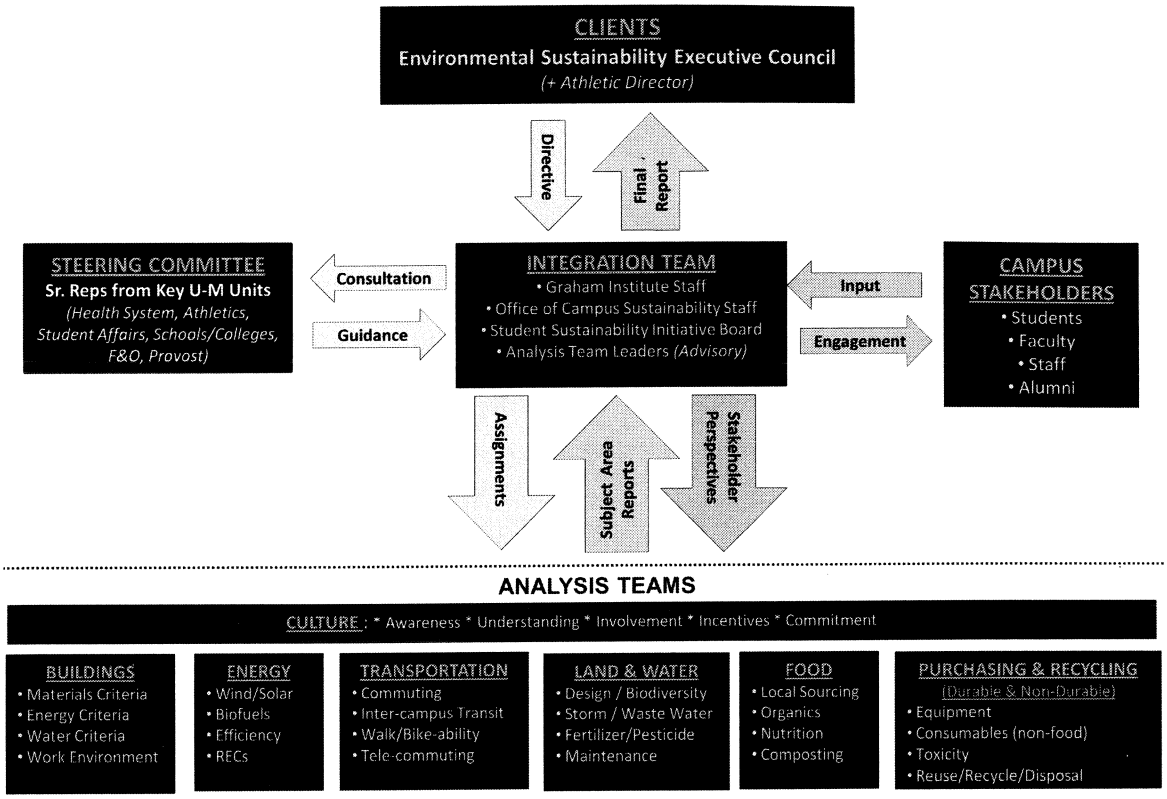
Another unexpected but particularly strong finding was that the course serves to facilitate the integration or convergence of views among students, faculty and staff through class-based projects. Specifically, students benefit greatly from the "real-world" view of university staff, learning about complexity, responsibility, and the types of analysis and arguments that can lead to high-level support. The idealism of students often collides with the dim view of change shared by many of the staff. Staff members benefit from the students' perspective, enthusiasm and hard work, often using interest on the part of the university's "customers" to advance projects that might have been untouched by university officials. For example, one sponsor described the key benefit as "increasing the engagement" and "buy-in" of people on campus, further explaining that projects that are directed at students but conducted by staff require student input up front in order to be successful.

While the outcomes of student projects vary widely, both students and staff reported high levels of satisfaction with skills and confidence acquisition as well as a mutual understanding of each other's perspective. Course projects have launched collaborative initiatives such as campus gardens, a published booklet called "How To Be a Green Wolverine", and several efforts to improve recycling and composting around campus. While small compared to the scale of the prob-

3 For the most recent course syllabus and a listing of past project reports, see: http://www.graham.umich.edu/education/campus.php.

lem and campus, these collaborative initiatives through one course are key underpinnings to creating a campus culture of sustainability.

