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Is It Finally Time to Kill the Credit Hour?

The Carnegie Foundation for the Advancement of Teaching has announced that it plans to reconsider the credit hour as it is currently being used in higher education and, at least potentially, propose a new alternative unit of measure to replace it. This is a welcome development and one that AAC&U has urged for some time, both through the Liberal Education and America's Promise initiative and through our recent work on the Degree Qualifications Profile. But having worked for several years to shift the focus from credit hours to competency—that is, from simply measuring the expected amount of time students spend in class (“seat time”) and out of class on course-related work to measuring what students know and are able to do as a result of their coursework—we are keenly aware of not only the need for change but also the many difficulties that lie ahead.

The adoption of the credit hour as the standard unit of measure a century ago, and the closely related decision to organize a required number of credit hours around the concepts of breadth and depth, brought needed order and some degree of common practice to what was then a highly uneven and fast-changing enterprise of higher education. However, the credit-hour system and the breadth-depth division of curricular labor built around it are both woefully inadequate to twenty-first-century needs and challenges. Recognizing this, the higher education community already is actively engaged in a broad-based effort to move away from credit hours and toward the development of more meaningful evidence about students’ competency and preparation to deal with a lifetime of complex and often unscripted problems. This ongoing effort is focused on assessing students’ ability to integrate and apply their learning—to bring breadth and depth together, so to speak—in the context of complex problems and challenges, such as those related to sustainability. The articles in this issue clearly demonstrate the potential educational power of organizing education around complex, twenty-first-century challenges.

Because it was the Carnegie Foundation for the Advancement of Teaching that first devised the credit hour and helped make it the preferred form of academic currency, the foundation’s embrace of the need for a fresh look at it has enormous symbolic significance. It is wonderful that Carnegie is now joining the historic effort to shift the focus from credit hours and seat time to students’ demonstrated accomplishment in integrating and applying their learning. At this pivotal moment, we need all hands on deck.

Yet, even as we work toward an alternative, the credit hour is gaining new currency in state policy circles and through federal actions related to accreditation. It is very worrying that states have begun to tie performance incentives to simplistic measures of productivity, using that same old credit hour as the de facto indicator of what is “produced” with the time and money invested by students and the state.

What policy leaders miss is that the credit hour was not designed to document the quality or level of student learning. Today, the notion that all courses are equal—at least, in terms of the number of credit hours—skirts the question of whether a particular course is sufficiently rigorous or what students of my generation called a “gut.” The fact is that the same number of credit hours is awarded regardless of whether students produce significant qualifying work or just perform adequately on multiple-choice exams. Students who have patched together the right number of credits in the right breadth-depth categories may, in practice, fall short when it comes to the integrative and adaptive learning that they need for work, civic participation, and life.
Clearly, we need a new system that can demonstrate whether students are gaining proficiency in applying their learning to complex, unscripted problems and new settings. So, why not just throw out the credit hour altogether? The answer is that better ways of certifying what students are actually learning are still being developed, so we are not yet ready to just pull the switch on the old system, creaky and inadequate though it is. In truth, we are not even close to ready.

AAC&U has been working intensively for many years with hundreds of colleges, universities, and community colleges on liberal learning outcomes—the most valuable competencies of all in an innovation-driven global economy—and on educationally useful ways to assess student learning. Based on this work, I want to caution that higher education is still in the design phase of developing new ways to show what students are really gaining from their studies, and of documenting what students' actual work reveals about their ability to engage successfully in analytic inquiry, take useful action on a complex problem or project, or contribute to society as thoughtful citizens.

The Degree Qualifications Profile (DQP) that the Lumina Foundation is currently field-testing and that I helped draft is challenging higher education to certify that every student has actually achieved the high-quality education that the DQP outlines: broad and integrative knowledge, deep knowledge in a particular subject area, high-level intellectual skills, and demonstrated achievement in applied learning and in civic learning and engagement. AAC&U is currently working in nine states with more than twenty institutions to test the DQP as a tool for assessing student learning, specifically in the context of transfer. Through this and related DQP projects, higher education leaders all across the country are experimenting with ways to certify student accomplishment and make it visible by gathering and examining students' own authentic work—their projects, papers, performances, internships, community-based research, and capstone projects. Many of the most promising of these efforts use the e-portfolio as the platform for gathering and assessing this work—a platform that potentially can enable students themselves to integrate their learning and make its quality visible.

But these are pilot efforts. We do not yet have anything even faintly resembling broad agreement across the different sectors of higher education on the most powerful ways to document the quality and level of student achievement using students' own authentic work, as the DQP recommends. And we should definitely not kid ourselves that there are standardized tests already available that can do the job for us. The existing tests fall far short in their capacity to reveal the kinds of educational outcomes that employers look for and that well-educated citizens of a democracy need. Moreover, the result of a standardized test is a very weak indicator of what a student can really do to solve urgent and unscripted problems, such as arise today in the economy and in civil society.

So, we are in the midst of much-needed change. But this is not the right time to jump off the old credit-hour boat, buoyed by the assumption that new competency-based assessments are primed and ready to sail. We need to take the time and learn from the assessment experiments that are going on all over higher education. We also need to build broad and compelling agreement on what twenty-first-century markers of student accomplishment actually look like. And, soberingly, that work is still in draft form.—CAROL GEARY SCHNEIDER
Many colleges and universities today are working to integrate the concept of sustainability into key areas of institutional practice. They are committing to pursue climate neutrality, establishing new offices of sustainability or campus-wide sustainability committees, opening campus sustainability centers, “greening” campus buildings and requiring LEED certification for new construction projects, conducting greenhouse gas emissions inventories, transitioning to tray-less dining, and implementing a host of other initiatives, many of which bring students, faculty, staff, administrators, and members of the local community together to address sustainability issues on campus. Through these efforts, colleges and universities are serving not only as models for responsible resource stewardship but also as vibrant laboratories for innovation and for the development of advanced sustainability practices.

But how does an institution’s commitment to sustainability affect the core academic mission? How are sustainable practices adopted by campus operations connected to research, teaching, and learning? How is the concept of sustainability being incorporated into the academic program, and what new pedagogies are emerging in response? The authors in the Featured Topic section of this issue address these and other related questions, with particular attention to what all this has to do with advancing the aims of liberal education.

In the lead article, Neil Weissman, provost and dean of Dickinson College, presents an overview of the progress being made in turning educational attention to sustainability, and concludes that “sustainability has the potential to vitalize and validate liberal learning in ways that both deepen our practice as teachers and engage us meaningfully with the wider world.”

I want to thank Neil, a member of Liberal Education’s editorial advisory board, for first proposing the topic of this issue and for providing invaluable advice and assistance in shaping our treatment of it.

The authors of the second featured article provide a detailed look at one especially successful model of faculty development, which is designed to inspire creativity in faculty members’ responses to sustainability challenges. Peggy Barlett and Geoffrey Chase, creators of the Piedmont/Ponderosa model, explain how the model can be adapted by campuses seeking “to broaden an environmental approach with the ‘triple bottom line’ of sustainability (economic and social, as well as environmental dimensions), to create sustainability minors or majors, or to integrate sustainability issues across the curriculum.”

Finally, the University of Richmond’s Mary Finley-Brook, Megan Zanella-Litke, Kyle Ragan, and Breana Coleman argue that campus-based renewable energy projects provide opportunities to advance liberal education at institutions of all types and sizes. “To demonstrate frequently over-looked synergies” between campus operations and the academic program, the authors present five mini case studies showing how renewable energy projects at five liberal arts colleges—a subset of higher education institutions rarely assumed to be leaders in the field of energy technology—are engaging students across disciplines and encouraging critical analysis and experiential learning.

—DAVID TRITELLI
New Strategic Goals for AAC&U
At its fall meeting, the AAC&U Board of Directors approved a new set of strategic goals to guide the association’s work on behalf of its growing membership in the coming years. These goals build on the successes of AAC&U’s existing signature initiatives, including Liberal Education and America’s Promise (LEAP), Valid Assessment of Learning in Undergraduate Education (VALUE), Global Learning and Shared Futures, Project Kaleidoscope (PKAL), and Civic Learning and Democratic Engagement, among others.

With its new strategic plan, AAC&U will work with its members to advance the following goals: (1) LEAP: Liberal Education as a Global Necessity; (2) Quality: 21st-Century Markers for the Value of US Degrees; (3) Equity: Innovation, Inclusive Excellence, and Student Success; and (4) Social Responsibility: Integrative Liberal Learning for the Global Commons. Each of these strategic goals will be addressed through proactive advocacy, campus action, strategic alliances, and the deployment of authentic evidence. The full strategic plan for 2013–17 will be released in January.

AAC&U Senior Vice President Assumes New Role
On November 1, 2012, Caryn McTighe Musil stepped down as Senior Vice President of Diversity, Equity, and Global Initiatives and assumed her new role as Senior Scholar and Director of Civic Learning and Democracy Initiatives. In her new role, Musil will help coordinate efforts across thirteen cooperating national organizations to make civic learning for a diverse and globally connected democracy expected rather than optional for all college students, in all parts of postsecondary education. In this context, AAC&U will work with partner organizations and campuses to map and promote the deep connections between students’ engagement with diversity and higher education’s mission-level role in preparing students to sustain a just and equitable democracy and economy.

New AAC&U Vice President
AAC&U has appointed David Paris as vice president for integrative liberal learning and social responsibility for all students, a key goal of the association’s new strategic plan for 2013–17. He will lead initiatives related to engaging students in exploration of “big questions” in a global society and developing inquiry and innovation in the liberal arts and sciences and across contemporary designs for general education.

Upcoming Meetings
- January 23–26, 2013
  AAC&U Annual Meeting
  The Quality of US Degrees: Innovations, Efficiencies, and Disruptions—To What Ends?
  Atlanta, Georgia
- February 28–March 2, 2013
  General Education and Assessment: A Sea Change in Student Learning
  Boston, Massachusetts
- April 4–6, 2013
  Student Success and the Quality Agenda
  Miami, Florida

Paris will head the AAC&U office charged with advancing integrative liberal learning and social responsibility for all students, a key goal of the association’s new strategic plan for 2013–17. He will lead initiatives related to engaging students in exploration of “big questions” in a global society and developing inquiry and innovation in the liberal arts and sciences and across contemporary designs for general education.

AAC&U MEMBERSHIP 2012
1,263 members

*Specialized schools, state systems and agencies, international affiliates, and organizational affiliates
Writing in the Chronicle of Higher Education in 2006, then Cornell University President Frank Rhodes proposed that “the concept of sustainability could provide a new foundation for the liberal arts and sciences.” While there have been many calls for curricular commitment to sustainability in the past, Rhodes singularly argued for the integral connection between education for sustainability (EfS) and liberal learning. Indeed, he labeled sustainability “the ultimate liberal art.”

In the years since, public attention to sustainability has spread widely across America, beyond growing environmental organizations to the media, business, and even the military. Colleges and universities have participated in, and in many ways led, this “green” movement. The Association for the Advancement of Sustainability in Higher Education (AASHE) has 890 institutional members. Moreover, 659 institutions have signed the American College and University Presidents’ Climate Commitment (ACUPCC), which not only focuses on achieving climate neutrality in campus operations but also encourages reform of academic programs. As the ACUPCC text reads, “Campuses that address the climate challenge by reducing global warming emissions and by integrating sustainability into their curriculum will better serve their students and meet their social mandate to help create a thriving, ethical and civil society” (2012).

There certainly has been progress in turning educational attention to sustainability. The Education for Sustainability Blueprint issued by leading EfS organizations in 2011 reported growth in the number of degree programs on the environment and the opening of seventy college and university sustainability centers. But most of the progress cited centered on campus operations—from greenhouse gas emission inventories to recycling and tray-less dining—rather than curricula. Within the academic realm, programmatic innovation often has focused on vocational training rather than the liberal arts. As the Blueprint’s authors summarized, “Progress is greater in ‘greening’ campus buildings, grounds and operations than in actual teaching and learning, resulting in few if any indicators that this generation of college graduates on average is any more literate about sustainability than its predecessors” (EfS Blueprint Network 2011, 4).

The contrast between, as David Orr (2012) aptly put it, “green operations and brown curricula” makes it timely and important to examine both the potential of, and challenges to, sustainability education in the liberal arts. My perspective is that of a provost at a liberal arts college that has undertaken a substantial initiative in this arena.*

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*NEIL B. WEISSMAN is provost and dean of Dickinson College.
**Sustainability and the liberal arts curriculum**

Viewed in terms of the liberal arts curriculum, sustainability has much to recommend it. Most obvious is the concept’s breadth. Public attention currently focuses on “global warming,” and particularly the scientific dimension of climate change. The same is true within academe. ACUPCC targets, for example, center on achieving climate neutrality and reducing greenhouse gas emissions, goals that start with measurement and understanding of the dynamics of carbon footprint. Investigation of climate change, particularly, and sustainability, generally in terms of biology, chemistry, earth science, or physics, quickly spills over into the realm of economic and social impacts and policy formation. Disciplinary study from the standpoint of social science promptly leads to issues of ethics, values, and culture that are the core concerns of the humanities. “We have many sophisticated scientific and policy analyses of climate change, species loss, and other environmental issues,” reads the report of a 2007 conference at Yale on sustainability, “but our situation also requires the knowledge and wisdom of psychologists and philosophers, poets and preachers, historians and humanists to help us see and communicate hard truths and inspire individual and social change” (Leiserowitz and Fernandez 2008, 13).

