



Higher education's sustainability imperative: how to practically respond?

Sustainability
imperative

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Abstract

Purpose – The purpose of this paper is to describe four phases for how universities have addressed a sustainability agenda and offer specific lessons for how and where experiences on one campus, the University of Colorado Boulder, have been met with success and other challenges. The authors offer general reflections for executing university-wide sustainability initiatives with a central intent of illuminating central barriers against, and incentives for, a coordinated and integrated approach to campus sustainability.

Design/methodology/approach – The approach for arriving at four phases and a description of the University of Colorado Boulder is based on experiences from learning, teaching, and administering within universities—collectively for almost a century among the authors—and lessons from “war room” discussions.

Findings – Sustainability initiatives on campus may evolve through a series of phases labeled: grassroots; executive acceptance of the business case for sustainability; the visionary campus leader; and fully self-actualized and integrated campus community. The University of Colorado Boulder, while a leader in many respects of sustainability (research, student activities, facilities management) has experienced serious challenges for coordination.

Originality/value – The four phases are a relatively novel contribution for the specific literature on sustainability education. Second, the tangible examples from University of Colorado Boulder demonstrate how coordination is difficult in these situations; these examples allow readers to better relate to and understand such challenges. Finally, the authors reflect on central issues according to three categories: self-reflection, recommendations, and advantages.

Keywords United States of America, Higher education, Universities, Sustainability, Campus framework, Coordination, University administration

Paper type Research paper



I. Universities as challenging places for sustainability

Sustainability continues to emerge as a marching banner for all walks of life and all types of organizations. Notwithstanding its sometimes ambiguous and pliable definitions, sustainability has an instinctive logic to it that many find compelling – if not an imperative. Yet, the larger and more complex the organization, the greater

the challenge of operationalizing the concept and daily operations of sustainability. Individual corporations, responding to emerging global issues of environmental degradation, social injustice, and changing economic realities, are examples of organizations that are successfully using sustainability principles and practices to influence their core business models (Volkswagen Group, 2008; Dow Jones Sustainability Indexes, 2010; Lubin and Esty, 2010). Their culture of responding to bottom lines and accountability coupled with largely ministerial decision-making (notwithstanding shareholders) allows for such success.

Institutions of higher education are different. While they have stakeholders, not shareholders, they are otherwise not immune to many of external drivers behind the corporate shift to sustainability (Bardaglio and Putman, 2009; Lubin and Esty, 2010; Wright, 2010). Yet, implementing sustainability practices across all walks of the campus often proves to be considerably more challenging than in a corporate environment because campuses have additional pressures (Velazquez *et al.*, 2005; Walton and Galea, 2005; Ferrer-Balas *et al.*, 2008; Bardaglio and Putman, 2009). For example:

- Institutions of higher education are typically tasked with the trinity of education, research and service; these three and sometimes competing orientations may dilute a focused orientation and create competing priorities.
- Different constituents demand different services. Universities are largely comprised of four personnel bodies – students, faculty, staff and alumni – each of whom have varying, and sometimes competing, priorities in terms of sustainability. For instance, recycling efforts offer some experiential learning for students, but may contribute little towards advancing formal curricula. Likewise, cross-cutting sustainability-oriented courses are on the rise, but may be insufficient to advance campus renewable energy installations. It is often difficult to uncover cross-constituency synergies between these constituents.
- Campuses face management challenges akin to small cities as they must provide an array of support services in an increasingly complex environment – thereby prompting a sprawling horizontal organization, sometimes with diffuse focus.
- New domestic competition from for-profit enterprises increasingly commodifies educational products and cuts into market share. Campuses may be less likely to move forward on sustainability if programs and revenues are shrinking.
- With recession economies the “new normal,” campus professionals are asked to cut costs, increase employee productivity but not payroll, and recruit and cultivate a new generation of administrative leaders to supply quality leadership succession.
- The typical structure of universities – including power concentrated at several levels and a philosophy of protecting tradition and academic freedom – hinders sweeping change. By contrast, corporations can often streamline and focus on core products or services with comparative ease. University structures account for many of their good attributes, but their inherent structure may impede the wide-sweeping changes that are needed.

