



Towards a campus culture of environmental sustainability

Recommendations for a large university

Campus culture
of environmental
sustainability

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Brett L.M. Levy

*School of Education, University of Michigan, Ann Arbor, Michigan, USA and
School of Education, University of Wisconsin-Madison,
Madison, Wisconsin, USA, and*

Robert W. Marans

*Institute for Social Research, University of Michigan,
Ann Arbor, Michigan, USA*

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Abstract

Purpose – The authors led an interdisciplinary team that developed recommendations for building a “culture of environmental sustainability” at the University of Michigan (UM), and the purpose of this paper is to provide guidance on how other institutions might promote pro-environmental behaviors on their campuses.

Design/methodology/approach – The authors synthesize research on fostering environmental behavior, analyze how current campus sustainability efforts align with that research, and describe how they developed research-based recommendations to increase environmental sustainability on the UM campus.

Findings – Analyses of prior research suggest that there are five factors that influence individuals’ pro-environment behaviors: knowledge of issues; knowledge of procedures; social incentives; material incentives; and prompts/reminders. Given these factors, UM should pursue three types of activities to support the development of pro-environment behaviors: education, engagement, and assessment.

Practical implications – The specific recommendations in this report are for the University of Michigan. However, other institutions interested in fostering a culture of environmental sustainability might benefit from undertaking similar comprehensive assessments of how they could support community members’ development of pro-environment behavior and knowledge.

Originality/value – The paper builds on prior research to offer a new vision for how to develop a culture of environmental sustainability on a large university campus.

Keywords United States of America, Universities, Sustainability, Environmental management

Paper type Case study

Many colleges and universities have undertaken large-scale environmental sustainability efforts, but few have developed comprehensive plans to address the cultural or behavioral aspects of environmental sustainability on their campuses. Recently the University of Michigan (UM) commissioned a committee to develop recommendations for how campus community members could begin to behave in more environmentally sustainable ways and thus develop a “culture of environmental sustainability.” The purpose of this paper is to describe these recommendations, their theoretical basis, the process by which they were developed, and how they relate to other efforts across the USA. The authors hope that other institutions interested in reducing



their environmental impact will also embark on the process of comprehensively addressing the behavioral aspects of environmental sustainability.

Background and objectives

Like many campuses across the USA and elsewhere in the world, the UM has undertaken various efforts to reduce its negative environmental impact. Until recently, however, these initiatives put little emphasis on the cultural or human dimensions of environmental sustainability. In the 1980s, building performance teams surveyed campus buildings and conducted tune-ups to reduce energy consumption. In the 1990s, the university participated in the EPA's Energy Star Program, which resulted in several energy conservation measures, including replacing incandescent light bulbs with compact fluorescent light bulbs, launching a recycling program, and upgrading water-cooled condensing systems. Also at this time, university staff launched an awareness campaign by placing posters in numerous campus buildings to encourage students and staff to reduce energy usage by wearing heavier clothing during the winter, turning off lights, and conserving energy in various other ways.

The last decade has witnessed an acceleration of energy conservation efforts on campus. In 2003, UM President Mary Sue Coleman established an Environmental Task Force which subsequently recommended that the university conduct and release a sustainability report that would include a set of social, economic, cultural, and aesthetic indicators. Since 2007, several environmental reports with selected indicators have been published annually, but none of these reports contained indicators reflecting the behaviors and thoughts of members of the university community (UM, 2007). Thus, to this point, cultural issues had not been given a central role in the university's assessment of progress in environmental sustainability.

However, in 2008, President Coleman launched a six-point plan for environmental sustainability, which included environmental reporting, renewable energy, alternative transportation, green purchasing, new construction and renovation projects, and Planet Blue. The latter sought to conserve energy within current buildings and included a study to understand the conservation-related thoughts and actions of faculty, staff, and students in five UM buildings. Findings published in this journal indicated that campus community members often do not practice individual conservation behaviors (leaving office lights on, etc.) but would be willing to accept collective conservation efforts, such as higher building temperatures during summer months or motion-sensor lighting in hallways (Marans and Edelstein, 2010). Further examinations have indicated that when faculty and staff were more aware of UM's conservation efforts, they were more likely to engage in conservation behaviors (Edelstein *et al.*, 2011). These studies suggest that although conservation behaviors at the university are suboptimal, campus-wide efforts towards environmental sustainability and awareness thereof can strengthen the adoption of such behaviors.