Faculty development efforts that demonstrate sustainability’s reach across the liberal arts, such as Northern Arizona University’s pioneering Ponderosa Project or Emory’s Piedmont Project, are readily available. Dickinson College’s comparable Valley and Ridge EfS study group has since 2008 included fifty-one faculty from twenty-five departments and all three divisions of the curriculum, resulting in over forty new or revised courses with sustainability content. These include a mathematics course in which the examples were all drawn from the environmental history of Easter Island—a good example of how sustainability can set the context for courses devoted to seemingly unconnected skill development.

Importantly, EfS not only speaks to virtually all academic disciplines, it also demands that they enter into dialogue. Descriptions of effective sustainability education invariably emphasize holistic systems thinking, the ability to make connections, interdisciplinarity, and “lateral rigor.” In a recent essay on leisure, Robert and Edward Skidelsky ask, “What is the good life? And what is it not? And what changes in our moral and economic systems are needed to realize it? Such questions are seldom asked because they do not fall neatly into any of the disciplinary boxes that make up modern intellectual life” (2012, 13). These are precisely the interdisciplinary questions raised by sustainability. Put somewhat differently, sustainability advocates frequently invoke practices that mimic nature and emphasize organic elements in the environment. This approach readily translates to the liberal arts potential for integrative study and learning, to adding synthesis to the traditional curricular dimensions of disciplinary depth and general education breadth.

As the foregoing suggests, sustainability powerfully validates the liberal arts. In response to contemporary accusations of economic impracticality, defenders of liberal education have emphasized how such skills as critical thinking and “learning to learn” are vital to success in careers. This approach readily extends to sustainability, which has become a growing source of employment across many fields, including business and finance. Experts in careers related to sustainability particularly require the ability to constantly remake their technical training in an arena in which successful strategies must be flexible and adaptive. Moreover, the integrative nature of sustainability challenges gives rise to a demand for “translators,” professionals with the understanding and communication skills to carry knowledge across the boundaries that divide communities of experts, policy makers, and the public (see, for example, Cash et al. 2003). As Bruce Schlein (2010), director for corporate sustainability at Citi, observed of sustainability-related careers, the practical need to combine deep expertise with broad perspective “makes liberal arts skills hard skills.”

Sustainability’s validation of the liberal arts extends beyond economics. While liberal education can hold its own in a contemporary dialogue dominated by concern over jobs and “return on investment,” its origins and ultimate worth center on citizenship. Colleges and universities certainly reiterate this element in mission statements, strategic plans, and elsewhere. Yet education for citizenship is often framed formulaically, using...
broad terms such as “leadership” or “engagement” that lack the programmatic roots to make a compelling case. Sustainability brings citizenship down to earth (no pun intended). While we do not know the precise contours of change, defining our relationship to the natural world will undoubtedly provide a profound challenge for American democracy. EfS prompts students to wrestle with fundamental issues of policy and practice, and impels them to seek solutions to the problems confronting the communities in which they live.

Dickinson College, for example, was chartered in 1783 in the wake of the Revolutionary War to provide a “useful” education in the liberal arts to leaders of the new American democracy. The precise relationship between liberal learning and utility, especially as articulated in college publications, has occasioned more than a little debate among our faculty. “Useful,” for some, carries a problematic leaning toward the narrowly vocational and away from the reflective. Sustainability, by contrast, lifts the concept of useful, still encompassing vocation and social action but in a way that moves toward deep, integrative learning.

The campus as a “living laboratory”

By its nature, sustainability also breaks down barriers between higher education and the wider world. “Regardless of the subject of the curriculum,” states AASHE’s 2010 call to action, “students must learn and practice holistic systems thinking and be able to apply such thinking to real world situations” (2). Virtually every EfS agenda stresses the need to connect the classroom with local, regional, and global communities with an emphasis on place-based experiential learning. Indeed, there is strong potential here to undermine, if not entirely erase, the all too common vocabulary that contradicts academe with the “real world,” language that implies that the work of higher education is somehow “unreal.” Colleges and universities in the United States have significant environmental impact. As the Presidents’ Climate Commitment indicates, campus operations can and must become “living laboratories” of sustainability for the application of ideas, skills, and values developed in the classroom. In so doing, higher education institutions model “real” practices beneficially adopted and adapted in other communities.

Envisioning the campus as a living laboratory carries us across boundaries within the institution as well. Much effort has been devoted to “bridging” academic and student development, especially in residential colleges and universities. Classroom discussion of sustainability issues readily yields important implications for what we loosely call student “lifestyle.” And residential practices similarly can be used as vehicles for reflection on, and study of, broader issues such as consumption and policy. A more resistant, if not even insidious, division on campus—between students and faculty, on the one hand, and the facilities staff who support them, on the other—also yields to EfS. Sustainability practices can bring these constituencies together in operations and in the learning process. The efforts of facilities staff to “green” the campus provided a powerful impetus to Dickinson’s EfS initiative; I doubt we have ever had a significant curricular change similarly sparked by their work. Facilities staff currently work with students as collaborators and instructors on multiple projects, including a biodiesel fuel shop, an organic farm, energy conservation, and courses on green operations and carbon footprint. Many other campuses have launched similar activities.

Finally, references to application and community indicate a further and critically important advantage of sustainability education, namely, its congruence with many of our most powerful pedagogies. Supporters of innovation in and beyond the classroom will find Second Nature President Anthony Cortese’s assertion that “the entire educational experience of students is a function of not only what they are taught, but how they are taught” entirely resonant (Bardaglio 2007, 21). The overlap between the lists of core EfS strategies and of “high-impact educational practices” (Kuh 2008) is striking. On the level of activities, such shared items as community-based and service learning, internships, learning communities, and undergraduate research serve as cases in point. The two lists connect in
deeper ways as well. Both emphasize collaborative work, integrative learning, the combination of the intellectual and the experiential, active approaches to learning, problem solving, and, especially, engagement with contested ethical issues and “big questions.” Certainly, there is a direct line from EIS to the Essential Learning Outcomes identified by the Association of American Colleges and Universities: knowledge of human cultures and of the physical and natural world, skills ranging from critical thinking to problem solving, and the development of personal and social responsibility (AAC&U 2007).

**Challenges**

Collectively, these strengths produce a powerful rationale for a strong sustainability dimension in liberal arts curricula. Some institutions, ranging in size and type from Green Mountain, Northland, and Unity Colleges to Arizona State University, have actively embraced EIS as a defining curricular dimension. Yet overall, introduction of sustainability into the liberal arts curriculum has been incremental at best. Why has progress not been faster?

In part, the barriers to change are the same as for educational reform in general. “Usual suspects” include disciplinary silos, promotion and tenure practices that work against experimentation and innovation, governance procedures that can make curricular renewal difficult, and faculty workload. There are, however, obstacles particular to EIS, issues that stem from the very strengths identified earlier. Most immediately, the breadth of the concept of sustainability that allows it to reach across the entire curriculum raises the problem of definition. EIS is typically envisioned as study of the environment. The ACUPCC’s focus on climate neutrality targets has had the unintended consequence of reinforcing this view. In fact, the origins of the term “sustainability” are usually associated with the 1987 report of the World Commission on Environment and Development (the so-called Brundtland Report), which had a much wider scope. It defined sustainable development as that which “meets the needs of the present without compromising the ability of future generations to meet their own needs” (43). Contemporary definitions customarily denote not one but three “legs”: environment, economic development, and social justice. And following this line, issues that might to some seem tangential to environmental education, such as poverty, gender inequality, or human rights, come to the fore. This approach is comprehensive and integrative, but it also opens the door to issues not obviously related to the natural world. These, in turn, generate ambiguity and the question of what might not be included. Does sustainability include everything?

Dickinson’s Academic Program and Standards Committee ran into this concern head-on when members insisted that as an educational institution we must include “culture” as a fourth leg in defining sustainability. This promptly mired the committee in a temporarily paralyzing effort to define precise boundaries for the concept. We have moved forward with a “working definition” of sustainability as “the capacity to improve the human condition in this and future generations without degrading the natural world.” That wording anchors such study securely in the environment but retains considerable “creative ambiguity.”

The importance of social justice to most definitions of sustainability signals a second concern. As the debate over climate change readily demonstrates, EIS poorly done can be open to the charge of partisanship. That we all face a fundamental challenge in regard to sustainability, as the scientific community continues to demonstrate, is beyond debate. The contours, magnitude, and appropriate responses to that challenge are not. Our institutions can readily endorse such elements of a sustainable future as the education of women, access to health care, or the reduction of our carbon footprint, but questions such as the role of free trade in economic development or of contemporary capitalism or of growth itself need to remain open. In short, EIS makes institutions of higher education accountable for defining boundaries between advocacy and partisanship, and calls upon us to help our students find their way to social action informed by learning and reflection.

A commitment to EIS also carries with it the task of assessment. Of course, accountability for learning outcomes is not unique to sustainability. Yet the very breadth of the concept, including its emphasis on fundamental values and on application beyond the classroom, makes evaluation particularly challenging. AASHE has observed that assessment “mechanisms have been underutilized...
in furthering sustainability education initiatives” (2010, 6). In a deeper sense, appropriate mechanisms have not been fully developed.

Some dimensions of EfS are readily measurable. Institutions can, for example, define courses that have sustainability content and track student enrollments. A first try at my college, for example, yielded 94 courses with 1,430 different students (60 percent of our total) enrolled in 2011–12. Yet a great deal needs to be done to make qualifying criteria tighter and, more importantly, to translate such totals into what students actually learned. Gauging mastery of specific content and individual skills (e.g., can students measure their carbon footprint?) is relatively manageable as well. But in its most important dimensions, sustainability moves far beyond these specifics. “Sustainability is a complex concept,” the authors of one report write, “perhaps even an entire way of thinking” (EfS Blueprint Network 2011, 4). Indeed, EfS advocates would argue, it is an entire way of living. For example, Dickinson’s current draft
of learning goals includes a “disposition” to action. One might imagine an alumni version of the Presidents’ Climate Commitment, with quantifiable indices connected to lifestyle and carbon footprint that are measurable over time. But frequently cited and critically important outcomes such as an ability to understand the consequences of one’s actions, appreciation of the natural world, and commitment to social justice are of a different evaluative order.

The need for broader, systemic application
What, then, follows from juxtaposing sustainability’s potential for invigorating if not fully transforming the liberal arts with the obstacles to achieving that promise? An analogy from the environmental movement itself may be apt. “Green” practices, from recycling to energy conservation, are everywhere. While welcoming these individual measures, activists also argue that they are inadequate, that the challenge of sustainability requires broader, systemic change. Similarly, EfS—with its ability to speak across the curriculum and to infuse courses from first-year seminars to capstones—is appearing with ever greater frequency. But broader systematic application is needed to take full advantage of sustainability’s capacity to make liberal education more deeply integrative and purposeful.

How to proceed?
Much will be accomplished at the grassroots level by individual faculty and students acting to insert sustainability into the curriculum where they see opportunity. There is, however, no substitute for broader institutional affirmation of purpose, in essence a more academically focused equivalent of the Presidents’ Climate Commitment. There are many opportunities to communicate this message, from mission statements and strategic plans to working documents such as admissions materials. We need to do so consistently, wherever it makes sense. At Dickinson, to cite an example initially unconnected to sustainability, a decision to translate diplomas from Latin to English provided an unexpected chance to complement the traditional language of “rights and privileges” bestowed on graduates with the affirmation of their “responsibilities.” These are now defined as “the obligation to use one’s talents and attainments for the betterment of humankind, our alma mater, and our planetary home.”

The degree of commitment to sustainability education and how it is realized will vary by institution.

The degree of commitment to sustainability education and how it is realized will vary by institution. For a few, EfS will become the organizing principle for general education or indeed the entire liberal arts curriculum. Most will likely view it as a dimension of greater or lesser significance in what they do. EfS may infuse first-year seminars, majors, minors, electives, and/or other curricular options. In all cases, faculty will be key to success. For reasons already noted, their embrace of EfS is hardly assured. Beyond institutional obstacles such as heavy workload and inflexible systems of evaluation and reward, faculty are understandably passionately committed to teaching and scholarship that may not obviously fall within the wide reach of sustainability. Even in the very many
fields that do, faculty may not immediately see the connections.

Academic leaders will need to be creative, persistent, and willing to devote considerable resources to harness the underlying potential of sustainability education. One strategy, which has been employed successfully at my institution, is to focus on “early adopters,” either those whose fields directly address sustainability or others drawn to the subject by its importance. Given access to EfS expertise, stipends, and even reassigned time, they can carry out course work and curricular development projects that inspire others to join in. In sum, material supports, the model of involved colleagues, and a strategic commitment by the college or university—all reinforced by growing concern for sustainability in society at large—can combine to move faculty and, through them, the academic program forward.

Finally, the potential of EfS will best be realized through its integration into broader efforts at pedagogical reform. In its ability to bridge theory and practice particularly, a sustainability focus facilitates best practices in experiential learning. Such activities as service learning, student-faculty research, and community-based projects are by their nature labor-intensive; therefore, financial resource-intensive. Infusing these practices with issues of sustainability can draw faculty and student interest and deepen learning. In so doing, EfS can provide important impetus to new pedagogies, helping (to use the term in a different context) sustain them in an era of limited institutional resources.