This paper’s purpose is threefold. The authors first describe four phases for how universities have addressed a sustainability agenda and offer specific lessons for how and where experiences at the University of Colorado Boulder (UCB) have been met

with success and where efforts have fallen short. The authors conclude by posing general reflections for executing university-wide sustainability initiatives. The primary methodology rests on two approaches:

- (1) Distilling various “war-room” discussions with faculty, students, administrators over the course of many decades to present four phases.
- (2) Reflecting in depth on one-case – UCB – to document the progress (and processes) that have been made and the challenges that lie ahead.

The central intent is to illuminate central barriers against, and incentives for, a coordinated and integrated approach to campus sustainability. The general reflections provide essential understanding for universities aiming to formalize their efforts. At a minimum, it helps develop the burgeoning literature on higher education’s response to develop, implement, and administer policies and programs that will help universities become international models for best practices in campus sustainability operations and programs.

II. Phases of university approaches to campus sustainability

For as long as there have been pressures to promote the concepts of sustainability, there have been approaches employed by universities to do so. The authors have intimate experience championing campus efforts with respect to sustainability in a variety of capacities. Collectively, these experiences include, but are not limited to: chairing academic programs (undergraduate and graduate), managing student-led efforts, directing campus-wide research institutes, interacting with campus operations (e.g. housing and dining, facilities management (FM)), participating in campus-wide sustainability steering committees, serving as campus sustainability coordinators, and teaching sustainability focused courses. Based on experiences learning, teaching, and administering within universities – collectively for almost a century – and lessons from “war room” discussions, the authors have observed four phases that may typify or predict campus responses to sustainability. Identification of these four phases represents the authors’ collective judgment and understanding, useful in processes gauging and understanding the comprehensives of a university’s endeavors. These phases are not discrete or exclusive. Elements of each may be found at any one time on any individual campus.

First phase: grassroots

In the first phase, grassroots efforts are king. Grassroots campus champions advocate for various sustainability-related services and policies – and campus leadership either resists the requests or is only minimally responsive. In response, advocates then organize and launch their own *ad hoc* efforts. Such activities as single department recycling programs, bicycle campaigns, faculty creating new coursework, campaigns to limit pesticides, campaigns to limit sweatshop athletic apparel sold by the university or bearing its logo, campaigns to boycott plastic water bottle sales, etc. evolve from myriad different constituencies across campus. Elements from this phase can linger and feed subsequent phases as new initiatives are brought forth by grassroots champions.

Grassroots and *ad hoc* activities and programs that are spawned during this phase by disparate campus entities can become ongoing, entrenched efforts. Should campus leadership fail to respond to the evolution of these efforts in a timely fashion, these programs become the de facto definition of the culture of sustainability efforts

on a campus; in this case, it is difficult to integrate subsequent efforts into emerging over-arching governance structures, as their disparate origin renders them difficult to coordinate. They may even work at cross-purposes to one another. Accordingly, it is important that the first phase be kept at a minimum.

Second phase: executive acceptance of the business case for sustainability

In this phase, campus leadership accepts some – but not all – aspects of the business case for sustainability. Leadership easily sees the value of efficiency programs that inspire cost savings and improve campus reputation. Accordingly, energy efficiency, water conservation, and green branding/public relations programs are supported by campus leadership.

Most often, the operations department (e.g. FM) roots the response toward sustainability which is directed at resource conservation. A sustainability coordinator, most often a staff member, may engender greater collaboration within the daily operations of a unit. There is, however, a parallel in developing a curriculum where a group of faculty may influence chairs and deans to create a new program (major, minor, certificate, etc.) and have it accepted and funded by the administration because it meets student demands. More generally, in this phase a sustainability committee may be assembled to help identify and direct needed efforts. However, while new initiatives may be brought forward by campus champions and/or the committee, campus leaders test them for costs savings and if found lacking, these suggestions are prioritized down.

In general, campus leadership accepts suggestions that enhance efficiency/cost savings and/or enhance brand/reputation. They are less supportive of sustainability initiatives that require broad-based stakeholder inclusion and transparency practices, or require broader life cycle and/or full-cost evaluation perspectives. Costs still trump many other considerations and economic terms guide most decisions. The most notable characteristic of this phase is that the push for best sustainability practices is still derived from campus constituencies that may not include most upper-level executives.