Fig. 1: Organizational framework for campus sustainability integrated assessment



Monitoring progress in moving toward a culture of sustainability

The Planet Blue Ambassadors program was an outgrowth of a comprehensive campus-wide sustainability integrative assessment (IA) conducted on U-M operational campus sustainability from 2010-2011.[4] An IA is a stakeholder process to "collectively define problems, address diverse perspectives, use best-available information, and establish partnerships with the goal of analyzing options for making positive change." The organizational framework and operations of the IA shown in Fig. 1 demonstrate how the intense stakeholder process focused around key themes of buildings, transportation and travel, purchasing and recycling, food, energy, land and water, and culture. With U-M's Environmental Sustainability Executive Council as a client, and an iterative process with multiple levels of the organizations, key data and recommendations for each area were developed.

The integration of this data and these recommendations was based on the collective work of faculty-led teams of students covering each topic. Subsequently, the integration resulted in four broad themes – climate action, waste prevention, healthy environments, and community – with guiding principles and targeted goals established for each by 2025 (Table 1).[5] Cultural change initiatives stem from the principles outlined under community awareness. They indi-

4 For a discussion of U-M's integrative assessments, see: http://www.graham.umich.edu/ia/ and Lund et al., (2011).

5 The Integrated Assessment Report which incorporates the report of the Culture Team is found on: http://www.graham.umich.edu/pdf/CampusIA-FinalReport.pdf.

cate that U-M will "pursue evaluation strategies toward a campus-wide ethic of sustainability" as articulated in President Coleman's September 2011 sustainability speech announcing the sustainability goals. Specifically, she stated that "we will scientifically measure and report our progress and behavior as a community ... ISR (Institute for Social Research) researchers will measure the sustainability attitudes and activities of students, faculty and staff, as well as identify where we can improve." The evaluation strategies involve a groundbreaking program for monitoring U-M's progress in moving toward a culture of sustainability. Progress would be determined by tracking a set of cultural indicators over time.

Table 1: Integrative assessment themes, guiding principles, and goals

Theme	Guiding Principle	2025 Goals
Climate Action	We will pursue energy efficiency and fiscally-responsible energy sourcing strategies to reduce greenhouse gas emissions toward long-term carbon neutrality.	Reduce greenhouse gas emissions *(scopes 1&2)* by 25% below 2006 levels. Decrease carbon intensity of passenger trips on U-M transportation options by 30% below 2006 levels.
Waste Prevention	We will pursue purchasing, reuse, recycling, and composting strategies toward long-term waste eradication.	Reduce waste tonnage diverted to disposal facilities by 40% below 2006 levels.
Healthy Environments	We will pursue land and water management, built environment, and product sourcing strategies toward improving the health of ecosystems and communities.	Purchase 20% of U-M food from sustainable sources. Protect Huron River water quality by: • minimizing runoff from impervious surfaces *(outperform uncontrolled surfaces by 30%), &* • reducing the volume of land management chemicals used on campus by 40%
Community Awareness	We will pursue stakeholder engagement, education, and evaluation strategies toward a campus-wide ethic of sustainability.	*There is no stretch goal recommendation for this theme. However, the report recommends investments in multiple actions to educate our community, track behavior, and report progress over time.*

Conceptual framework

Concepts of culture of sustainability range from the world-view of sustainability among members of the university community to their involvement in sustainability practices on a daily basis. Measuring these concepts over time requires both direct and indirect contact with students, faculty, staff, and even alumni. The annual reporting of these measures or cultural indicators is intended to complement the campus-wide environmental indicators that have been reported by the University since 2004, which are very comprehensive in scope yet focused on traditional measures like water and energy use, transit ridership, procurement, etc.[6]

Direct contact with members of the university community will involve surveys (individual indicators) while indirect measures will be obtained through university records or field observations (generic or aggregate indicators). Examples of the latter include the proportion of campus bike racks that are occupied, proportion of university parking spaces occupied, number of students involved in sustainability organizations both on- and off-campus, etc. Surveys with members of the university community will generate cultural indicators that reflect levels

6 Among the key environmental indicators by the university are building energy use, greenhouse gas emissions, and waste disposal. For a complete listing of indicators and annual sustainability reports, see: http://www.ocs.umich.edu/reporting.shtml.

of understanding (literacy), commitment (motivation), and behaviors of students, faculty, staff and alumni.