Sustainability advocates have long argued for the ethical imperative of higher education in regard to EfS. Authors of the 1995 Essex Report, for example, explicitly tied academic freedom and tax-free status to “a profound moral responsibility to increase the awareness, knowledge, skills and values needed to create a just and sustainable future” (Second Nature 1995, 3). When viewed particularly through the lens of the liberal arts, there is a profound educational imperative as well. Sustainability has the potential to vitalize and validate liberal learning in ways that both deepen our practice as teachers and engage us meaningfully with the wider world.

To respond to this article, e-mail liberaled@aacu.org, with the author’s name on the subject line.

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NOTE

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Curricular Innovation is at the center of the challenges many colleges and universities face as they seek to help students address more successfully than previous generations the complex, multi-faceted, systemic challenges of global climate change, population growth, loss of biodiversity, environmental justice, toxic wastes, and food insecurity. The key to meeting these challenges is to inspire faculty creativity, whether the goal is to broaden an environmental approach with the “triple bottom line” of sustainability (economic and social, as well as environmental dimensions), to create sustainability minors or majors, or to integrate sustainability issues across the curriculum. The Piedmont/Ponderosa model is a successful approach to curricular change that has inspired faculty at dozens of colleges and universities around the country.

The Piedmont/Ponderosa model

The Ponderosa Project began in 1995 at Northern Arizona University (NAU), led by Geoffrey Chase, Paul Rowland, and several of their colleagues. Building on the week-long Tufts Environmental Literacy Institute, Chase and Rowland developed a two-day summer workshop, followed by independent time for syllabus work. Over five years, the Ponderosa Project helped nearly 100 faculty revise over 120 courses, and the university went on to gain national visibility for its environmental education. With help from NAU leaders, the Piedmont Project began at Emory University in 2001. It is now the country’s longest-running curricular development program in sustainability. Over 180 participants have developed or revised over 200 courses with sustainability-related content. The Piedmont Project networks provided important groundwork for the university’s subsequent adoption of rigorous sustainability commitments and goals.

Each summer, the Piedmont Project offers a curricular development program for twenty faculty from all parts of the university. In response to an email call in January, applicants briefly describe a new course or a revised course module that they would like to develop. Applicants chosen to participate in the project commit to attending the workshop, developing their syllabi over the summer, and taking part in an August fieldtrip that includes lunchtime sharing based on the summer’s intellectual journey. To encourage further reflection and cross-fertilization, the project hosts a follow-up dinner for participants in March. A rotating group of two or three faculty leaders facilitates each program.

The Piedmont workshop, like the Ponderosa workshop that preceded it, has a lively rhythm of short presentations by facilitators and resource people, small group discussions to reflect on possible course connections, outdoor activities that also introduce new materials and new pedagogical approaches, large group discussions, and structured exercises. A website of readings and links offers opportunities before the workshop for faculty to learn more

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Curricular Innovation for Sustainability

The Piedmont/Ponderosa Model of Faculty Development

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about definitions and issues related to sustainability. Each participant receives $1,000 when his or her revised syllabus is submitted at the end of the summer, and all the syllabi are posted on the project website. A parallel one-day workshop is offered for ten to fifteen graduate students.

Because of the success of both the Ponderosa and Piedmont Projects, and in response to multiple requests from other schools to help create similar faculty development programs, we began in 2005 to offer twice-yearly workshops to help campus leaders from around the United States (and, eventually, in nine foreign countries) use the Piedmont/Ponderosa model. Sponsored by the Association for the Advancement of Sustainability in Higher Education (AASHE), these workshops enroll thirty to forty-five participants, and to date over 400 individuals from more than 275 institutions have attended. The range of institutions represented in these workshops is extensive, and their individual missions and needs are varied. Nonetheless, similar programs have been implemented successfully at institutions of all types—large and small, public and private, technical and liberal arts, two-year and four-year. As more schools adopt sustainability commitments, such as the American College and University Presidents’ Climate Commitment, academic leaders recognize the need to support faculty as they integrate environmental and sustainability issues into the curriculum. Unless they are to rely entirely on self-education, some form of curricular development program is necessary to accelerate faculty commitment to renewal and change.

Principles of the Piedmont/Ponderosa model

The seven principles described below animate the Piedmont/Ponderosa approach, and their application has proven useful in diverse contexts around the country.

1. **Foster creativity.** The challenge for sustainability education is to stimulate the desire for change within the broadest possible group of faculty, because top-down administrative mandates often generate faculty resistance. Building intellectual excitement for sustainability education begins with mixing faculty from diverse fields in a context that downplays rank, power, and prestige. Faculty at all career stages are welcome, and we encourage a range of curricular projects—those centrally and obviously connected to sustainability (such as an environmental ethics course in philosophy, say, or a science lab on “green” chemistry) as well as those further afield (a math course that redesigns ecological footprint calculators, for example, or a nutritional anthropology course that addresses urban food deserts and the impact of HIV).

Workshop presentations make it clear that not only scientific or technological contributions are valued; no one area of the curriculum “owns” sustainability. As a result, creative thinking about different topics or course strategies emerges. To teach finance principles in a business class at Auburn University, for example, the instructor added case examples from sustainability-oriented businesses. New materials can also take the form of new units within an existing course, such as a section on recent trends in environmental rights and rights to livelihood in a political science course on human rights. Chinese language courses at Emory use web-based written and verbal units on wildlife protection and sustainability challenges, and different kinds of writing exercises, from poetry to letter writing, explore the relationship between nature and human society.

2. **Emphasize faculty expertise.** Unlike workshops that seek to transmit best practices or introduce new materials, the Piedmont/Ponderosa workshops are based on the recognition that the experts in the room are the faculty themselves. Although three to five outside resource people are brought in for half-hour talks to provide new perspectives, the emphasis is on open-ended dialogue with peers, small group discussions, and emerging new connections. Faculty have many years of training, intellectual commitment to teaching, and expertise in their fields, and their experience allows them to discover what will work best for them.

3. **Build faculty community.** Workshop assignments or small-group tasks also help build new networks and spark new connections. One participant commented, “The intensive contact with other faculty I had never met or knew only vaguely was really powerful and lasting. In fact, knowing that I now know more colleagues on campus is one of the best results of the Piedmont Project.” The peer
learning experiences help faculty establish lasting relationships across the disciplines, which provide opportunities to learn from others beyond the boundaries of the workshop. The experiences also reaffirm that we are all, to some extent, beginners in the process of figuring out how to live more sustainably.

4. Encourage an interdisciplinary approach. Because sustainability cannot be adequately addressed from within a single area of study, the workshops embrace the need for multiple perspectives and collaborative thinking—the very skills our students will need. In this sense, faculty are positioned as both experts and learners. Rather than assuming the instructor is the expert and the sole holder of knowledge, truly interdisciplinary perspectives and interaction across disciplines encourage faculty to embrace the usefulness of bringing together multiple forms and sources of knowledge. An example of the resulting curricular innovations is an agricultural economics course at the University of Idaho that examines ethical questions related to agriculture and natural resource use in the context of different legal frameworks.

While sustainability challenges demand broad linkage among issues and can lead to creative approaches, they can also create some discomfort for faculty who want to have all the answers before they go into the classroom. Education for sustainability often requires that faculty extend their interests into new areas, which can be both rewarding and somewhat disconcerting. A willingness to step outside the “expert” role, into a stance of co-learner with students, is a disposition that must be nurtured and rewarded. Said one faculty member, “One of the best benefits I’ve seen in Piedmont Project is that it provides a forum for people to talk and learn without needing to be ‘the expert.’ It’s a place to actually be safely curious.” Paradoxically, when teachers give up a slice of the expert role, it can support leaps of learning—for both students and faculty.

5. Welcome diverse pedagogical approaches. As a result of the workshops, faculty revise their courses in dramatically different ways. Some change content significantly and begin using texts that require students to approach nearly everything in a given course from the perspective of sustainability, while others simply incorporate additional reading assignments. Although changing a few readings in a course may seem likely to have only a minor impact on learning, experience shows that a few well-chosen readings can galvanize student interest—and lead faculty to add even more readings. Often, faculty who begin by assuming that sustainability issues can be inserted into an existing course ultimately decide to shift the paradigm that orients the course. For instance, in revising the comprehensive nursing curriculum at Emory University, Piedmont Project alums have integrated an “eco-centric” paradigm, which takes into account the entire environment of health, in place of a curative-medicine, patient-focused, “ego-centric” paradigm.

Experiential learning is a powerful component of sustainability education. Part of what makes experiential learning an enhancement for a workshop is that it produces a shift from an exclusively mental focus to a focus on body
movement and sensory input. A restorative walk in a nearby garden or woods as part of the workshop experience, for example, can help faculty rediscover the uses of outdoor experiences and empower them to carry out their own fieldtrips. Moreover, spending time in natural settings can open our eyes to the living systems around us and to the effects humans have on them. As one faculty member explained, “Seeing others’ reactions of wonder affirmed for me that exposure to the natural environment and means to protect it does inspire others, even well-established scholars, in a way that few other experiences can match.”

Many faculty have responded to experiential learning in the workshop setting by incorporating such experiences into their courses. Some have even come to regard the development of lifelong habits of personal restoration as an important goal for their students.

6. Make connections. As faculty make connections among themselves and across disciplines, new opportunities emerge for team-teaching and guest lectures. Connections are also made between teaching and research, operations, and outreach. Hands-on experience and engagement with outside resource people can help students understand sustainability from new perspectives. One Emory course, for example, introduced students to a local Watershed Alliance leader who embodied the scientific knowledge, political savvy, personal persistence, and effectiveness in leadership that the students had read about in class. Students in the class reported that engagement in a creek cleanup had opened their eyes to the local landscape and to the recreational side of community service.

It is also important to give faculty a concrete introduction to the social issues connected to sustainability, a component that is often not well understood. At Northern Arizona University, a geologist discussed predictions that a plan to relieve congestion and expand visitor facilities at the Grand Canyon National Park would cause a downstream waterfall to dry up. The waterfall, he explained, is regarded as sacred by local Native Americans who practice important religious rituals there. This example illustrated the often complex trade-offs of sustainability and led to an open discussion of the dilemmas associated with the plan. Many undergraduate courses use geographic information system mapping to explore toxic waste sites and landfills, thereby adding environmental justice dimensions to course content.

Local and international connections also inform faculty teaching. At the College of the Menominee Nation in Wisconsin, for example, nearly half of all students take an introductory course on sustainable development. The students, whose own tribal commitments include protecting the land, are troubled by accounts of the Ogoni people in Nigeria who struggle with environmental impacts of oil extraction, poverty, and human rights violations. They come to recognize a connection between their personal tank of gas and the suffering of groups in other parts of the world.

7. Focus on learning outcomes. An important part of the workshop’s second day is an exercise in which groups of faculty seek common ground in response to the following question: what should a student be able to do

What should a student be able to do with regard to sustainability as a result of his or her academic work at this institution?
with regard to sustainability as a result of his or her academic work at this institution? The attention to learning outcomes helps shift the focus from an individual teacher's course to the curriculum as a whole. By placing what students can do—not what teachers know—at the center of the educational experience, while also considering sustainability as a complex paradigm that connects to the entire curriculum, we encourage faculty to step outside the boundaries of their own work and to consider the broader purposes of higher education. Typically, workshop participants reach consensus on the view that students, regardless of major or career goals, should have the skills and abilities to take leadership roles in bringing about a more sustainable future. The ensuing discussions reflect an almost palpable sense of relief at being able to talk about the larger purposes of higher education.

**Long-term impact**
The long-term impact of faculty development programs is rarely measured, but the Piedmont/Ponderosa model has benefited from several longitudinal studies based on interviews and surveys (Barlett 2005, 2008; Barlett and Rapaport 2009). The 2009 survey, conducted five to sixteen years after sustainability-related course development at Tufts and Emory Universities, found that between two and four teaching innovations (new readings, laboratories, assignments, research projects, units or modules, or new course paradigms around sustainability) continued to be adopted by 47 percent of faculty at Emory and 61 percent at Tufts. According to one respondent, the workshop experience "gave me the confidence to create a student project that tasks the students with identifying and then taking concrete action to address some environmental problem."

Roughly half of the faculty in both survey groups reported changing their courses in order to enable students to go outdoors for research, reflection, observation, or fieldtrips. Many faculty begin with a commitment to change only one course, but find themselves drawn to change other courses as well. The impact on research is also important. Overall, 62 percent of the Emory participants surveyed and 76 percent of the Tufts participants said their research interests had been affected by growing awareness of environmental and sustainability issues.

**Adaptation and spread of the model**
Many colleges and universities have adapted the Piedmont/Ponderosa model to fit their own unique circumstances. At the University of Southern Maine, for example, the Maine Watersheds Project is in its eighth year, and nearly one-quarter of the faculty have integrated sustainability into their courses, reaching over five thousand students per year. Faculty receive a $500 stipend as well as home inspections to help reduce energy bills, and they are also eligible for financial support for home insulation. Faculty from nearby colleges are welcomed into the project, and it has benefited from grant support from a Swedish climate change foundation, whose policy experts visit to support the two faculty project chairs. Good connections with statewide journalists have fostered regular media coverage of efforts to "green" the curriculum.