Third phase: the visionary campus leader

In this phase, campus leaders – including the highest level executives – openly promote a sustainability vision and rally behind it as a central element of their platform. These leaders embrace the concept as a central value of the administration's goals and strategic plan and are supported or at least tolerated by their trustees. As part of this phase there is full executive leadership on sustainability, a keen understanding of its tenets, and an articulated vision for the future. Examples of executive level university leaders who have embodied this dimension include President Michael Crow (Arizona State University), and immediate past or outgoing Presidents David Shi (Furman University) and Mitchell Thomashow (Unity College).

The visionary campus leader reprioritizes sustainability efforts and is supportive of stakeholder engagement/inclusion, robust transparency/goal setting, and prospective full-cost evaluation practices. A visionary campus leader, furthermore, elevates sustainability professionals from mid-level coordination roles to the executive level – or at least reporting to the executive level. For example, Arizona State has a Science Policy Advisor to President Michael M. Crow; this person also serves as Executive Director for Strategic Institutional Transformation in the Office of the President. Dartmouth University was operating with a position of sustainability coordinator

who reported to an Assistant Vice President; recently, the university hired a full time Director of Sustainability who now reports directly to the Provost. Rochester Institute of Technology in Rochester, New York, launched a newly-created position of Senior Sustainability Advisor to President William Destler.

The visionary campus leader grapples with a campus sustainability apparatus that may be mired in any one of the following conditions:

- poorly-coordinated silos;
- legacy *ad hoc* programs;
- constituencies/activities leftover from the phase one;
- the fundamental incompatibility of sustainability's systems-thinking; and/or
- an interdisciplinary approach at odds with the reductionist, turf-heavy culture that earmarks the academe's traditional paradigm.

In turn, entrenched campus interests may at first bide time in hopes that "this person won't last" and all will return to the status quo after the visionary leader possibly moves on to other posts. The visionary campus leader may stimulate revolutionary change, but it may come at a cost (e.g. substantial body count in his/her wake). Indeed, as sustainability becomes popular, the political stakes increase, consequences and political maneuverings have greater consequence for both the executive and the campuses' historic sustainability advocates.

Fourth phase: fully self-actualized and integrated campus community

The fourth phase is not a phase with which the authors are acquainted – but one that universities can aspire to and encourage others to do so as well. Select universities across the globe exhibit attributes demonstrative of the fourth phase. For example, Leuphana University, Germany (the first zero-emission campus), Birkenfeld from University of Applied Sciences Trier, Germany, and the University of Gothenburg, Sweden, are useful case studies to consider as fully self-actualized and integrated campus communities around sustainability. This fourth phase is characterized by engaged, visionary leadership and a fully integrated sustainability approach; this approach enhances educational outcomes by synergizing them with sustainability-related operations, student life, staff, and community engagement activities. Hence, the educational experience is coherent inside and outside the classroom; students learn about sustainability in all majors – and they observe and learn from the campus which physically models sustainability's principles and practices.

In this "nirvana" phase, systems-thinking and interdisciplinary cooperation would be the central mission of all campus departments. Sustainability operations, student activities, and community partnerships are coordinated, coherent, and high quality. Sustainability futures may be visioned collectively across all stakeholders after the deliberative analysis and mapping of internal and external forces and data iterates appropriate and effective new pathways that converge and synergize the sympathetic but necessarily discrete foci of various stakeholders. Innovation, entrepreneurship, and creativity is empowered across the operation and then channeled into tangible and focused evolutions. Sustainability becomes integral to the university. This is an enormously challenging goal, but yet critical to achieving true and lasting sustainability practices.

III. Experiences at the University of Colorado Boulder

The third part of the paper focuses on the experiences at UCB, in which the authors have most familiarity. The focus is on this campus as a setting to further explicate examples of initiatives that have grown to receive national prominence but also to learn why other efforts have had difficulty “growing wings.” The intent is to spotlight educational programs and experiences – pointing to variations in resources, staff, materials – and describe some of the factors that explain how or where aspects of sustainability education came to fruition or still bear challenges ahead. These reflections ultimately shape many of the conclusions offered in the final section (part IV).