Fig. 2: Cultural indicator operational framework

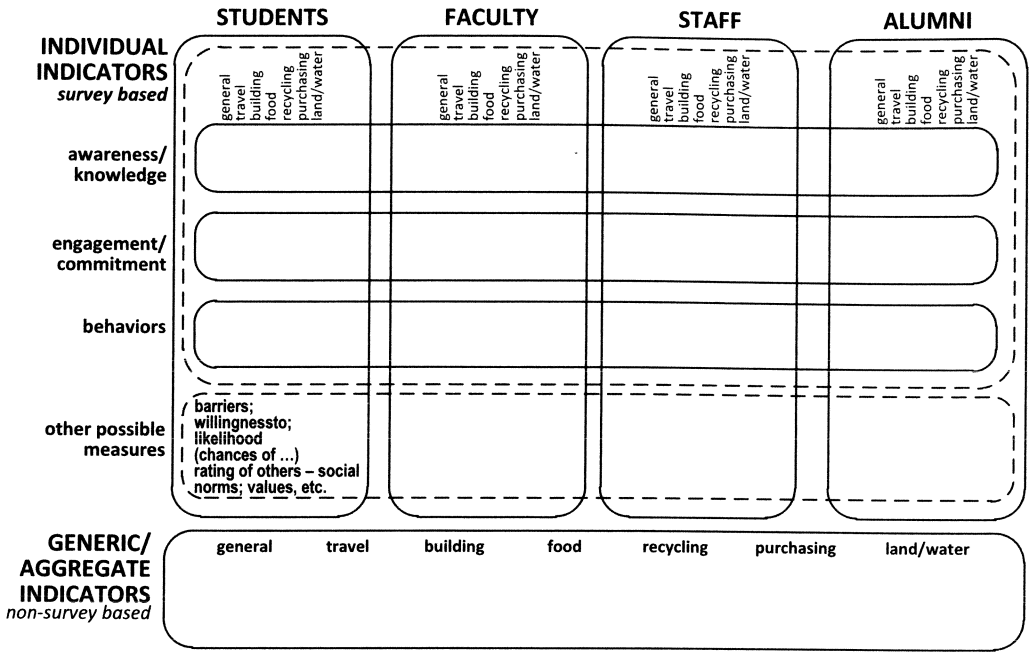


Fig. 2 presents an operational framework for the individual and aggregate cultural indicators covering buildings, travel, land and water, food, and purchasing and recycling The top set of four boxes represent the survey component used to measure individual indicators for each population group while the bottom box shows the aggregate indicators representing each topical area that reflect all members of the University community. Since the survey components offer opportunities to collect other kinds of information besides cultural indicator data, the figure shows other possible topics that could be measured as part of the questionnaires administered to students, faculty, staff, and alumni (i.e., barriers, willingness to pay, ratings of others, and so forth). The operational framework is intended to serve as a guide to the detailed planning needed to develop and measure the cultural indicators.

The process

The program for monitoring the culture of sustainability on campus including the operational framework for measuring and reporting indicators was submitted to U-M officials in summer 2011.[7] The overall program was approved including an authorization of funding (as a portion of the US$14 million in new funding that U-M committed to sustainability following the IA) to gather a set of baseline indicators through surveys in fall 2012. Funds have also been authorized to collect and report follow-up indicators in 2013 and 2014.

As an initial step to carry out this work, a steering committee was established consisting of representatives from the Graham Environmental Sustainability Institute, the Office of Campus Sustainability, faculty and students, and the Institute for Social Research, the organization that

7 The program submitted to U-M administrators did not include the development and collection of indicators for alumni. In the future, we plan to develop indicators covering alumni as these indicators will become increasingly important when current and future students graduate.

will conduct the surveys and analyze the data. We also created an external advisory panel with expertise in environmental literacy and campus sustainability to provide feedback to the steering committee. To date, the steering committee has prepared a detailed schedule for the administration of the surveys and the reporting of their findings including baseline data covering the cultural indicators. It has also reviewed sustainability-related questionnaires used at other universities.