At Auburn University in Alabama, the Fall Line Project is in its fifth year, and sixty-six faculty have now found ways to bring sustainability issues into their courses. For example, a freshman composition course asks students to explore the relationship between human ambition and environmental awareness, drawing upon the film *An Inconvenient Truth* and perspectives from Thomas Jefferson, Ralph Waldo Emerson, Henry David Thoreau, and Edward Abbey. In the art department, a sculpture professor asks students to "create a sculpture that addresses the theme and/or practice of sustainability," building on essays from a 2005 exhibition at the University of Chicago called "Beyond Green." The course syllabus presents three different precedents for sustainable art: (1) art that engages with the land or landscape by altering the landscape, placing forms in the landscape, working with processes found in nature, or reclaiming sites; (2) art that incorporates sustainable practices such as recycling; and (3) art that responds to social issues through the production of objects or discourse.

A long-running project at St. Olaf College in Minnesota has partnered with other schools and organizations, sometimes with neighboring Carleton College and also with Luther College and the Associated Colleges of the Midwest conference of schools. In 2012, when it was held in conjunction with the conference of the Upper Midwest Association for Campus Sustainability, the faculty development program
reflected the further maturation of the sustainability movement nationally. Leaders from St. Olaf and Luther have also led multi-campus workshops for faculty at the University of Wisconsin–River Falls. As at many schools, St. Olaf’s efforts have extended to education within the residence halls. Beginning in the fall of 2012, a new program called “SustainAbilities” supports student sustainability representatives in each dorm; sponsors monthly games, talks, and activities; and encourages individual and institutional action for sustainable living on campus—and after graduation.

At Santa Clara University, the Penstemon Project emerged after twenty years of quiet work by a few individuals. With a renewed university-wide commitment to sustainability, the project began to offer annual faculty workshops. The twenty participants in the first year added sustainability components to forty-seven courses. The Penstemon Project then experimented with three one-day workshops, with the goal of reaching fifteen faculty apiece. The initial offer of a stipend of $500 per day proved to be an inadequate incentive, so project organizers instead offered free iPads to all attendees for a “paper-free” workshop. Ironically, the iPads cost only $499 each, but they generated more interest than the cash stipends had. A letter from the president invited all faculty to participate, and sixty-seven applied. This group included a much higher percentage of senior faculty, including several department chairs and the president of the faculty senate, and greater participation from the professional colleges (business, engineering, and law).

An outgrowth of the Penstemon Project is the Sustainable Living Undergraduate Research Project (SLURP) in which faculty supervise students in directed research related to some aspect of sustainability on campus. SLURP students live together on the same floor of a residence hall, which helps align academic life and residence life.

At the University of Florida, the Prairie Project expanded almost immediately to a parallel program for graduate students, but budget cuts in 2012 shifted attention away from workshops and toward grants for course-related projects. In Idaho, the Palouse Project also shifted from the workshop format to offer “Greening the Curriculum” grants. By the spring of 2011, over fifty courses involving more than forty faculty on four Idaho campuses had received $57,000 to support curricular development for sustainability.

Institutional structures of support also can emerge from these faculty development efforts—such as the Center for Sustainability Education at Dickinson College, which emerged from the college’s Valley and Ridge Project. Many schools have developed minors in sustainability that provide students with a credential on their transcripts. Majors and advanced degrees are also emerging at a few pioneer schools, such as Arizona State University. Especially significant for liberal education is the integration of sustainability into general education, but equally important is the degree to which sustainability supports liberal learning more broadly. At the University of Wisconsin–Oshkosh, the Winnebago Project, an adaptation of the Piedmont/Ponderosa model, continued for four years (from 2008 to 2011) before morphing in response to a general education overhaul. Sustainability is now one of three signature questions that anchor a required fifteen-credit sequence of courses. The approach taken by the Winnebago Project now also guides the workshops that coach faculty from across the university to create new courses for the general education program.

**Conclusion**

Workshops based on the Piedmont/Ponderosa model offer colleges and universities important opportunities to provide time for intellectual engagement and reflection, and they contribute to curricular innovation. Through such workshops, faculty can reconsider their own teaching and scholarship, their roles in relation to colleagues from other disciplines, and their connections to a larger sense of common purpose. Across the country, at schools large and small, faculty report that this work is deeply meaningful to them.

One of the lessons we have learned from these projects as they have been implemented successfully on multiple campuses is the degree to which liberal learning is as important for faculty as it is for students. Sustainability presents unprecedented challenges—challenges that cannot be met from only one perspective or solved by one set of technological innovations. Instead, sustainability requires an integrative
capacity from all of us. These workshops are powerful reminders that the very same lessons that inform our teaching need to inform workshops for faculty development. Engaging problems, working with others from diverse backgrounds, making connections, and creative thinking are as critical to providing the space for faculty to develop their own approaches to sustainability education as they are to preparing students for the twenty-first century.

To respond to this article, e-mail liberaled@aacu.org, with the authors’ names on the subject line.

REFERENCES

PKAL INITIATIVE
Sustainability Improves Student Learning in STEM (SISL in STEM)

This initiative leverages the professional voices of STEM disciplinary societies to contextualize STEM teaching and learning in terms of twenty-first-century sustainability challenges. Along with Mobilizing STEM Education for a Sustainable Future and the Disciplinary Associations Network for Sustainability, Project Kaleidoscope (PKAL) is enabling and supporting the partner societies in using sustainability to underpin their programs, policies, and member activities. The ultimate aim of this initiative is to build a community of professional societies that are working together to better prepare students for real-world, twenty-first-century “Big Questions” that relate to challenges such as energy, air and water quality, and climate change. Our urgent sustainability challenges offer an interdisciplinary lens through which to engage students in learning while helping them develop the skills they need to contribute to a better society. With funding from the Department of Education’s Fund for the Improvement of Postsecondary Education, the initiative will host a convocation at the National Academies in 2013 to widen the circle of involved societies beyond STEM and to plan for sustaining this work in the long term. Following are the initial disciplinary society partners:

- American Association of Physics Teachers
- American Chemical Society
- American Institute of Biological Sciences
- American Psychological Association
- American Society for Engineering Education
- Association for Career and Technical Education
- Mathematical Association of America
- National Association of Biology Teachers
- National Association of Geoscience Teachers
- National Numeracy Network
- Special Interest Group on Computer Science Education

For additional information about the SISL in STEM initiative, please visit www.aacu.org/pkal/sisl.
Colleges across the country are hosting on-campus renewable energy projects. The general assumption is that trade schools, community colleges, or technology-oriented universities with large engineering departments make the most appropriate sites for training future leaders in renewable energy innovation. While it makes sense to take advantage of existing strengths when developing new initiatives, we argue that nearly all schools offer interesting avenues for energy education and that renewable energy projects provide important opportunities for advancing liberal education.

To demonstrate frequently overlooked synergies, we explore how liberal arts colleges, a subset of higher education institutions rarely assumed to be leaders in the field of energy technology, deliver unique prospects for researching, developing, and expanding the use of renewable energy and for promoting educational initiatives associated with on-campus and community projects. We highlight place-based examples from Swarthmore, Middlebury, Pomona, Amherst, and Williams Colleges.

Physical plants, academic and administrative buildings, housing, food services, groundskeeping, information technologies, athletic facilities, and other operations on college campuses utilize significant energy that is mostly generated from nonrenewable fossil fuels. As institutions that train leaders and decision makers, colleges play a fundamental role in educating for a healthier and more sustainable future and are often called upon to provide ethical leadership and demonstrate civic responsibility. In 2007, Middlebury College’s board of trustees approved a plan to become a carbon-neutral institution by 2016, and members of this academic community hope their efforts to lower greenhouse gas emissions will inspire others to make similar changes. This commitment is especially important in the context of renewable energy because while there is a valid ongoing need for experimentation to improve efficiency and lower the cost of alternative technologies, one of the biggest constraints is resistance to change whereby institutions hesitate to be policy leaders. However, colleges advocating liberal education often pride themselves on being current, flexible, and innovative and by doing so are able to attract and retain excellent students, faculty, and staff. Furthermore, schools that seek to significantly reduce greenhouse gas emissions realize that, while conservation is essential, they also must move away from the use of fossil fuels.

Renewable energy projects at liberal arts colleges

Opportunities for transformative education related to renewable energy projects are cross-disciplinary and encourage both critical analysis and experiential learning. Evidence suggests that experience with renewable energy projects can frequently help open doors for employment after graduation. Some liberal arts advocates bemoan initiatives that could be interpreted as “tooling” students or providing job training; however, core liberal education values and practices can be found within
interdisciplinary renewable energy programs. Planning, implementing, and assessing energy projects makes available numerous prospects for students and faculty to explore issues in ethics and leadership, aesthetics and design, social psychology, media and communication studies, public relations, business and finance, human behavior and ecology, physics, technology, planning, and mathematics, among other areas. Renewable energy projects provide hands-on education involving real-life applications, while encouraging students to play a part in making their campus more sustainable and addressing climate change. Environmental education, advocacy, and action arguments resonate with dedicated faculty and staff who oversee the implementation of on-campus renewable energy initiatives. As the examples described below illustrate, liberal arts colleges that are experimenting with renewable energy have demonstrated remarkable success.

Swarthmore College. Like many schools initiating a transition away from fossil fuels, Swarthmore College decided to purchase Renewable Energy Credits (RECs), in this case from Direct Energy Renewable Choice. Today, 100 percent of the electricity the college purchases comes from wind power, and 40 percent of its total energy use comes from wind-powered sources. This amount has risen steadily from REC purchases targeting wind power starting in the late 1990s that initially made up 2 percent of total campus energy use. The student environmental organization Earthlust has been instrumental in pressuring the college to increase its commitment to wind energy. Swarthmore students are part of a vibrant, national student movement promoting clean energy, and with their efforts they “hope to inspire other universities and state, local, and national governments by demonstrating that solutions to global warming are within reach” (Swarthmore College 2012).

The college’s RECs, along with the Borough of Swarthmore’s own RECs, are why Swarthmore has become one of the Environmental Protection Agency’s Green Power Communities (GPCs). The town of Swarthmore ranked second in the nation as of March of 2011 in terms of the percentage of total green power electric use. Swarthmore was the first GPC located east of the Mississippi River; most GPCs are found in California, Colorado, Utah, and Washington. After a positive experience with renewable energy education linked to RECs, Swarthmore College is now preparing to host its own on-site renewables. Students in an engineering class conducted a study on the feasibility of installing solar panels on the performing arts center building. The students modeled the energy use, researched systems, and calculated paybacks. Student researchers have also worked with the sustainability office to assess geothermal and cogeneration options.

Middlebury College. Alongside teams from large research-oriented universities applauded for advancements in science and technology, Middlebury College competes annually in the US Department of Energy’s Solar Decathlon. During the 2011 competition, the Middlebury team designed an energy-efficient and solar-powered farmhouse that drew from New England tradition, while also incorporating modern designs for collaborative living spaces. Solar technology is just one area where the college has gained national recognition. Building from an environmental studies class proposal, a ten-kilowatt wind turbine installed on campus in 2005 provides energy to a nearby recycling facility.

In 2009, Middlebury College started generating heat from a biomass gasification plant that replaces one million gallons of fuel oil annually with locally sourced, sustainable woodchips and reduces the college’s greenhouse emissions by 12,500 metric tons. Although the investment in the gasification project totaled $12 million, officials expect a payback period of a dozen years at the same time that the college injects $800,000 into the local economy annually through the purchase of woodchips. Meanwhile, faculty and students are researching willow trees as a fast-growing woodchip source that could provide additional income to local farmers as well as exploring how to expand the use of alternative fuels for other campus operations. For example, Middlebury’s Nordic ski team travels to competitions in a biodiesel truck powered by waste vegetable oil from campus dining halls. Research on alternative energies is integrated into the college’s academic curriculum, and students work closely...
with faculty mentors to assess positives and negatives.

**Pomona College.** Solar hot-water systems that generate nearly 250 kilowatts of electricity from photovoltaic solar arrays have been installed on dorms and athletic facilities at Pomona College. In addition to embracing renewable energy infrastructure and solar technology, campus leaders define education as an essential component of any sustainability initiative (President’s Advisory Committee on Sustainability 2011). Pomona is a national leader in using the campus as a living-learning laboratory and seeks to increase the use of campus facilities as topics of academic inquiry, both within the curriculum and through cocurricular activities that complement classwork. As an example of this commitment, students in a class called “Physics in Society: A Critical Analysis of Energy Policies” study rooftop solar panels for lab assignments. They measure the panels’ power output depending on their angle in relation to the sun and with varying levels of resistance. To provide user-friendly information to occupants in Pomona’s new North Campus Residence Hall, flat-screen panels within the building provide data on solar production from panels on the roof. Solar data and other real-time feedback on building energy, water, and gas use is also available online, as it is at many schools that use building “dashboards” to educate occupants and other members of the campus community about consumption and to promote behavioral change toward conservation.