In short, sustainability efforts at UCB have received decades of attention and have made progress, including examples of most of sustainability’s common elements and phases but also path breaking institutional achievements. The common theme is that most have been extremely successful at the grassroots level. The resulting sustainability capacity at UCB is accordingly large, horizontal, and – for better or for worse – driven as much by legacy inertia as by deliberate planning. The irony is that such successes are arguably now proving to be major challenges to overcome. The first section provides a general and historical context to set the stage for the more current detailed accomplishments and subsequent challenges, highlighting academic, student, and administrative perspectives.

Roots

In the area of curricular development and degree creation, in 1951 a major in Conservation Education was first offered through the joint Department of Geography and Geology with a required interdisciplinary set of coursework in geography, biology, journalism and communication. In 1972, the major was replaced as Environmental Conservation and continued to be interdisciplinary but shifted to a more science-based curriculum. In 1995, the curriculum was strengthened by requiring more fundamental courses in the physical sciences, policy, economics and ethics, and the university created an independent Environmental Studies Program (White, 1995). Over succeeding decades, this academic and research seed helped sprout robust geosciences, environmental studies, and related academic and research efforts via separate departments and research institutes. Not coincidentally, UCB is now among the nation’s top ranked universities in environmental and geosciences research funded by the National Science Foundation, the environmental studies program is consistently ranked among the top handful of similar national programs, and myriad sustainability-related and focused courses are appearing in over half of the campuses academic units (Sustainability Tracking, Rating, and Assessment System (STARS, 2010).

In the area of student involvement, the CU Environmental Center (EC) was founded by students on Earth Day 1970 and has grown in the succeeding 40 years into a robust sustainability operations and service platform employing over 100 students part time, eight full time professional staff, and generating an annual budget of ca \$US6 million. Over four decades, the students have continued to push for and ultimately funded and launched numerous unilateral efforts towards sustainability. Consider that the EC:

- launched the nation’s first collegiate recycling program (1973);
- launched the nation’s first alternative transportation/prepaid bus program (1991);

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- launched the nation's first collegiate renewable energy purchase program (2000);
 - launched the nation's first zero waste football stadium (2008);
 - won a carbon neutrality commitment first from student government, then the Administration (2007);
 - won a LEED green building standard requirement for all campus construction (2003); and
 - crafted CU's first campus sustainability plan (Blueprint for a Green Campus, 2000).

The EC's student-led advocacy has historically been met with resistance from the administration. Yet after a period of controversy, the administration has seen the wisdom of the EC's suggestions and at least tolerated their implementation. In recent times, the administration has sought to assume a primary role in moving forward on issues such as carbon neutrality, zero-waste, and other programs the EC historically championed and the Administration resisted. The Administration recently named a campus sustainability director to coordinate ongoing activities. However, navigating that transition has been difficult for numerous reasons – and brings to light the challenges a campus may face from spending too long in phase one.

Cross disciplinary research institutes and faculty hires

In the area of research, starting in the 1950s the university created cross disciplinary research institutes with the purpose of providing faculty with an outlet for interdisciplinary research efforts. Examples in the field of sustainability include the Cooperative Institute for Research in the Environment, a joint institute with the National Oceanic and Atmospheric Administration), the Institute of Arctic and Alpine Research and the Institute of Behavioral Sciences. Notably, these institutes were meant to be more than a side research outlet for faculty; to strengthen them, the university allocated faculty positions to the institutes, although not the status of tenure home, stimulating the institutes to partner with more traditional and disciplinary departments.

The result was significant in two ways for the actions suggested herein this manuscript. First, the institutes hired interdisciplinary scholars that may not have been the top choice for disciplines, inoculating the campus with scholars that embrace the interdisciplinary core of sustainability, and second, these interdisciplinary scholars helped to nudge the disciplinary departments towards a broader campus point of view with greater acceptance of cross campus initiatives such as sustainability.

Operations

Finally, related to the physical campus, CU FM and Housing and Dining Departments (HDS) have in the last decades evolved credible sustainability initiatives that now either synergize, partner with, or in some cases conflict with legacy efforts from the student-led EC (see above). Overall, mutual efforts have been productive and have led to achievements such as a 23 percent total energy reduction campus wide from 2005 to 2009. However, coordination inefficiencies and planning conflicts persist among these units as discrete needs and circumstances may not be currently unified behind a common campus vision for sustainability.