During the fall of 2009, in response to student demand, President Coleman announced the university's ambitious Sustainability Initiative, which included a strong cultural component. To establish the UM as both a leader and laboratory in environmental sustainability, this initiative aims to influence teaching, research, and operations in order to reduce the institution's environmental impact. As part of the effort to effect changes in operations, university officials commissioned an integrated assessment (IA). The IA strategy, which has been employed to address a wide array of environmental

challenges (Scavia, 2010), includes both experts (e.g. scientists) and stakeholders (e.g. community members) in designing solutions to large-scale collective problems. Similar to certain environmental management systems employed by business leaders (Daily and Huang, 2001), the IA process aims to maximize input and buy-in in the development of strategic plans.

UM's IA involved seven teams, and their areas of focus were: energy, buildings, transportation, food, purchasing and recycling, land and water, and culture. Each team was charged with:

- assessing the environmental sustainability of the campus within their domain;
- recommending actions to be taken on campus in that domain; and
- summarizing their findings and recommendations in a report for UM administrators.

To complete these tasks, the teams, which included one faculty lead and five to eight students (including one student lead), met weekly and conducted relevant research. The charge of the authors' team, the culture team, was to develop research-based recommendations that would promote a "culture of environmental sustainability," that is, a campus community in which individuals understand major environmental challenges and act to resolve them. Whereas previous research had studied the efforts to promote environmental sustainability in industry through fostering employees' environmental behavior (Brio *et al.*, 2008; Harris and Crane, 2000; Jabbour *et al.*, 2008; Renwick *et al.*, 2008), the authors' team examined how a decentralized university could influence not only its tenured and non-tenured employees but also its students. The culture team's development of research-based recommendations is only one step towards developing a stronger culture of environmental sustainability, but carefully designed plans can be crucial to the widespread adoption of cultural changes (Jabbour, 2010).

Methods

To complete the assessment and recommendations, the authors' team of eight students and one faculty member collected and analyzed three types of information:

- (1) research and theory on environmental behavior and psychology;
- (2) efforts to build a culture of sustainability on other campuses; and
- (3) the status of the culture of sustainability on our campus.

To develop a theoretical understanding of environmental behavior, the team consulted with academics on campus, reviewed and analyzed relevant literature, and discussed their ideas. Developing an understanding of current campus sustainability efforts required our team members to review campus sustainability reports from 70 colleges and universities from around the country. In addition, to learn about efforts on our own campus, the authors assigned one culture team member to attend the weekly meetings of each of the other six teams. By analyzing and discussing findings at the team's weekly meetings, the group developed recommendations that aligned with its theoretical understandings of human behavior change. The team's analyses enabled them to make recommendations that the authors believe will be useful to leaders at UM and beyond.

Theoretical foundations

Over the last few decades, empirical studies have shown that several factors support environmentally responsible behavior, such as recycling or energy conservation. Among these are:

- understanding challenges;
- procedural knowledge;
- prompts;
- social motives; and
- material incentives.

Any one of these factors alone may be sufficient to influence some individuals to act in environmentally responsible ways, but because humans are motivated differently across time, combinations thereof are often most effective in sustaining environmentally responsible behavior (Abrahamse *et al.*, 2005; Parnell and Larsen, 2005).

First, evidence indicates that understanding environmental issues positively influences one's likelihood of undertaking environmentally responsible actions. In their seminal meta-analysis of behavioral research, Hines *et al.* (1986-1987) found 17 studies indicating that individuals are more likely to act in environmentally responsible ways when they understand environmental problems and/or their potential solutions. Meanwhile, De young's (2000) review suggests that individuals make more environmentally responsible choices when they feel competent – and thus have the know-how – to successfully undertake such actions. These two types of knowledge – declarative (knowledge of the problem) and procedural (how to address the problem) – are both important for effecting behavior change (Ramsey and Rickson, 1977).

Although understanding environmental issues and how to address them is a vital step in fostering pro-environmental behaviors, it is insufficient for sustaining such behaviors over an extended period of time. Individuals often need to be reminded to behave in an environmentally responsible manner. Numerous studies have documented the power of providing such reminders or prompts. For example, Katzev and Mishima (1992) found that when signs about recycling were posted near waste receptacles in a college mail room, paper recycling increased. Likewise, Aronson and O'Leary (1982-1983) found that when signs promoting water conservation were posted in a shower room, individuals decreased their water usage while Ayotte and her colleagues (2006) found that small prompts on light switches and computers succeeded in encouraging energy conservation on their college campus. Thus, if individuals possess knowledge but are still not undertaking environmentally responsible behaviors, deploying prompts can help to effect change.