A highly successful renewable energy initiative at Pomona with great potential for replication at other schools is a “solar rover,” a portable one-kilowatt array called SolTrain that students helped design and create. In 2008, the President’s Advisory Committee on Sustainability approved funding for the mobile solar station, which is used as a renewable power source for the school’s organic farm, powers campus events and activities, and serves as a showcase project for renewable energy. In 2011, SolTrain won the Excellence in Innovations for Sustainability award from the Association of American College Unions International. According to Pomona’s associate dean of students, SolTrain “provided and continues to provide real-world education on campus. The first group of students involved learned about budgeting, funding processes, and committee work. A second group served as the construction crew and learned valuable skills in building, engineering, problem solving, and teamwork. Now each time SolTrain is used, it has signage and information about how it works, how it saves energy and resources, which has reinforced the work of the President’s Advisory Committee on Sustainability” (Peters 2011). David Tanenbaum, a Pomona physics professor involved in the creation of SolTrain, notes that students were highly enthusiastic about the solar rover. When eager-to-learn students asked for technical help, he became convinced that it was worthwhile to dedicate his time to the initiative. Students are often the driving force behind on-campus sustainability initiatives, although faculty, staff, and administrators must provide needed support.

**Amherst College.** Solar hot-water systems have been mounted at three sites at Amherst College, including the physical plant, a student dormitory, and the president’s house. Solar and wind research is integrated into physics courses, along with data from a rooftop weather station that monitors conditions such as solar intensity, wind speed, temperature, and humidity. While these renewable...
energy pilot projects are designed predominately for educational purposes, power generated from solar and wind technologies feeds into batteries used to energize a laptop computer and classroom projector, providing students with a working example of an “off-grid” energy system.

**Williams College.** Two different types of solar projects are underway at Williams College: photovoltaic arrays have been installed at two sites, and solar thermal water heaters have been installed on three buildings. Real-time readings allow for ongoing analysis in campus research projects, including internships and class work. Student research analyzing the potential for wind, biomass, biodiesel, and geothermal projects is featured prominently on the college’s website. These research projects are the result of course projects for a class titled “Renewable Energy and the Sustainable Campus” and for internships offered throughout the year by the Zilkha Center for Environmental Initiatives at the college. According to Amy Johns, interim director of the Zilkha Center, students are crucial to the fulfillment of the center’s goals. Johns says that for certain students, the practical application of classroom education energizes their education and gets them deeply involved in campus renewable energy projects. The Zilkha Center drives many of the on-campus renewable energy projects at Williams, and works directly with in-house facilities personnel and outside consultants to conduct feasibility studies.

In many cases, the studies have demonstrated that the proposed projects would either save money or be cost neutral. The fact that the projects make sense from environmental and economic perspectives has made it easier to gain the support of school administrators. Students are involved throughout the entire process, gaining research and decision-making experience. Student researchers have been involved in multiple efforts to investigate the potential of wind turbine use on a nearby ridge since the 1970s. Additionally, the science building hosts a tower with three anemometers measuring wind speeds, and subsequent investigations concluded that on-campus wind potential appears insufficient for energy production. While discussions continue to evolve on the use of wind in nearby locations, there is clearly educational value from involving students in real-life decision making about alternative energy technologies, whether projects are ultimately determined to be viable or not.

**Benefits**

Renewable energy projects, such as those described above, capture student attention because they resonate with lived experiences and foster the deep learning that comes from personal engagement. “The best teacher of all, sometimes, is the campus as a learning laboratory, and how the students live and what kinds of gardens we have and the energy we use,” says Mitchell Thomashow, former president of Unity College. Thomashow suggests that for sustainability education to be most effective, “it has to be ubiquitous, it has to be done by everyone, it has to be part of the whole infrastructure. Because it does not matter what you teach, if you do not demonstrate it through the actual practices of the institution, it is not going to have nearly as much of an impact. So let us make sure that the hands-on tangible overhaul of institutional infrastructure is crucial to this sustainability-infused learning. . .” (Rowland et al. 2009, 346).

In addition to providing excellent student learning opportunities, renewable energy projects provide new avenues for interaction with local communities, as shown in both the Swarthmore and Middlebury examples. Across a spectrum of different types of colleges and universities, energy initiatives have also proven fruitful as a means to involve alumni and donors. Finance for alternative-energy research and analysis is directed toward highly regarded institutions, including Stanford University, where alums spearheaded the donation of $100 million for an energy institute in 2009. In promoting the project, the president of Stanford stated that universities “need to focus their full talent on the greatest challenges facing the world today” and argued that “energy is certainly one of those issues” (Stanford University 2009). By being part of this trend, liberal arts colleges and other institutions that provide a liberal education can demonstrate their relevance while, at the same time, developing strong curricula for integrated student engagement involving the head, heart, and hands.

Alternative-energy initiatives are just one element of a broader “green school movement”
that has emerged internationally over the past two decades and can be found today at all levels of education, from preschools to postdoctoral programs. There is increasing recognition that sustainability education bridging the natural and social sciences with applied and practical education can lead to the development of intellectually, socially, and ecologically valuable problem-solving skills. Since sustainability challenges are so vast, there is an ongoing need for experimentation and innovation.

The inclusion of credits for innovation is one of the most exciting elements of the Association for the Advancement of Sustainability in Higher Education’s Sustainability, Tracking, Assessment, and Rating System (STARS), which requires the presence of social, ecological, and economic dimensions of sustainability and has so far been used to rate a total of 185 schools on dozens of practices. The innovation category covers new and ground-breaking practices that are not covered in standard STARS assessments or that exceed the highest criterion of current credits. Nearly 75 percent of schools accredited under STARS have pursued at least one innovation credit, commonly addressing public engagement, curricular and cocurricular activities, and energy projects. The opportunity to obtain innovation credit for curricular and cocurricular activities, in addition to listing education credits first in the STARS reporting tool, emphasizes the need to provide all students with opportunities for exposure to sustainability, both in and out of the classroom. Evidence of innovation is important because it suggests that leading academic institutions are constantly looking to improve and expand sustainability in their daily practices, and that students and future leaders are being trained to “think outside the box” in order to address important challenges.

Initiatives at the colleges cited above demonstrate a few of the ways that infusing sustainability projects into higher education encourages moral and civic leadership, inspires experiential curricula, and energizes students, faculty, staff, alumni, and donors around a shared goal. On-campus and community-based renewable energy projects create innovative, empowering, and transformative experiences for students, while also reducing the physical and environmental impact of energy consumption linked to academic institutions. Moral, practical, and intellectual interconnections such as these reinforce strengths and opportunities underpinning liberal education.

To respond to this article, e-mail liberaled@aacu.org, with the authors’ names on the subject line.

REFERENCES


NOTES

1. The authors thank David Tanenbaum, Laura Carr, Amy Johns, and Clara Fang for communicating with them about renewable energy initiatives at their schools.

2. While there is disagreement over the use of national rankings, the fact that, in 2011, US News and World Report listed these five as the top liberal arts colleges in the country based on such criteria as peer assessment, graduation and retention rates, class size, admissions test scores, and alumni giving, while Washington Monthly listed the same schools among their “top twenty” in 2011 based on social mobility, research, and service, nonetheless provides evidence of institutional integrity and educational quality.
What Colleges and Universities Need to Do to Advance Civic Scientific Literacy and Preserve American Democracy

JON D. MILLER

There are several fundamental requirements for democratic government. First, there must be free and fair elections to elect leaders. Second, there must be freedom to express a wide range of views and positions, including criticisms of incumbent leaders. And third, the public discourse about elections and public policy issues must be conducted in a language that is accessible to all the citizens in any democratic system. During the first two centuries of its history, the United States met all three of these requirements and has been exemplary in many of its democratic practices. We have had periods when presses were closed or the freedom of speech restrained, but over our history we have done well on most indicators of democratic life (Dahl 1971, 1989).

But we are entering a period in which the third of these requirements is increasingly problematic. A growing number of public policy and campaign issues are now presented and argued in the language of science at a level that is incomprehensible to most American citizens. In the 2004 presidential debates, for example, George Bush and John Kerry tried to explain and defend their positions on stem cell research, with President Bush saying that adult stem cells could be used effectively for most medical purposes and Senator Kerry arguing that embryonic stem cells were necessary for many important biomedical purposes.

Several national surveys—including some of my own—demonstrate that only about 20 percent of American adults could provide the most basic definition of a stem cell, and even fewer could explain the differences between an adult stem cell and an embryonic stem cell.

The ongoing public discourse over climate change illustrates the challenge of trying to explain scientific ideas in non-scientific language. Proponents and opponents of climate change continue to argue about the effect of carbon dioxide and other atmospheric gases on the retention of heat, and to try to explain the issue of burning fossil fuels without having to explain the role of carbon in our planetary ecology. In a series of national studies of students, young adults, and adults of all ages over the last twenty-five years, I have found that only about 15 percent of American adults can explain the idea of a molecule (Miller, 1997, 1998, 2000, 2010a, 2010b, 2010c). It may be disappointing that many Americans arrive at their views of climate change through their political partisanship, but it should not be surprising. When individuals are faced with a complex idea about which they have limited understanding, they tend to rely on the judgment of other adults that they trust to know more about that area. Patients rely on their doctors for advice about the treatment of a disease, and they appear to rely on political leaders to interpret complex climate information (Sternberg and Ben-Zeev 2001).

The solution is to increase the level of civic scientific literacy in our society. The idea of civic scientific literacy was first suggested by Benjamin Shen (1975), the distinguished...
astrophysicist from the University of Pennsylvania. Shen suggested that there are three kinds of scientific literacy—consumer, cultural, and civic. Consumer scientific literacy is applied and product oriented and increasingly necessary to shop in a drug store, a hardware store, or a computer shop. Cultural scientific literacy refers to a more epistemological understanding of science as a way of knowing in comparison with other ways of knowing. And civic scientific literacy refers to the level and kinds of information that a citizen needs to know in order to follow current and emerging public policy issues. Civic scientific literacy is critical to the preservation of our democratic principles, and I have suggested that civic scientific literacy represents the level of reading and comprehension skills needed to read the science section of the Tuesday New York Times or to watch an episode of Nova on public television (Miller 2010a, 2010b). I stress that this is the minimal level necessary to allow citizens to engage with science-related public policy issues and that we ought to seek to elevate this level of understanding in the decades ahead.

**What is our current status in regard to civic scientific literacy?**

Using a pool of open-ended questions (What is a molecule? What is a stem cell?) and closed-ended questions (Agree or disagree that “antibiotics kill both viruses and bacteria”), I have measured civic scientific literacy in the United States since 1988. The proportion of adults who score seventy or higher on a scale of zero to one hundred increased from 10 percent in 1988 to 29 percent in 2008 (see fig. 1, page 30)—a substantial rate of growth (Miller 2010a). In a national longitudinal study of young adults (Generation X), I found that 44 percent are civic scientifically literate using the same measure—the red dot in figure 1 (Miller 2010a, 2010c).

Many people wonder how these results are possible, given the United States’ flat and unimpressive scores in international school comparisons, such as the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMMS). The answer is college science courses. The United States is the only country that requires all college students to take one or more science courses as a part of a general education requirement. In a series of statistical analyses using structural equation analyses of both cross-sectional and longitudinal data, I have shown that exposure to college science courses is a strong predictor of civic scientific literacy in young adults and in adults of all ages (Miller 2010a, 2010c). More than fifty years ago, C. P. Snow (1959) made
a strong argument that all students in Britain should study both physics and Shakespeare—his version of general education—based in part on the US experience, but neither Britain nor any other major country has followed his advice. Our national commitment to liberal education is the single most important factor in our current level of civic scientific literacy.

It is also useful to note that the United States does well in comparison with other countries using the same measure of civic scientific literacy (see fig. 2, bottom left). In a comparison of thirty-four countries in 2005–8, the United States ranked second to Sweden and ahead of thirty other European countries and Japan (Miller 2012).

If the United States is second in the world in civic scientific literacy, why should we be concerned? The answer is that our basic commitment to meaningful democracy—as opposed to ritual democracy—is at stake. The important message from this comparison should not be our relatively strong showing, but the pervasiveness of scientific illiteracy in major democratic systems throughout the world. We should take little comfort in the idea that our democracy is slightly less at risk than that of several European and Asian nations.

**What are the problems, and what do we need to do?**

There are several problems, and we need to understand all of them, even if they are not the primary responsibility of higher education.

First, our current systems of elementary and secondary education are broken in the majority of states and school districts. There is no reason that every high school graduate in the United States should not be civic scientifically literate. The failure of American secondary schools to produce civic scientific literacy is the result of (1) the absence of a strong advocacy group to push schools and teachers toward that objective, (2) a political system that has turned the teaching of modern biology (evolution) and physics (Big Bang) into a political litmus test, and (3) an acceptance by too many political leaders that the precollege education system is hopelessly broken and that a system of charter schools may provide enough high-quality education for the most talented (i.e., advantaged) young people. The solutions require courage and resources. Political leaders must confront the anti-science agenda inherent in current US fundamentalist movements. Corporate leaders need to decide that the advancement of science and technology in the United States is worth more than the tax breaks they get from right-wing anti-science politicians. And the American people need to recognize that good education costs money and that a system of school financing built on property taxes (a reasonable tool for eighteenth-century agricultural societies) will never have the
resources to attract and retain outstanding teachers. It is easy for colleges and universities to blame the failure of precollege education, but the leadership of higher education needs to recognize the problem and to begin to bring some of the intellectual and political resources of higher education to bear on these issues.