The example of UCB's flagship recycling program – the nation's first – personifies the barriers evolved from horizontal growth in sustainability capacity. The EC, FM, and HDS

each have roles in operating and managing the campus recycling system. However, as each unit has emerged as a sustainability player, each asserts standing and authority over current and future elements of the program. Now trying to plan the transition to a campus-wide zero waste system, the units are somewhat at loggerheads over the nature and scope of that effort. Accordingly, planning stalls and conflict emerges.

On a broader level and as has been seen in other leadership universities, a perhaps inevitable power play emerges as sustainability activities become politically popular. The campus' historic sustainability champions or early adopters may be squeezed out as leadership recognizes the intrinsic power of these efforts and seeks to take control of – and credit for – sustainability successes.

Current status at UCB

Thus, UCB is now facing the increased realization that enhanced coordination between these and similar efforts is necessary, and that the inertia created by these initiatives coupled with the horizontal legacy efforts present barriers to change. Likewise, pathways to integrate academic, research, operations, and community sustainability efforts are far from clear.

Notwithstanding some bumps in the road, UCB is seeking to divine an overarching integration vision and coordination structure that guards against a central “command and control” philosophy but also weaves cohesiveness into the largely fragmented efforts. Combined with visionary leadership, UCB could then be well on the way to achieving the fourth phase of campus sustainability. Indeed, based on the recent assessment compiled under the STARS in which UCB was the first major research institution achieving a Gold rating, the university is arguably as advanced as any US university in all aspects of sustainability (STARS, 2010). However, as reflected above, that historical momentum may itself be an impediment to the UCB moving into the fourth phase because the decades of lower-level organizational capacity spread horizontally across disparate campus units have created strong and independent organizations that provide inertial barriers to the robust integrative model that must attend a fourth phase effort.

Examples of this inertia are plainly visible. Courses using the campus as a laboratory for sustainability have emerged, flourished for a few semesters, and then been dropped, in part due to difficulties in coordinating activities between the faculty and the campus facilities management. Student-led efforts to increase sustainability have met resistance in the administration over costs and control, despite the fact that both student-led and administrative efforts in sustainability are extensive and successful. Highly successful efforts in recycling and sustainable food services in campus dining halls go largely ignored in courses that touch on sustainable food supplies, a situation that students remark upon frequently in their course evaluation comments.

As noted above, part of the problem is the success of the various independent efforts. An analogous situation can be found in the academe across the US where the strongest departments are often the most resistant to change such as incorporating interdisciplinary efforts (e.g. sustainability); their rationale is that because they are strong, they consider their activities as cherished and there is little reason to change. There is no cross-fertilized institute for sustainability along the lines of those mentioned above. Part of the problem also lies in the campus reward structure. There is little reward, for example, in FM for cooperating with faculty on sustainability courses.

Unless administrators value and reward such efforts (e.g. increasing resources, raises linked to key activities, employee awards) the incentive for continuing these efforts lies primarily in personal satisfaction – a situation that is increasingly untenable in difficult budget times when all are asked to more with less. Finally, a large part of the problem lies in the fact that there is an extremely weak culture of crossing the lines between the faculty, facilities and student efforts, and thus no formal structure by which to do it.

Lacking an integrating framework, a recent inventory tallied in excess of two dozen committees, programs, efforts, or initiatives at UCB that directly addressed dimensions of sustainability. In response, the campus is acting to ensure that the sometimes disparate efforts are better coordinated. The first step was to create a new position of “campus integrator” – not beholden to any specific organizational unit – charged with finding synergies and integrative pathways that leverage the campus’ various sustainability domains. Owing to the curricular, research, and political dimensions required as part of the coordination, it was determined that a tenured faculty member would be best suited for such a position. Ultimately, funding for the part time (0.10 full time equivalent and a course release) “Education Outreach Coordinator (EOC)” position was derived from students, facilities, and the Provost.