Focus groups: A key activity in the planning phase of the project is a series of focus groups with students and staff. The primary purpose of the focus groups is to provide input into the design of the questionnaires to be administered in fall 2012. A secondary purpose is to gather insights that will aid in interpreting survey findings. Five research questions have been used to guide the focus group discussions:

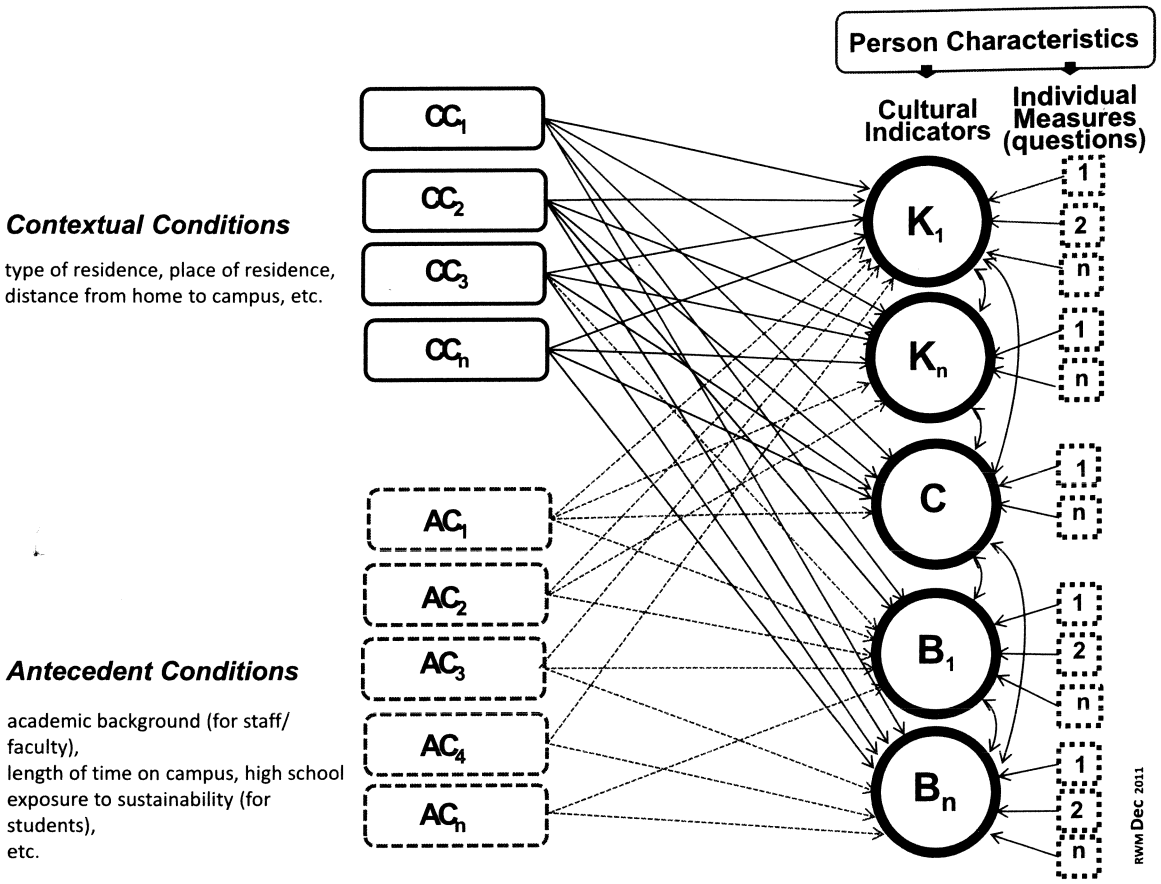
1. What is the meaning of sustainability and how has this meaning changed over time?
2. To what extent are students and staff aware of the university's sustainability efforts and what roles do they see themselves playing in these efforts?
3. How is knowledge about sustainability communicated and processed through interactions between students and others?
4. How are student and staff perceptions reflected in their actions vis-à-vis sustainability on-campus and off?
5. To what extent do student perceptions about sustainability relate to career choices and life after college?

Approximately 10-12 focus groups covering undergraduate and graduate students, residence hall and private housing residents, student athletes, students involved in sustainability organizations, and staff from different parts of the university are planned over a two-month period. The focus groups are being facilitated by the Planet Blue Ambassadors and monitored by senior research staff. Findings from the focus group sessions along with our review of past sustainability-related questionnaires will be used in drafting questions to be asked of U-M students, faculty and staff.[8]

Questionnaire Design: As a guide for drafting questions and writing questionnaires, an analytical model was prepared showing relationships to be explored between different types of cultural indicators and contextual and antecedent conditions. The model shown in Fig. 3 has several parts. Firstly, it suggests that indicators could consist of possibly two or more questions. For example, an indicator capturing the travel behavior of students could consist of responses to questions about automobile ownership, mode of travel to campus, and intra-campus bus use. Secondly, the number of indicators reflecting knowledge ($\mathcal{K}$), commitment ($\mathcal{C}$), and behaviors ($\mathcal{B}$) and the number of variables reflecting contextual and antecedent conditions will vary. Thirdly, the model suggests that contextual variables such as type and place of residence, and distance from residence to campus may be related to selected cultural indicators. Similarly, antecedent conditions such as length of time on campus and academic background in high school and college could affect selected cultural indicators. Finally, the model suggests possible relationships between cultural indicators. The questionnaires will include items that capture contextual and antecedent conditions as well as those used in creating the different types of indicators.