Second, there is always pressure on colleges and universities to produce more “job-ready” graduates, and this pressure is growing in the aftermath of the Great Recession. It is important for the leadership of higher education to speak candidly about the educational needs of the twenty-first century and to seek to educate political leaders on these issues. There is a good deal of truth in Goldin and Katz’s (2008) argument that we are in a race between history and technology, and that economic prosperity in the twenty-first century will be higher in those countries that do the best job in providing more advanced education to their citizens. Our students and our citizens will need more advanced technical education, and they will need it periodically throughout their lifetimes. But we would be negligent not to argue for the necessity of a strong liberal education component to advance civic scientific literacy and similar levels of social and cultural understanding in the humanities and social sciences.

Third, assuming the continuation of the standard requirement that all students take one or more college courses in science, it is important that we look carefully at how we conceptualize this responsibility and how it operates in our institutions. Too often, science courses for nonmajors have been treated as onerous duties or as a source of credit hours to allow a department to teach needed courses to its majors. The “rocks for jocks” and “physics for poets” labels reflect real perceptions by both students and faculty. But this is a flawed conceptualization of the task. The University of California recently renamed its introductory physics course “Physics for Future Presidents” and rewrote the curriculum to make the title more than a marketing effort. It is essential for university scientists and administrators to recognize that a science course for nonmajors may be the last time they have a chance to talk to their future senator or congressman about science before he or she is elected. And it is the only chance they will have to talk to the millions of voters who will ultimately make electoral choices that have an impact on the future of their university and of the nation. It is a serious responsibility that needs to be taken seriously by science faculty, department chairs, deans, provosts, and presidents. And it should not continue to be at the bottom of the budget totem pole.

Finally, many colleges and universities have a lifelong relationship with their graduates. Traditionally, this relationship may have resided primarily in an alumni office that is a part of the university development function, but higher education institutions and leaders need to see this as an ongoing educational linkage. Although some colleges and universities have started to offer online and summer courses in various subjects to their alumni, there is an opportunity to use this linkage to foster civic scientific literacy among alumni. Many alumni may be receptive to opportunities to improve their understanding of scientific ideas ranging from the climate debate to changes in cognitive function during the lifecycle to genetic modification. The objective should be genuinely educational and not a thinly disguised development effort to generate additional revenue. I believe that there is a strong (and largely unmet) market for this kind of information and material, and we need to bring our full creativity to thinking about ways to address it. Some alumni may need or want to do a course, but others may want easy access to a college website that provides information resources and links on important topics. The possibilities and opportunities in the rapidly emerging wireless world of tablets and mobile devices are vast and largely unexplored.

Liberal education and the challenge of complexity
The problems of civic scientific literacy illustrate a more basic problem for liberal education in the twenty-first century. There is broad agreement that many occupations and professions now demand a strong understanding of complex scientific, social, and economic systems, and the growing length of graduate, professional, and post-graduate education reflects this reality.

There has been less awareness or concern about the growing need for individuals to understand a variety of complex scientific, social, and economic constructs in order to perform their duties as parents, patients, and citizens. The inability of most American citizens to
understand and make sense of complex arguments about stem cell research or climate change is only the tip of the iceberg. There can be little doubt that the number and complexity of science-related issues that reach public policy agendas at all levels of government will continue to grow in the twenty-first century.

The challenge for educators is to recognize that our task is to help our students acquire a core set of scientific constructs that will enable them to read the science section of the New York Times today and to read it twenty, thirty, and forty years from now. The key is to avoid teaching details about the West Nile virus and to teach the nature of viruses generally. We know that adults who have a sound understanding of the meaning of a molecule are substantially more likely to make sense of subsequent news stories about nanotechnology, but that adults with a limited understanding of the nature of matter are almost universally unable to understand the idea of a nanoparticle. It is impossible to imagine the breaking genetic news thirty years from now, but it is a safe bet that those adults who understand genes and DNA will have a far better chance of making sense of that news and those issues than citizens without this core knowledge. This conceptualization of understanding core scientific and technological constructs is fully consistent with our longer tradition of liberal education, and we need to embrace it.
Complexity is not wholly owned by the biological and physical sciences. Economists, psychologists, and sociologists increasingly speak in social science, reflecting the complexity of their fields. This is a language that is not included in my measure of civic scientific literacy, but the same principles would apply. And there are compelling arguments that citizens in the twenty-first century will need to understand complex economic arguments to make sound public policy judgments.

As educators committed to liberal education, we need to recognize that the advancement of civic scientific literacy is not icing on the cake; it is a basic insurance policy for the preservation of American democracy in the twenty-first century.

To respond to this article, e-mail liberaled@aacu.org, with the author’s name on the subject line.
An Education for the Twenty-First Century: Stewardship of the Global Commons

DOUGLAS C. BENNETT, GRANT H. CORNWELL, HAIFA JAMAL AL-LAIL, AND CELESTE SCHENCK

In this brief proposal, we are trying to envision a foundational higher education for the twenty-first century, an education that has some claim to adequacy for the possibilities of human beings today on this earth. We are writing this to provide more depth to the idea of “global education,” a term that has become commonplace but that, too often, is put forward without adequate substance. We call this “An Education for the Twenty-First Century: Stewardship of the Global Commons.”

We take on this task as members of the Global Liberal Arts Alliance, a consortium of twenty-five colleges and universities co-operating to advance the theory and practice of undergraduate education designed to prepare graduates for citizenship and leadership in the highly globalized twenty-first century.

We believe it is important to imagine an education fit for global possibilities because ours has become a world in which connections and consequences reach across borders and leap oceans. For much of the nineteenth and twentieth centuries it may have been appropriate to frame education in national terms, but no more. The challenges of the twenty-first century—the possibilities of prosperity, of peace, of health, of fulfillment—all unfold on a global stage. What a few people do in Boston or Bangkok, in Riyadh or Rome or Rio de Janeiro can affect others at a considerable distance. The earth has become a place of global cultures, in all of their valued particularity, and increasingly a global commons, in all of its necessary interdependence.

An appropriate university education for everyone, not just a privileged elite, must prepare women and men for participation in these cultures and this commons.

Ours is world being transformed by transnational flows of goods and capital, peoples and practices; by the unraveling of the nation state; and by the rapid rise of new forms of instantaneous electronic communication. There is an urgent need to prepare young people to negotiate such complexity, and to enter into thoughtful stewardship of initiatives, resources, languages, and cultures.

We know that there are many approaches to higher education across the world, some more narrowly focused on preparation for vocation, some aiming to educate the whole person. We do not intend our conception of global education as a singular conception of education to be implemented everywhere in the same way. We want, rather, to articulate the main features of any education that can be truly adequate to global challenges. In relation to current educational systems around the world, this is an approach that is generally more interdisciplinary, more collaborative, and more attuned to stewardship than to instrumental effort or narrow self-interest. It is also an education that compels students, and those who teach them, to come to know not just that which is familiar and already “one’s own,” but to seek understanding of others and to welcome the opportunity to learn what those who are different from them have discovered about our common humanity and our common habitation of this planet.

We conceive of this education as having three kinds of elements, which may well be best learned together. It requires the acquisition of some literacies: scientific, cultural, and global—understandings that are both substantive and, because necessarily unfinished, include the capabilities to continue learning. It requires the learning of some skills that are...
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essential to effective action. And it requires acquisition of some dispositions that promote constructive rather than destructive engagement with others.

We share this proposal to invite others into the conversation. We encourage others to comment on and add to our work in envisioning a foundational education for the twenty-first century—a global education that prepares students for effective stewardship of the global commons.

**Literacies for global stewardship**

The following areas of knowledge are important for effective agency. What do our graduates need to know to be able to exercise stewardship?

**Scientific understanding:**
- The capacity to use scientific knowledge and methods to identify questions and to draw evidence-based conclusions in order to make decisions about the natural world and the changes made to it through human activity\(^1\)

**Cultural understanding:**
- A comparative and historical grasp of world religious traditions and practices of faith
- A comparative and historical understanding of the variety of human cultures as expressed in music, the arts, and literature
- A sense of world history focused more on the movement of peoples across the globe, intercultural encounters, and cultural creolization than on nations, dynasties, empires, and hegemonic regimes; mastery of world geography supporting such an approach
- A sophisticated understanding of the social construction of identities and the dynamics of positionality—race, gender, ethnicity, sexual orientation, and nationality—involved in the distribution of power

**Understanding of global issues:**
- A critical understanding of the workings of global capitalism, global patterns of production and consumption, and the global flows of people, commodities, and money
- A grasp of the dynamics of globalization as a complex, disjunctive, and overlapping set of “scapes,” as described by Arjun Appadurai\(^2\) to include ethnoscapes, mediascapes, technoscapes, finanscapes, and ideoscapes; we would add enviroscapes and culturscapes

**Skills for global engagement**
- A grasp of the transdisciplinary and transnational nature of global problems and the sciences that illuminate them—problems related to health, food, poverty, security, climate change, and the environment
- An understanding of the philosophy and history, the possibilities and limitations of human rights
- Communicating meaningfully using expert writing, speaking, listening, and negotiating skills; deploying electronic communication technologies with rhetorical sensitivity to the potentials and limitations of their various modes
- Developing the capacity to see, appreciate, and draw novel insight from cultural differences and the ability to work, negotiate, socialize, and play with people of different cultural backgrounds
- Mastering a foreign language, learning to translate from one language to another, and, by means of both experiences, gaining access to another culture
- Using mathematics and statistics, and building and using models of complex systems
- Cultivating discernment by searching and sorting through information from multiple sources, assessing the validity of truth claims, and interrogating one’s own most basic assumptions
• Producing original research and new knowledge in the service of problem solving
• Praxis: taking theory to practice and thought to action
• Mastering “scalar thinking”: a method of Google Earth–style reasoning that permits us to zoom in and zoom out on issues in ways that reveal the interconnections between the local and the global; at each scale of analysis, different features and relationships emerge
• Triangulating differences using global positioning: a GPS is only reliable if it is coordinating information from a variety of differently situated sources; this skill entails taking into account disparate points of view—disciplinary, cultural, ideological—and being able to discern where they can be reconciled into a more complex and complete understanding and also the limits of that reconciliation

Dispositions for global engagement
• Respect: a recognition of the dignity inherent in humanity, of human rights, and of our responsibilities to others
• Vulnerability: a disposition not to recoil at difference, but to see encounters with difference as opportunities for growth and learning, for innovation, and for joyful interaction with others
• Hospitality: a disposition to feel at home in the world and to make others feel welcome and valued
• Compassion: a disposition undergirded by the awareness that suffering is an essential dimension of the human condition and that suffering can be ameliorated by the comfort of empathy
• Agency: the resolve to transform commitment into action by promoting change, by resisting the unacceptable, and by championing justice
• Agility: the capacity to continually revise one’s notion of one’s own identity and that of others in constellation with new cultures, persons, and experiences
• Fairness: a disposition toward egalitarian distribution of power and privilege, and a commitment to democratic processes
• Service: a commitment to support the well-being of others and the global commons more broadly
• Leadership: the proclivity to stand up among others so as to take initiative constructively, generously, and persistently

The purpose of a twenty-first-century education is to produce graduates who recognize themselves to be of the world and who also assume responsibility for the world. Such graduates respect the specificities of particular cultures as well as the need for a global commons. As stewards of such cultures and commons, they draw upon multiple disciplines and viewpoints to address the world’s problems, and they work collaboratively with others to solve them.

Education for Stewardship of the Global Commons
Commentary by Celeste Schenck

As we gathered in Paris, four presidents from vastly different liberal arts institutions around the globe—the first private, nonprofit women’s university in Saudi Arabia; an American university in Paris with one hundred nationalities represented in the student body; two prestigious members of the Great Lakes Colleges Association, one having a religious mission, the other not—we were surprised to find such common ground in our thinking about the future of liberal learning. In these commentaries, however, we have decided to foreground our differences, and with them the flexibility with which such a model can be adapted to very different educational projects. In fact, one of the discoveries of our meeting was the alliance felt by the two presidents of Earlham College and Effat University, albeit Quaker and Muslim, and that comfortably established by the two presidents of secular institutions based in Paris, France, and Wooster, Ohio. To arrive at consensus on the proposal printed above, we had to negotiate past fundamental differences in our missions. It may be that in defining a transnational practice of the liberal arts, purpose and context are ultimately much more important than content. The common denominator we are seeking has something to do with providing learning experiences for our students that enable them to value, to examine, to struggle with, to negotiate, and ultimately to take joy in the fact of human differences.

In my view, “An Education for the Twenty-First Century: Stewardship of the Global Commons” builds upon the tradition of the
Our conception adds to the central liberal arts concern with preparation for freedom a parallel concern with preparation for stewardship of the global commons

Is Global Education a Kind of Liberal Education, or an Alternative?
Commentary by Douglas C. Bennett

Are we writing a revision of a liberal arts education? Or are we envisioning an alternative to a liberal arts education? These were recurrent questions as the four of us worked on “An Education for the Twenty-First Century: Stewardship of the Global Commons.” Because what we propose is an education of considerable breadth, the answer may appear to be an affirmation that this is a liberal arts education reframed for a new era. Certainly it is not a narrow education that only prepares one for a vocation. But that is hardly enough: surely more than “breadth” is required to make an education truly a liberal arts education.