The EOC position is a notable, but only a first, step towards a campus strategy to suitably address and synergize sustainability efforts. Coordinating the bountiful and powerful efforts ongoing at one of the nation’s pre-eminent environment and sustainability universities is obviously larger than a single person’s part time efforts. Therefore, the time is ripe to pursue and install more comprehensive administrative structures. The literature has numerous papers offering background information and valuable research outcomes, that have helped inform this work. However, it is difficult to learn of a major research university well into the fourth phase and thus there is little literature sharing empirical information related to organizing a fourth phase campus (Sharp, 2002). Section IV of the paper therefore turns to outlining possible components and benefits of such a structure.

IV. Lessons for executing university-wide sustainability initiatives

There is enough evidence nationwide to detect an arms-race of sorts among universities competing for green status. Recent national campaigns related to carbon neutrality, green buildings, local food, renewable energy and sustainability reporting have boosted sustainability activities at campuses across the globe. Studies now show that upwards of two-thirds of prospective college freshman look at campus green rankings as a factor in college choice (Pryor *et al.*, 2008; Princeton Review, 2010); it is often cited as one of the top three reasons why UCB students made their decision for where to attend university. But in university settings, being “greener” or “sustainable” means something broader than widespread dual flush toilets, award winning recycling programs, and installing a wind farm on campus. Such agendas need to formidably weave through curriculum, research, service, operations, and campus/community life (Velazquez *et al.*, 2005; Ferrer-Balas *et al.*, 2008).

Just as sustainability is an emerging global mega-trend that is fundamentally redefining business in the private sector; it can be – and should be – a touchstone for all walks of life on campus. Organizations – and universities – ignore the sustainability imperative at their own peril. As suggested in the *Harvard Business Review*

(Lubin and Esty, 2010), albeit largely aimed toward corporations, there are also direct implications for higher education:

Why do we think sustainability qualifies as an emerging megatrend? Globalized workforces and supply chains have created environmental pressures and attendant business liabilities. The rise of new world powers, notably China and India, has intensified competition for natural resources (especially oil) and added a geopolitical dimension to sustainability. “Externalities” such as carbon dioxide emissions and water use are fast becoming material – meaning that investors consider them central to a firm’s performance and stakeholders expect companies to share information about them.

These forces are magnified by escalating public and governmental concern about climate change, industrial pollution, food safety, and natural resource depletion, among other issues. Governments are interceding with unprecedented levels of new regulation – from the recent SEC ruling that climate risk is material to investors to the EPA’s mandate that greenhouse gases be regulated as a pollutant.

Further fueling this megatrend, thousands of companies are placing strategic bets on innovation in energy efficiency, renewable power, resource productivity, and pollution control. What this all adds up to is that managers can no longer afford to ignore sustainability as a central factor in their companies’ long-term competitiveness [...] *Megatrends require businesses to adapt and innovate or be swept aside* (emphasis added).

Accepting the premise that sustainability is an almost unavoidable megatrend, an outstanding question emerges: how to get the most out of this megatrend within university cultures? Subscribing to Naisbitt’s Naisbitt (1982) quote, “Trends, like horses, are easier to ride in the direction they are going,” suggests that one strategy is to ensure that the campus is indeed on a horse. However, more can be gained by ensuring that all horses are indeed pulling in the same direction.

The central issue, as described above, is that universities embody multi-headed monsters, each with unique recipes for success. The contributions herein shed light on important issues in three respects by first hypothesizing four phases of university activities that summarize approaches to materialize sustainability on campus. These descriptions are a relatively novel contribution to the specific literature on sustainability education, building on themes expressed elsewhere (Chambers, 2009). Second, the article provides tangible examples from UCB of how coordination is difficult in these situations; these examples allow readers to better relate to and understand such challenges.

The final contribution is to share some implications for central issues to overcome for successful pursuit of university sustainability, classified into three groups:

- (1) Self-reflection – challenging goals that despite their daunting nature should still be publicize.
- (2) Recommendations – readily achievable goals based on experiences of aspects that can work well in current university structures.
- (3) Advantages – goals that can have financial implications.