Evidence also indicates that another powerful motivator for behavior change is social motives, including perceived social norms and stated commitments (McMakin, 2002). Studies show that when individuals commit to acting in an environmentally responsible way, they tend to keep their word. For example, Katzev and Pardini (1987) found that when community members committed to recycling their newspapers, they were more likely to undertake these activities than those who received material rewards for recycling. Also, in their meta-analysis, Hines *et al.* found six studies documenting a strong relationship between individuals' written commitments to act environmentally and their actions. This research suggests that people strive to align their actions with their words.

Perceived social norms can also have a large effect on an individual's behavior (Cialdini, 2003). In Fishbein and Ajzen's (2010) theory of reasoned action, an individual's perception of social norms is one of the strongest predictors of behavior: when someone perceives something as a "normal" way of acting, that individual is more likely to pursue that behavior. Various studies have found that when individuals work together towards environmental goals – thus creating norms of pro-environment behaviors, these individuals begin to behave in more environmentally sustainable ways (Hopper and Nielsen, 1991). For instance, Staats *et al.* (2004) found that when people worked with neighbors to discuss ways to reduce their energy consumption and trash generation, they were successful in achieving these goals. Likewise, De Young (1989-1990) found that when university staff members were given responsibility for monitoring their buildings' energy usage and promoting energy conservation (on a voluntary basis), energy use in their building areas declined substantially. Also, in a study of small-scale sustainability initiatives, Irvine and Kaplan (2001) found that individuals were willing to change their unsustainable behaviors if community members asked them to do so and explained the rationale.

Although social incentives, prompts, and awareness seem to be the most powerful means of promoting sustained environmentally responsible behaviors, there is some evidence that material incentives such as cash or gifts can play a role, as well (Geller, 1989). These should be employed cautiously, however, because research suggests that behavior changes motivated by material rewards will last only as long as the reward is issued. Katzev and Pardini (1987) for example, found that households recycled regularly while receiving a material reward but substantially reduced their recycling frequency once that reward was removed. Likewise, Ryan and Deci (2000) found that providing material incentives for individuals' performance of certain tasks can undermine their intrinsic motivation to complete those tasks. However, if the material incentive is modest and carefully targeted to encourage specific behaviors, its use may work well when paired with other strategies to jump-start behavior change in the short-run.

Human decision-making is motivated by various factors, so fostering a culture of sustainability on a large university campus may require a variety of approaches. Because of the unique circumstances in each community, some scholars have proposed that each intervention be treated as a small-scale experiment (Irvine and Kaplan, 2001). Nonetheless, as the culture team designed their recommendations, they considered the central principles evident in prior research on environmental behavior and examined efforts to promote sustainability on campuses nationwide.

Efforts to promote a culture of sustainability on campuses nationwide

Numerous colleges and universities throughout the USA have undertaken efforts to promote a culture of sustainability on their campuses. Many of these efforts involve strategies that are supported by research on environmental behavior and psychology. In this section, the authors describe how various efforts nationwide (including those at UM) relate to this research.

Knowledge of issues

Many colleges and universities have promoted sustainable behavior by supporting students' increased understanding of major environmental issues and how to address them. Most institutions have long offered students opportunities to learn about these

issues through coursework in engineering, natural and social sciences, and the like, but now schools are increasingly integrating such learning more into individuals' regular routines or trajectories. For example, at a number of institutions, including the University of Georgia, Bucknell University, and Furman College, students are required to complete a course in environmental issues in order to graduate. In addition, at many colleges and universities, campus community members are able to learn about significant environmental issues through peer education programs (e.g. University of Maryland), training in sustainable building design for employees (e.g. University of California, Berkeley, and University of Pennsylvania), and outreach teams of innovative engineering projects, like solar cars (e.g. UM, University of Waterloo) (UC Berkeley, 2010). Thus, there have been an increasing number of opportunities for students to learn about major environmental issues on their campuses. UM offers many options, but as of this writing, no coursework or activities in environmental sustainability are required for graduation.