I came to the project thinking that our task was to conceive of a liberal arts education that was honestly and fully global. On more than one occasion in recent years, I had argued that the high-minded idea of a “global liberal arts” meant simply a liberal arts education thoroughly expunged of its prejudices favoring...
the United States and Western Europe. I imagined those prejudices to run deep, so I imagined this extirpation of Western bias would be difficult. But as I thought about our task in advance of our gathering in Paris, my doubts grew. Might we be taking a thoroughly Western conception of education, adding to it some few perspectives from Asia or Africa, and calling this new confection “global liberal arts”? Would such a conception have any integrity?

The idea of a liberal arts education is one that grew up unabashedly in the Western world. It began as a Roman conception drawing deeply on Greek ideas, was challenged by the rise of Christianity, then evolved into a synthesis of Christian and Greco-Roman ideas, only (down the dominant line of evolution) to emancipate itself from Christianity into a largely secular conception of education. Its understandings of knowledge, inquiry, reason, and goodness were all shaped (complexly to be sure) by the cultural contexts in which it arose and was revised. What ideas it had incorporated from outside the Western tradition it had appropriated on its own terms. So could such a thoroughly Western conception of education be sufficiently rid of its biases to be considered “global”?

Each having our own reasons, the four of us decided early in our discussions to lay aside this question of whether we were working within the liberal arts tradition. We agreed we could come back to that question at the end. And in the end, I think we would give four different answers, none of them an unequivocal yes or no.

A liberal arts education is one that makes a claim for universality: it seeks to address what it means to be human, weighing answers to that question from many different perspectives and disciplines. Our conception certainly falls within that conception, seeking to embrace a yet wider set of perspectives. A liberal arts education is also one that prepares a person for a life of freedom, rather than a life of necessity; it is an education that prepares a person to make choices, not to be driven blindly by compulsions neither seen nor understood. Our conception is compatible with that lofty aim.

But our conception adds to the central liberal arts concern with preparation for freedom a parallel concern with preparation for stewardship of the global commons. A well-educated person, we believe, needs not only to be fit for freedom, but needs also to be prepared to take a full measure of responsibility for what happens to and among human beings in this world.

Or was that concern for stewardship always latent in the idea of a liberal arts education? If so, it has been a latent concern now needing fuller voice.

**Stewardship as a Global Ethic**

Commentary by Haifa Jamal al-Lail

An educational model inspired by the concept of man as God’s steward (Khalifa) and trustee on earth (universal stewardship), and the principles it advocates to be relevant and meaningful to differing traditions and cultures of the world, is a most attractive proposition. Thus, higher education in the twenty-first century must aim at promoting and adopting these principles.

In proposing a globally acceptable foundation for twenty-first-century education—for the development of individuals, organizations, and communities that share mutually beneficial goals—we must consider how people from different parts of the world will accept, adopt, develop, and react to this concept. Being part of both Muslim and Middle Eastern communities allows me to foresee how this model is relevant and meaningful to this region, but also internationally. Addressing both issues will qualify this foresight, and help others understand the holistic approach we followed in constructing our model.

With regard to universal relevance, the design of the model addresses the fundamental needs and aspirations of all cultures in seeking to prepare every human being to become a responsible global citizen, and also a key player in universal stewardship. The aim is not merely to develop young people for the job market as technically competent in their chosen fields, but to ensure that they are fully aware of their role in their communities.
from the very beginning and fully prepared to meet challenges of positive engagement in a wider context with confidence, energy, understanding, and initiative.

Our model places responsibility for change and development on everyone, not just a select few, and stresses the need to analyze correctly, taking others into account, while responding to human aspirations. In my own religious tradition, the Prophet Mohammad (PBUH) said, “Each of you is a steward, and each of you is responsible for his or her stewardship.” This concept of individual accountability and responsibility is common to all major faiths, and is a major tool for positive change. In the light of current events in the Middle East, which includes the rise of youth voices, I believe this model will equip youths with the knowledge, skills, and dispositions needed to bring about positive transformation from within the systems, communities, and institutions to which they belong—all while seeking harmonious, responsible change for society, rather than disruption for its own sake.

Relevance and meaning demand balance in educational curricula. Scientific understanding must be balanced by wide cultural understanding of global and communal social issues. Equally, liberal studies, which appeal to the inner self, must include an understanding of key scientific principles. And communication skills are essential for all. This approach is vital to students in higher education, and it is equally vital in the vocational sphere. An understanding of the long-term purpose and context of study and the role one should play in society are fundamentally important to the holistic development of individuals and to the benefit of society as a whole.

In my opinion, the combination of these elements is what makes the model truly holistic, special, and viable.

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**Yes, but Is a Global Education Practical?**

*Commentary by Grant H. Cornwell*

I can imagine a fair question posed by trustees, students, their parents, and the publics to which we are accountable: is this education practical? That is, if we imagine a graduate going forth in the world with the knowledge, skills, and dispositions we describe, what are they equipped to do? How will they fare? How
will this education serve them in the world of work, and in pursuing a life of aspirations and obligations?

First, it is easy to notice that the education we describe is not vocational training. And while I will argue that it develops job skills in the most profound sense of that term, it is not an education designed to prepare students for particular careers. However, if you imagine the qualities and capabilities of graduates of this kind of education, and test them against the research into what employers most eagerly seek when hiring, graduates of this global education will not merely fare well, but will far excel in their readiness to be effective in contemporary careers.

According to the extensive study conducted by the Association of American Colleges and Universities, *Raising the Bar: Employers’ Views on College Learning in the Wake of the Economic Downturn,* employers seek to hire people with knowledge of human cultures and of the physical and natural world. More specifically, the study found that employers seek to hire graduates with knowledge of concepts and new developments in science and technology; the ability to understand the global context of situations and decisions as well as global issues and developments, and their implications for the future; and an understanding of the role of the United States in the world and of cultural diversity, both in America and in other countries. With regard to intellectual and practical skills, employers seek to hire those who have the ability to communicate effectively, orally and in writing; critical thinking and analytical reasoning skills; the ability to analyze and solve complex problems; teamwork skills and the ability to collaborate with others in diverse group settings; the ability to innovate and be creative; the ability to locate, organize, and evaluate information from multiple sources; and the ability to work with numbers and understand statistics. Finally, with regard to decision making and responsibility, employers seek those who have the ability to connect choices and actions to ethical decisions, who have a commitment to civic participation and community engagement, and who can apply knowledge and skills to real-world settings and problems. Against these benchmarks, the education we propose is more intentionally tuned to develop in graduates the qualities sought by employers than are most curricula in place today.

With all this said, we dramatically undershoot the mark if we reduce the idea of a practical education to career readiness. The kind of education we propose is practical in a much deeper sense; it is preparation for effective and responsible adult agency throughout a life engaged with the global realities we describe. Practical wisdom is the moral and intellectual wherewithal to live well, to prosper and thrive oneself, and, in so doing, to contribute to the prosperity and well-being of others. In this sense, a global education of the kind we describe is the most practical education possible in and for the world today.

To respond to this article, e-mail liberaled@aacu.org, with the authors’ names on the subject line.

NOTES
1. This definition of “scientific literacy” was developed by the Organization for Economic Cooperation and Development’s Program for International Student Assessment. The full text of the program’s “Definition and Selection of Competencies” can be found online at http://www.deseco.admin.ch.
Beyond Carrots and Sticks
Toward a Transformative Model of Division I Athletics

The old expression about the carrot and the stick, which refers to the application of reward and punishment to induce action, dates back to the days when pack mules were used for transportation. The mules would move toward carrots that dangled just ahead of them—and move all the faster because they feared drivers with sticks behind them. In 2012, a carrot-and-stick method of motivation is prevalent in National Collegiate Athletic Association (NCAA) Division I college sport. At many schools, marquee coaches chase the carrot of big-dollar salaries and short-term wins, and they work to avoid the stick of being fired for losing. Athletics directors are responsible for leading multi-million dollar units and are expected to generate revenue in order to build a budget and sports that win; if they fail, they too get the stick.

While there are philosophical and operational differences among various intercollegiate athletics programs, the race for resources and the industry’s evolution toward immediate return on investment are challenging institutions’ fundamental purpose of educating student-athletes. At Drake University, we confront the same sets of issues and mindsets, but we are working strategically to align the daily athletics focus with the core fundamentals of the university mission. We are focused on attracting athletically gifted students who desire excellence in academics and athletics. We understand our efforts to increase competitiveness in athletics to be rooted in efforts to ramp up learning experiences and outcomes in the classroom.

Our athletics program reflects the purpose of our university, which is to educate students in an environment that integrates liberal education with preparation for careers, by teaching student-athletes to become ethical leaders and responsible global citizens who are prepared for meaningful personal and professional lives. The athletics department is strategically and intentionally leveraging the power of Division I athletics to align with, and advance, the academic mission of the university. Athletics staff are partnering with faculty to create a culture of excellence that integrates athletics with the liberal arts curriculum—a culture where carrots and sticks are relegated to their proper roles as crunchy orange vegetables and small pieces of wood.

The dirt on carrots and sticks
In his bestselling book *Drive: The Surprising Truth About What Motivates Us*, Daniel Pink explains that performance based primarily on rewards and punishments can foster short-term thinking, encourage cheating and unethical behavior, and lead to poorer performance. Football and men’s basketball often shape the culture of a Division I athletics program on a campus. In those sports, head coaches draw salaries that rival the highest-paid faculty, and athletics departments rely on coaches’ success for millions of dollars to support the entire enterprise. As a result, some people will do almost anything to win. Penn State’s handling of the recent Jerry Sandusky case is the most recent example of this behavior. The outcome for student-athletes can be the polar opposite of what we hope to accomplish through Division I athletics and contrary to what our institutional missions promise to deliver for our students.

The role of intercollegiate athletics
At Drake, the intercollegiate athletics program brings what is perceived as “traditional” value to campus. It serves as a gathering place and source of pride for students and alumni, provides connection and entertainment for the community, brings media and television exposure, and generates revenue. Without sacrificing these outcomes, Drake is working to
Model of Division I Athletics
demonstrate that NCAA Division I athletics can and should be primarily focused on enriching the educational experience of student-athletes, and that it is possible to do this and still win. This effort started by discovering how athletics can serve as a direct, rather than peripheral, expression of the university’s mission. As a result, we intentionally integrated the athletic strategic plan with institutional strategic priorities for student learning, and we focused on the university mission as a guide. Drake’s goal for athletics is stated in the university’s 2008–2012 strategic plan as follows: “To transform intercollegiate athletics from an extracurricular to a cocurricular experience.” Our goal is to bring the fundamental purpose of intercollegiate athletics closer to the core of the academy. To that end, the university’s intercollegiate athletics strategic plan identifies ways in which student-athletes can push themselves academically, embrace the tenets of global citizenship, and develop as extraordinary leaders—all priorities identified in the institution’s overarching liberal arts–based academic strategy.

Academic theory suggests that our early initiatives are valuable not only for the enrichment of students, but also for the general health and well-being of the institution. In the article “Dealing with the Future Now: Principles for Creating a Vital Campus in a Climate of Restricted Resources,” Alan Guskin and Mary Marcy (2003) assert that “transformative actions” are necessary for universities to survive into the next generation. They suggest that universities ought to develop curricula around current student activities that make positive, significant contributions to student success. Intercollegiate athletics presents a unique experiential learning opportunity for student-athletes to know, understand, and develop themselves as world-class leaders. But first, we must create a new institutional view of intercollegiate athletics.

Rethinking athletics from an institutional perspective
As the early discussions regarding Drake’s development of a new paradigm for Division I intercollegiate athletics continued, the athletics department became one of the catalysts for pulling together campus efforts related to leadership learning. To develop an institutional definition for leadership and establish related learning outcomes, the provost’s office created Drake’s Council on Leadership Development. Every academic and cocurricular area on campus that touches leadership learning, including athletics, is represented on the council, which continues to meet monthly. In addition, as director of athletics, I sat on a faculty committee charged with developing an academic concentration in leadership, which includes experiential learning as a key requirement for completion. This academic program entered its second year in the fall of 2012.

Perhaps most remarkably, the athletics department is partnering with a faculty member (who is also currently a fellow in the academic affairs division) to create Coaching in the Classroom, a coach-faculty collaboration that will explore ways of using the team-building and accountability strategies employed by coaches in order to motivate active, engaged, and collaborative learning in the classroom. Coaching in the Classroom pairs coaches of the institution’s marquee programs with faculty in diverse academic programs.

The campus community has welcomed and embraced our new approach to college athletics. However, our experience has taught us that the transition to a new model can only happen when the people inside the athletics program think differently about their roles as instructors and embrace their leadership roles across campus.

Refining the strategic planning process
Preparing for significant change takes time and intentionality. Shifting the culture can be the most challenging part of the process. The first step is to help people start thinking differently.

At Drake, the entire athletics department staff read the book Raving Fans by Ken Blanchard and Sheldon Bowles in order to get everyone thinking about “who we are” as an athletics program and about whom we serve. Facilitated discussions ensued. We engaged consultants to help the department identify its core values and clarify its mission, help team members discover whom the department serves, and assist in both the articulation of the vision for athletics and the preparation of the strategic plan. In the
first draft of the intercollegiate athletics strategic plan, the vision was well captured and a plan was clearly outlined; however, we were overly aggressive in outlining our overarching goals. It became clear during the first year of implementation that too many goals had been articulated and that the focus needed to be reduced to one or two major, primary targets.