Self-reflection

Traditional disciplinary structures, ubiquitous in universities, tend to stifle the growth of interdisciplinary efforts required of sustainability. For example, deans of academic units often protect the strong departments within their colleges, and new, interdisciplinary programs such as sustainability fail to fit into this structure and thus must fight for

resources on an unequal playing field. Taken to the extreme, academic units represent silos that run counter to the systems integration required. When multiple and firmly entrenched silos exist, successful integration may become virtually impossible without substantial structural overhaul; in the experience of the authors, the challenge of siloed structures increases with the number in existence and/or their dominance in the university setting. At the same time, it is important to recognize the benefits that siloes provide to prevent over-centralization; there is a balance to strike.

The traditional power structure within universities includes considerable authority and autonomy at the college and dean level, unlike the business world where in general, top management clearly runs the show. This structure means that colleges are slow to change; deans protect their colleges and directional change that will benefit their students/faculty/staff and are rewarded for doing so. There is typically less reward, if any, for thinking more broadly about the benefits of campus wide initiatives such as sustainability. Given the structures into which they are placed, it is often difficult to fault college-level leaders for failing to promote cross-college initiatives; doing so runs the risk of them meeting the very terms of their employment.

Much as some visionary leaders have recognized the need to alter individual faculty reward structures to promote interdisciplinary success and effective communication to public spheres, so too much campus top executives “free up” their college leaders to promote creative campus-wide initiatives that ultimately can result in a rising tide. In practice, this would require shifts in the standard models for financial distributions and rewards for faculty that are employed in most universities. Absent such changes, however, efforts such as sustainability are likely to hit a glass ceiling, one that can only be partially broken from above by the efforts of a bold and dedicated top-level executive (e.g. the third phase described above). Providing top administrators and deans with the evidence of such to push interdisciplinary programs is difficult; it would, however, not only help them grow, but could help overcome the organizational cacophony that multiple, disparate grassroots efforts often create.

These are challenges for the fourth phase and they are not easy, but they contain notable opportunities. Campuses who would achieve the fourth phase can redefine many societal challenges as opportunities to hone sustainability as a doctrine. There is an analogy from the adaptation to climate change: sustainability provides a driver that refocuses academic, operational, and research interests behind a more integrative unifying pursuit. This re-framing creates hope, increases knowledge, advances solutions, and synergizes the campus integration sustainability demands. It also enhances the campus “moral license to operate” thus improving the academe’s lot among the communities it serves.

Universities may be buffered from the more rapid cycles of boom and bust evidence by corporations, but they too must adapt or die. Many of the world’s most innovative and successful corporations have seen the writing on the wall. They have recognized that sustainability does not represent the preachings of overly green and extreme sector of society, but rather the principles of a successful organization, whether that be an individual company or the human enterprise as a whole. In the decades to come, those universities willing to embrace the challenges of sustainability thoroughly will redefine the nature of higher learning for the better. By doing so, they will keep the tradition of educating future leaders in society, but redefine critical aspects of what that leadership must become. In the end, embracing this challenge will be a “win-win” for the

universities that choose to take it on: they will become the most prominent institutions in the eyes of both their direct constituents (students, faculty, and staff), and the community at large.

Recommendations

On a much more tangible level, there is evidence to suggest the following approaches seem to work (Comm and Mathaisel, 2005; Walton and Galea, 2005) to get key campus sustainability stakeholders to find better ways to resolve issues:

- *Communicate a consistent institutional stewardship philosophy.* People react well to sustainability as a core value because of its altruistic motives that match well with higher education's best qualities.
- *Detail clearly defined roles and responsibilities.* A sustainability performance system (such as STARS) helps identify shared goals, develop buy in, improve coordination, and boost morale. Sustainability fosters the systems-thinking needed to help the academe move from its traditional hierarchical organizational approach to better compete in the increasingly network-oriented world.
- *Feed off of professional memberships/organizations.* In helping establish a university-wide philosophy, membership as part of a network such as Association for the Advancement of Sustainability in Higher Education or the COPERNICUS Alliance (European Network on Higher Education for Sustainable Development) provides invaluable resources that in part, help spur a positive arms-race of sorts.
- *Foster an environment of innovation and creativity.* Asking the campus community to pioneer sustainability implementation has proven an inspiring task. People feel good about themselves when their work is connected to making the lots of everyone involved better. That translates into increased productivity, innovation, and individual leadership.
- *Value people and reward them.* Sustainability, by definition, is about being outside oneself. Rewarding that altruism raises organizational spirit and improves execution.
- *Value measurable goals and objectives.* Procedures are put in place to ensure sustainability metrics now map to all campus business outcomes. By understanding sustainability's influence on the breadth of campus business outcomes, investment can be more appropriately directed – and the roles of all campus players better understood, integrated, and boosted.
- *Make clear the vision, mission and values.* Sustainability principles and practices inform a comprehensive ethical compass by which campus leaders can steer. Sustainability spans education, research, and service outcomes thus uniting higher education's traditionally disparate mission. Sustainability must become part of the fabric of the basis for the institution – the mission, vision, and values of the institution.