Procedural knowledge

Students, staff, and faculty around the USA have a variety of opportunities to develop procedural knowledge on a range on environmental issues – both directly and indirectly. Most prevalent are campus recycling programs, which often include literature explaining the methods and rationale for recycling materials. During the winter of 2011, about 630 colleges and universities participated in Recyclemania (2011), a nationwide recycling competition that includes students, faculty, and staff. In addition to recycling, campus community members can learn other methods for conserving resources while on campus through green orientation programs (e.g. University of Maryland), guides on greening one's workplace (e.g. University of Vermont, Harvard University), and programs for purchasing green office and cleaning supplies (e.g. California Institute of Technology, Princeton University). Also, some colleges and universities indirectly teach their campus community members about environmentally sustainable procedures with descriptive displays of their solar panels and sustainable building practices. Whereas our own campus does the latter, it has no solar panels on public display. UM does have recycling available in all campus buildings and provides written information for freshmen, but it has not developed programs to prepare new students or employees to practice environmentally sustainable behaviors on campus.

Social incentives

There are also many programs that allow campus community members to become socially engaged with others in environmental learning and action, and these programs may support the development of social norms for environmentally sustainable behaviors. Needless to say, most institutions have numerous volunteer organizations in which students can opt to become collectively involved in various environmental issues and actions. In addition, several schools have initiated programs that organize students and employees to positively influence their peers as "sustainability ambassadors" (e.g. University of Chicago, Massachusetts Institute of Technology), "conservation advocates" (e.g. University of Virginia), or "eco-reps" (e.g. Dartmouth College). Yet other colleges and universities have living and learning residential communities for students (e.g. Earth House at Pennsylvania State University), gather pledges for energy saving goals (e.g. University of Wisconsin, Madison), and employ

“recycling monitors” (e.g. Bucknell University). The UM has about a dozen student environmental organizations, but it currently has few other programs that include social incentives for pro-environment behaviors, so there are many opportunities for change in this domain.

Material incentives

Many institutions have promoted environmental sustainability via material incentives. This has been especially prevalent in the domain of transportation. For example, it is common practice for schools to offer students free bus ridership (e.g. University of Texas), and some offer free bike rentals. Claremont McKenna College even pays individuals who bike, walk, or carpool to campus whereas other universities offer bike share programs (e.g. New York University). To encourage electricity conservation, various schools hold energy reduction competitions between dorms (e.g. Notre Dame University) and lightbulb exchanges through which campus community members can trade their incandescent bulbs for more energy efficient bulbs (e.g. University of California, Los Angeles). Also, some institutions have “green funds” through which students and employees can secure funding for environmental improvement projects (e.g. Duke University). Meanwhile, some campus administrators have required building contractors to abide by national Leadership in Energy and Environmental Design (LEED) standards in new construction and renovation of campus buildings (e.g. Princeton University, Cornell University). In these areas, the UM has been quite active, providing free bus transportation to the campus community, requiring large new buildings to be LEED-certified, and administering small grants for environmental projects (through the Graham Institute).

Prompts

While the aforementioned programs specifically support campus community members’ pro-environment issue knowledge, procedural knowledge, social incentives, and material incentives, many of these programs have prompts integrated into their work. For example, recycling and energy conservation programs on our campus and elsewhere commonly involve extensive signage (often physically close to the location of the decision) to remind individuals to enact specific behaviors, such as turning off lights when leaving a room. However, given humans’ capacity to behave unsustainable in the absence of such prompts, it is important for colleges and universities to include these in their plans to develop cultures of environmental sustainability.

Looking back, moving forward

Indeed there are many outstanding efforts nationwide to reduce the environmental impact of university life and to promote a culture of sustainability. However, the culture team’s review of activities at over 70 campuses indicated that these efforts to support cultural change tend to lack two central features:

- (1) comprehensiveness; and
- (2) systematically measured outcomes.

The team found little documentation indicating the extent to which changes in recycled materials, energy use, transportation costs, and/or organic food consumption were, at least in part, attributable to changes in the behaviors of students, staff, or faculty.

Nor was there any evidence showing that the actions taken at the schools had shifted the mindsets of campus community members. Thus, in our recommendations for the UM campus, the culture team suggested a comprehensive, research-based approach to shifting cultural norms as well as systematically monitoring our progress towards developing a culture of sustainability.

Practical recommendations

Given prior research on supporting the development of pro-environment behaviors (as described above), the team developed recommendations in three areas:

- (1) education and training;
- (2) engagement; and
- (3) assessing and monitoring.