8 Instead of conducting focus groups with faculty, the research team with be testing concepts and draft questions with selected faculty using a cognitive interview approach.

Fig. 3: Analytic model for investigating determinants of cultural indicators



Questionnaire administration: Following extensive questionnaire pretesting including indicator development, plans are being made to launch web surveys soon after the beginning of the fall semester 2012. The plan calls for a selecting samples that would produce 4000 undergraduate students, 400 graduate students, and 1500 faculty and staff members. For the targeted 4000 students, more than 1000 email addresses will be selected from each list of incoming students (freshmen), sophomores, juniors and seniors. Because we are interested in measuring change in the indicators reflecting the culture of sustainability, we are using a panel design such that in fall 2013, approximately a quarter of the 2012 entering class will be contacted again and asked to complete the same questionnaire. These students will be re-contacted in 2014 and 2015, the latter being their senior year at the university. A similar sample design will be applied to the 2012 sophomore, juniors, and seniors with a third form each cohort re-contacted during their each of their remaining years at the university.

In addition to the panel design, a cross-sectional design will be employed; for subsequent years (2013 and 2014), a sample will be selected from each freshmen class to yield 330 respondents. Similarly, a new sample producing 330 respondents from the sophomore and junior classes will be selected. This combination of sample designs will enable us to track cultural indicators for individual students who move through their four years at the university to see the extent of change in their level of understanding of sustainability issues, their degree of commitment to dealing with environmental problems, and their actions. It will also enable us to track changes in cohorts of students as well as faculty and staff.

Next steps: The collection of indicator data in September 2012 is expected to continue until mid-October. By early December, a preliminary set of cultural indicators will be available and incorporated in U-M's 2012 Annual Environmental Report. The final set of cultural indicators representing the university's baseline measures against which future measures can be compared will be reported in the spring 2013. This report will include findings from in-depth data analysis that tests relationships suggested by the model presented in Fig. 3. Interpretation of the survey findings and their policy implications will be guided in part by the results of the focus groups discussed earlier. These findings will serve as an evaluation mechanism for our educational programs and other sustainability initiatives and can be used in altering them.

Although the data available from the 2012 surveys will continue to be scrutinized by U-M researchers after the first cultural indicators report is issued, we expect to begin planning for the first of the subsequent surveys that will take place in fall 2013. These surveys will replicate the collection process and will produce data that, when compared to the data collected in 2012, will be the first indication of whether or not the culture of sustainability at on the U-M campus has changed.

Conclusion

In this still early stage of the campus sustainability movement, universities and colleges have focused much of their efforts on the scientific and technical challenges of sustainability, which represent only part of the intellectual, structural, and social transition necessary to attain a sustainable institution. Increasing attention can and should be given to establishing a "culture of sustainability" within these institutional settings. At the University of Michigan, the Planet Blue Ambassadors program and the "Sustainability & the Campus" course are two leading two efforts that directly target cultural change for sustainability.

To measure the success of these and other specific initiatives, a new evaluation program is being implemented to monitor U-M efforts to create a culture of sustainability. This program involves the development of sets of "cultural indicators' that measure sustainability literacy, commitments to being a more environmentally and socially responsible members of society, and pro- sustainable behaviors among students, faculty, and staff. The indicator program will enable U-M to track its progress as it moves toward becoming more sustainable by changing its culture. At the same time, it will provide insights that can be used to strengthen existing campus sustainability efforts and launch new ones. We believe that this program could be replicated at other institutions of higher education and could guide them in measuring the effectiveness of their efforts to create a more sustainable university. In particular, the University of Michigan program and its indicators can serve as models for campuses striving to complete the self-evaluation for AASHE (Association for the Advancement of Sustainability in Higher Education) STARS (Sustainability Tracking, Assessment & Rating System) or other campuses interesting in monitoring progress toward advancing a culture of sustainability. Finally, measuring cultural indicators in a number of institutional settings offers opportunities for comparative research on topics related to the human dimensions of sustainability.

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