Advantages for integrating sustainability

Finally, in such an article, it is important to point out that an unwavering and legitimate focus on sustainability can help unite some varied and increasing challenges universities face. For example:

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- Sustainability values help unite disparate units in the organization. To the degree that sustainability becomes a broadly embraced campus vision, workers within silos can better see their role in fulfilling a common agenda.
 - Over the relatively short term, perceived “green” campuses differentiate themselves from their competitors. And sustainability’s central transparency value meshes well with the emerging “iCollege,” open-source world.
 - Sustainability systems foster intra-organizational coordination thus increasing efficiencies and decreasing business risks.
 - Declining public support and increasing unfunded mandates coupled with increasing legislative oversight confound campus leaders’ ability to respond to emerging challenges at an accelerating pace of change. Proper execution of a sustainability performance system includes a constant feedback loop about current performance and emerging challenges. Sustainability leaders will see challenges and solutions sooner – and subsequently can lead a more attractive organization in the process.
 - Sustainability often produces unanticipated synergies. The experiences of the authors with interdisciplinary graduate programs ranging from small and short-term (e.g. NSF-IGERT funded) to larger and lasting (e.g. the Environmental Studies graduate program) shows that creating mechanisms for cross-disciplinary student interactions brings the faculty in tow, and that it is the latter who often struggle more initially, but ultimately are capable of launching longer-term new directions within the university. One caveat to this principle: there is no substitute for in-person time. Finding new synergies across disciplinary entities requires the development of new common languages, and that requires focused, unpressured time for stakeholders to interact in deep and meaningful ways.
 - Sustainability planning includes more robust full cost assessment matrices that identify hidden costs and hedge future risks more effectively than traditional low bid, first cost approaches. Personnel engaged in these activities will become more broadly skilled in the strategic and tactical practices that help inform leadership.

Conclusions

This paper offers perspectives and recommendations designed to promote campuses’ ability to move into the fourth phase. These observations are first directed at developing an integrative vision that can span and unite disparate campus units. It also offered pathways to organizational changes that will enable robust campus implementation of sustainability-related principles and practices.

With respect to integrative vision, sustainability is best articulated by campus leadership as a more pronounced foci across campus academic disciplines in order to engage the breath of interests a campus represents and seed the integration on which sustainability relies. This is no small task but a great opportunity to multiply sustainability’s sweep to the order of magnitude impacts needed to effect change at the campus and, as a result, at societal levels.

Organizational realignment, however modest, would flow from that integrative vision. The reflections above offer observations relating to the manifold benefits of a sustainability performance system that defines and quantifies sustainability’s

influences on campus systems. Developing a culture of sustainability sufficient to break down organizational barriers to change and integration is also no small task. However, in a few circumstances where glimmers of the power of this synergy can be seen, they further inspired to pursuit of the Holy Grail.

In the end, despite some of the daunting challenges discussed above, there is optimism about trends in sustainability at universities such as UCB and beyond. What was once nothing more than a buzzword largely associated with groups on the fringes of power at best is now a guiding principle in some of society's most successful economic engines. Similarly, universities that once relegated sustainability to the provinces of grassroots efforts that were largely ignored at the top are now making serious structural and philosophical changes in recognition of the challenges and opportunities a resource-limited world brings.

Indeed, universities are often relied on to serve as the wellspring of innovation and success, particularly for the sciences and engineering; for centuries they have been precisely that in nearly any field that has played a role in the remarkable success of twenty-first century humanity. Now they must embrace and foster a new direction of innovation: how universities can sustain the success they have achieved. This article summarizes some of the barriers that are present to that goal, but also some of the successes already achieved and the opportunities waiting to be seized.

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