Whereas the educational and engagement recommendations are intended to help campus community members to develop knowledge and behaviors that are aligned to environmental sustainability, the latter set of recommendations is intended to gauge the short-term and long-term impact of these and other efforts at our university.

Education and training

The culture team recommended several types of education and training for campus community members. First, UM students and employees should develop knowledge of environmental issues and procedures by completing an online tutorial in basic environmental knowledge. This could be similar to the AlcoholEdu tutorial for students or the PEERRS certification for faculty and research staff (for IRB-related issues), which provide background and practical information in their respective areas. A tutorial that focuses on environmental sustainability could inform campus community members about the rationale and methods for recycling, traveling by bus, and conserving electricity, among other behaviors. Second, the university should provide numerous opportunities for faculty to learn how issues of environmental sustainability can be integrated into their courses; including luncheon workshops, multi-day institutes, and a central web site through which faculty can share curricula and syllabi. Once there are a sufficient number of courses with substantial sustainability content, we recommended requiring every student to complete at least one course emphasizing environmental sustainability. Through the development and enactment of such courses, both students and faculty could develop greater knowledge of environmental issues.

In addition, the team recommended that the UM Housing Office work with the Office of Campus Sustainability and the School of Education develop and implement training programs in environmentally sustainable living for residential advisors and specialized “eco-reps” for each residential hall floor. Eco-reps would be responsible for teaching others on their floors about the importance of environmental issues and demonstrate how to live more sustainably – thus supporting social incentives for environmentally sustainable living. Finally, the culture team recommended that Procurement Services work with the Office of Campus Sustainability to develop a staff training program to support environmentally sustainable purchasing of products such as recyclable paper, cleaning supplies, soy-based inks, and the like. Currently over 4,000 employees purchase products through university accounts, and many do so through one campus web site which could be adjusted to easily support environmentally sustainable purchasing.

Through appropriate training programs, employees could develop knowledge of environmentally sustainable processes.

Engagement

The culture team recommended that UM establish organizational arrangements to support the increased active engagement of students, faculty, and staff in improving the sustainability of our campus community. To do this, the UM should hire a full-time cultural liaison to regularly solicit conservation-minded ideas from students, faculty, and staff; evaluate their ideas; and help bring feasible ideas to fruition by communicating with administrators and providing organizational support and resources. Many individuals throughout our campus have helpful ideas about how to increase the effectiveness of recycling programs, decrease consumption of materials and energy, and engage their peers and colleagues in such activities. With adequate support, a cultural liaison could productively harness new ideas for improving community members' environmental behavior – and could also lead to small-scale studies of these ideas.

In addition, the team recommended that the provost require each academic unit to develop a sustainability plan for its operations and that employees of those units assume responsibility for implementing the plan; employee evaluations should then be related to their work in this area. Meanwhile, the Office of Campus Sustainability should design competitions designed to provide fun, interactive solutions to the challenge of increasing sustainability practices on campus. These could involve building or floor competitions to reduce waste, electricity use, or driving, and should be accompanied by community-created information campaigns to encourage broad participation and procedural knowledge.

To reduce the amount of unnecessary equipment and materials on campus (e.g. printers, copiers), the culture team recommended that the Office of Campus Sustainability design a system of incentives to encourage offices to share equipment. Finally, to address the large amount of waste and energy used in laboratories, the team recommended that the Office of Campus Sustainability work collaboratively with relevant schools and departments, such as the medical school and the chemistry department. This should be an arena in which labs throughout the campus can set attainable sustainability goals and share ideas about how to achieve them. Through the above activities, members of the campus community can develop knowledge of various environmentally responsible processes and also experience social incentives to employ such knowledge. Also, depending on the employee- or student-developed ideas, there may be substantial material incentives to support the development of more sustainable behaviors.

Assessing and monitoring

To measure our progress in building a campus culture of sustainability, the culture team recommended that UM carefully assess and monitor various aspects of this culture. The university should support the development of a set of cultural metrics or indicators aimed at such measurement. These indicators – which should be developed through focus groups with the campus community and pilot-testing – could include aspects of community members' (including alumni) knowledge, behavior, and engagement and would provide useful information to UM about how it might improve its efforts to foster a culture of sustainability. In addition, the administration should report these indicators publically as part of the UM's annual sustainability report.

Furthermore, the culture team recommended that the UM undertake several small-scale studies to assess the effects that certain sustainability interventions have on individuals. For example, if the cultural liaison oversees the development of a composting program or if Planet Blue tries to reduce energy consumption in several buildings, the university should examine the effects that such programs have on individuals' environmental behavior, knowledge, and/or attitudes. At a more basic level, such studies could determine how much of dorm composting or energy savings is attributable to behavioral change. Furthermore, UM should examine potential barriers to the development of pro-environment behaviors by administering periodic surveys to relevant community members, such as employee and students who drive to campus and do not take advantage of the bus system. Finally, to assess the environmental behavior of occupants of new and renovated buildings, UM should conduct post-occupancy evaluations (POE), an established procedure in architectural research that can determine the extent to which design objectives have been met (Table I). Such assessments would provide useful information about the extent to which the university's efforts to create a culture of environmental sustainability succeed.

Summary and conclusion

Throughout the USA, many colleges and universities have undertaken serious efforts to reduce their negative environmental impact while also reducing their energy costs. At many institutions, the efforts to influence individuals' behavior have often not been prioritized as highly as technical adjustments. When there have been efforts to influence the cultural aspects of environmental sustainability, they have been neither comprehensive nor carefully assessed. The UM's recent initial efforts to address the cultural and behavioral aspects of environmental sustainability thus represent a unique approach to addressing the environmental impact of campus communities.

In this paper, the authors described how their team at the UM developed research-based recommendations for developing – and monitoring progress towards developing – a culture of environmental sustainability among UM students, faculty, and staff. Whereas the culture team recommended education and training programs to strengthen campus community members' issue-based and procedural knowledge, they recommended specific engagement strategies for both building campus community members' knowledge and provide social and material incentives to behave in

Table I.
Summary
recommendations for
fostering a campus
culture of sustainability,
categorized by method
and goal

| Method/goal | Issue knowledge | Procedural knowledge | Prompts | Social incentives | Material incentives |
|---------------------------|---|--|--------------------------------------|--|---|
| Education/ training | Coursework; eco-certification; faculty development | Eco-reps; eco-certification; procurement training | | Eco-reps | |
| Engagement | | Cultural liaison | Cultural liaison; competitions | Cultural liaison; competitions; unit initiatives | Competitions; unit initiatives |
| Assessment/ monitoring | Cultural indicators; alumni survey | Cultural indicators; alumni survey; POE | Cultural indicators; POE | Cultural indicators | Cultural indicators; barrier surveys |

environmentally sustainable ways (Table I). Meanwhile, the culture team strongly recommended that the UM study the impact of the interventions it chooses to implement by designing, piloting, and employing assessments to measure cultural change. The authors expect that the UM will pursue several of the team's recommendations as it selects among the numerous recommendations (in various categories, such as food purchasing and new construction policies) of the entire IA.

When institutions consider how to become more environmentally sustainable, it is important that they consider the cultural aspects of environmental sustainability. Whereas technical adjustments can help to reduce energy costs in the short term, widespread awareness of and engagement in environmental sustainability may lead to ongoing progress towards reducing waste, energy use, and resource depletion. The authors believe that the work of the culture team at the UM can serve as a guide for how institutions interested in fostering a culture of environmental sustainability might approach this potential transition. Because of their recommendations' grounding in research, these or similar recommendations may be useful at other institutions of higher learning or perhaps in other educational or corporate contexts. Such institutions must first consider their existing capacity, needs, and programs, and then can explore how to leverage those resources to support cultural change. If institutions worldwide were to undertake this cultural challenge, we may witness the vital long-term progress necessary for environmental sustainability.

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About the authors

Brett L.M. Levy recently earned his doctorate in Educational Studies at the University of Michigan and is currently a visiting Assistant Professor at the University of Wisconsin-Madison. His research examines how educational programs and institutions can support individuals' and communities' environmental and civic engagement, and he has worked on environmental and civic education programs in Michigan, California and other parts of the USA. Brett L.M. Levy is the corresponding author and can be contacted at: bmlevy@wisc.edu

Dr Robert W. Marans is a Research Professor at the Institute for Social Research and a Professor Emeritus of Architecture and Urban Planning in the Taubman College of Architecture and Urban Planning at the University of Michigan. He is the author or co-author of eight books and more than 100 articles and technical reports. He currently serves on the editorial boards of several professional journals and has lectured extensively throughout the USA and in Europe, Asia, South Africa, South America, Australia, and the Middle East.