Subsequently, Drake Athletics’ senior management team spent a number of hours debating, arguing, and refining the five goal areas into just two to be completed by the end of fiscal year 2012–13: (1) to create a measurable culture of excellence, and (2) to establish a sustainable business model. The leadership team knew that these two goals must be implemented in order to realize its distinctive vision to be a competitive NCAA Division I intercollegiate athletics program that cultivates world-class leaders. We agreed that if we do not have a culture that promotes success, we can achieve only pockets of academic and athletic excellence, not overall programmatic excellence. Moreover, without a business model that supports the needs of the department and makes sense for Drake University, all our efforts will fail. Narrowing the scope of the strategic plan significantly helped the senior management team learn how to lead the transformational change.

A transformational model of sport
The athletics department is embracing sport as a platform for experiential-based leadership education for Drake’s student-athletes. The vision is to develop world-class leaders who are dedicated to stewardship of, and take responsibility for, the common good. Teaching leadership alongside Division I athletics is not new; however, Drake is taking a new approach. In addition to the academic study of leadership, our coaches—the strongest influencers of student-athlete behavior—will serve as core leadership educators in the classroom of sport.

We believe that ethical leadership starts with character development, and character is shaped through culture. Therefore, Drake Athletics is focusing significant human and financial resources to intentionally shape a defined culture of excellence and ethics that will produce more consistent and outstanding outcomes. At the core of the organizational culture is “The Bulldog Way,” our touchstone statement that is signed by all coaches, student-athletes, and staff and that defines how we will live out our organizational culture (see above).

More specifically, through a partnership with the Institute for Excellence and Ethics, a nonprofit organization based in upstate New York, we are working to establish an organizational culture that is measurable and to improve the consistency of results. Consequently, our organizational culture/leadership program, which is being implemented in two phases, has five major components: (1) education for coaches and integral support staff, (2) academic curriculum for student-athletes, (3) student-athlete experiential leadership learning through sport and in the community, (4) a student-athlete service requirement delivered to middle school children, and (5) an assessment process with measurable outcomes.

Phase one: In progress
Coaches/staff development. The coaching and key support staffs are essential to meaningful leadership learning for student-athletes. Each staff member engages in focused professional development and receives a custom “play book” to be used by all student-athletes, coaches, and staff as the foundation for our organizational culture. Athletics department officials share weekly updates, discussions, and examples of implementation. Additionally, all full-time staff and coaches participate in an annual two-day retreat.

Student-athlete curriculum. Student-athletes are oriented to the organizational culture and the leadership curriculum through Bulldog Foundations, a seminar program that is taught during a student-athlete’s first semester at Drake.
This program consists of a three-hour orientation session followed by four one-hour sessions every three weeks throughout the semester. Student-athletes are directed toward the academic leadership concentration designed for the general student population, Leadership Education and Development (LEAD). Students learn leadership theory and practices, and study how to intellectualize what they are learning about leadership through sport.

**Experiential Learning.** Experiential learning enhances student leadership education through sport for those student-athletes engaged in the LEAD concentration and through special projects. The Global Kilimanjaro Bowl, a historic trip undertaken by the Drake University football team in the summer of 2011, highlights the powerful impact of experiential learning. The “Kili Bowl” included athletic, service, and academic components: sixty-five student-athletes from Drake played (and won) the first-ever collegiate game of American-style football on African soil, worked with their on-field rivals from Mexico to build classrooms and orphanages in Tanzania, held football training clinics for hundreds of children, climbed to the summit of Mount Kilimanjaro, and completed an academic course on leadership titled “Leading with Emotional Intelligence.” How often does an institution leverage the power of sport to give students a chance to engage in international service, to climb a nineteen-thousand-foot mountain, and teach a new sport to children in a developing country? It’s just these types of life-changing experiences that we pursue—at home and abroad—to help our students become ethical leaders and responsible global citizens.

**Service requirement.** In the community service–driven curricular program, Seeds of Success, student-athletes are being trained to take habits of excellence, leadership, and performance as well as core values, ethics, and moral and character development into middle school classrooms. For the training component of this program, student-athletes visit classrooms for four sessions throughout a semester. Seeds of Success is beneficial to our student-athletes and to Iowa’s middle school students. Preparing for and teaching in the program encourages the student-athlete to engage with and absorb leadership concepts. Our students also learn to harness the credibility afforded them by their athletic jersey in order to teach young people lessons they might not otherwise be receptive to learning. The success of the program, which was created in collaboration with the Drake-based nonprofit Character Counts in Iowa, hinges on strong collaboration with classroom teachers as well as a supplementary follow-up curriculum.

**Assessment.** The Institute for Excellence and Ethics has created the Bulldog Index of Conditions for Excellence and Performance (BICEP), which combines several performance indicators into an aggregate score for benchmarking overall conditions for excellence in school, sport, and beyond. The BICEP combines several performance indicators together into a single score for each team, which, in turn, is combined to determine an overall BICEP score for the athletics department. Those performance indicators include: individual and team culture, which is evaluated through a student-athlete and coach survey; academic performance, as demonstrated by semester and cumulative grade point averages; team performance, which is indicated by finish in the conference (the departmental goal is to have each team competing in the top third of their respective conference); student eligibility and retention, which is determined using the NCAA Academic Performance Rate; and program resources and support, a measure of organizational resources and support dedicated to a program as measured by budget, facilities, and coaching support as compared to programs within the department, across the conference, and other appropriate comparisons.

**Phase two: On the horizon**

In phase one, we have begun to see a program-wide shift in behavior and a separation from the traditional indicators of success within our Division I athletics. As we move into phase two, we are exploring the development of a certificate program, A Champion for a Better World. This citizen-athlete program is being designed to supplement a student’s central program of study by maximizing the cocurricular varsity athletics experience.
Undergraduate student-athletes from any school or college will be encouraged to apply. The purposes are to provide students with

- a combination of concentrated study, personal experience, and reflection that will inform their understanding of sport and its power to influence local and global communities;
- the leadership skills that will enable them to use sport as a platform to unite people and improve the condition of populations through sport participation.

These elements reinforce the liberal education expectations Drake places on all its students. Upon completion, student-athletes will receive a certificate. During the 2012–13 academic year, the athletics department will explore moving this program to an academic unit in order to ensure its academic rigor and to enable us to seek approval for a notation on the academic transcript acknowledging successful completion of the program.

**Benchmarks for success:**

**Beyond wins and losses**

From a qualitative standpoint, this new model of integration will be deemed a success when student-athletes perceive the value of their athletic experience as a significant component of their curricular education. As the paradigm for integration shifts, student-athletes will recognize that their athletic involvement parallels the classroom experience; they will understand that the valuable knowledge, skills, and practice gained through the sporting experience significantly contribute to their professional preparation and promote meaningful personal lives. Student-athletes will recognize these powerful leadership and life lessons through sport when coaches view themselves as master teachers.

When the Drake model is successful, student-athletes will graduate with meaningful and competitive degrees, and they will have intellectualized important leadership lessons from their sport experience. Student-athletes will understand the leadership, analytical, critical-thinking, and teamwork skills they have developed through their experiences within both our intentional culture of excellence and ethics and the corresponding curriculum. This understanding, coupled with a championship-level athletic experience, will ensure that Drake student-athletes become some of the most highly sought graduates in the nation.

As administrators, we are also looking beyond anecdotal outcomes to identify measurable indicators for the development of our “culture of ethics and excellence.” The BICEP assessment tool described above provides a new way of evaluating programmatic success for Division I athletics. The 2011–12 academic year was the first year of data collection. Although only partial data were available last year while we developed the tool, we were pleased to learn that the tool is going to provide appropriate evaluation feedback. Our consultant from the Institute for Excellence and Ethics is now working directly with Drake’s office for institutional assessment, and we are excited about collecting our first full year of data in 2012–13.

**Conclusion**

If it is human nature to be motivated by carrots and sticks—by rewards and punishments—then we must strive for the reward of enriching our student-athletes’ learning experiences and fear the consequences of focusing too much on revenue and win-loss records. At institutions committed to providing a liberal education, with an emphasis on interdisciplinary study and lifelong learning, athletics programs can and should be key partners in helping students reach the hallmarks of a liberal arts experience. Significant change will only occur and be sustained, however, if it is clearly aligned with the values and mission of an institution, and if the athletics program is implemented strategically with broad engagement and accountability. Otherwise, we risk being regarded merely as pack mules.

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**REFERENCES**


Reforming General Education

Three Reasons to Make Writing Across the Curriculum Part of the Conversation

However much we may recognize that writing is best taught not just in the first year and not just by English instructors, but across all four years and in all departments, we all know the reasons why it’s tempting to leave writing across the curriculum out of our conversations about general education reform: People outside of the English department worry that they might be forced to do someone else’s job; people in the English department aren’t sure they trust their colleagues to teach writing. It’s too controversial and could doom the entire general education model. It would be better just to leave it alone, to shove it aside in order to deal with more important issues.

Fair enough. Changing a curriculum is already stressful enough without finding new ways to create anxiety, discontent, and rancor. And yet . . .

What follows are three reasons why—all political instincts to the contrary—it’s probably better to fold conversations about writing across the curriculum into the larger debate about general education models, scaffolding, institutional support, and student needs. While this short essay addresses oral communication across the curriculum and quantitative reasoning across the curriculum only in passing, it’s safe to say that much of what applies to writing applies to these areas as well.

Reason #1: Writing is a complex skill
Because writing is not, like spoken language, a biological imperative, psychologist Ronald T. Kellogg argues that learning to construct “an effective extended text” is akin to becoming a chess master or a concert violinist. “The very best violinists, for example, have accumulated more than 10,000 hours in solitary practice, whereas lesser experts (7,500 hours), least accomplished experts (5,000), and amateurs (1,500) have devoted proportionally less time to self-improvement” (2008, 3). Needless to say, very few students arrive at college with 1,500 hours of highly motivated individual practice in writing under their belts, much less 10,000 hours. And needless to say, thirty-nine hours of first-year writing, while helpful, likely won’t be enough to give students the amount of practice they’ll need to satisfy their second-, third-, and fourth-year instructors. What writing across the curriculum recognizes, then, is that students need more practice and more instruction in composition in order to become the writers we want them to be. Indeed, given that employers regularly cite writing (along with oral communication) as the top skill they look for in employees (Hart Research Associates 2010), and that most of our students were raised in the age of Twitter and Facebook, where an “extended argument” equals all of 140 characters, an emphasis on developing writing skills has become all the more important.

Acknowledging these realities, though, is not just beneficial for students. It’s also valuable for institutions involved in broader curricular conversations, for implicit in Kellogg’s data is the recognition that learning takes time and that teaching must be deliberate. Put another way, this isn’t just about writing. Discussion of writing across the curriculum reminds us that all teaching must meet students where they are and bring them to where we want them to be.
Bemoaning how ill-prepared this or that cohort is in this or that area becomes irrelevant. Similarly, telling students “You had this last year! You should know this!” is beside the point: exposure to an idea or skill is not the same thing as learning that idea or skill. If students are to learn, if they are to acquire the skills they’ll need to succeed in a complex world, all of us will have to share the responsibility for teaching them key content and skills—not just once, but multiple times and at increasing levels of complexity.

**Reason #2: Different fields define “good writing” differently**

A few years ago, we asked a number of the candidates for a position in the English department to give “job talks” that were open to the entire campus. After one of these, a friend of mine from the biology department came over to me, horrified by one of the applicants. “Did you see that?” she said. “He read his whole talk! Not just from notes—he read it!” It was one of those moments that sharpened my awareness of the potential disconnects between fields, particularly in matters of literacy. What my colleagues saw as grievous sin, I saw as . . . well, someone who’d carefully constructed an argument and wanted to make sure he got it right by following his text very closely.

The fact is that when it comes to writing (and speaking and quantitative reasoning),
various fields value different things. Our history department, for instance, is insistent that students avoid the passive voice at all times, at all costs. Coming from English and writing, I see no particular harm in the practice, as long as it’s not overdone. Our computer scientists and philosophers tend to value very precise writing, while other fields recognize that sometimes complex truths require a more loquacious approach. Moreover, what one field views as an appropriate thesis is not what another field values—indeed, for some types of writing in some kinds of fields, the concept of the thesis is irrelevant. Similarly, what does and doesn’t qualify as appropriate evidence changes from discipline to discipline, field to field, and even course to course. Even if a student does very well in a fourteen- or sixteen-week writing course, he or she is no more prepared to do the sorts of advanced writing in, say, chemistry or economics than a student who passed a generic foreign language course would be to speak Russian.

The writing-across-the-curriculum approach recognizes the varieties of discourse and discourse expectations students will be exposed to, both during their time at college and once they’re in the workplace. Through participation in a writing-across-the-curriculum program, faculty are made aware that we can’t assume our students understand the particular writing practices of our own fields. As a result, we’re forced to be more deliberate about teaching writing, not just assigning it.

Here again, the point is not just that writing across the curriculum is good for students once a new curriculum is in place. Discussion of across-the-curriculum programs is in itself valuable for faculty, even while a particular general education model is under consideration. In such discussions, we foreground the ways in which our fields and disciplines do or don’t connect with one another as well as how they do or don’t overlap in terms of their values, their methodologies, their ways of constructing meaning and truth. As an increasing number of colleges and universities adopt more “integrative” models of liberal education, these kinds of interdisciplinary conversations among faculty are crucial. How can we prepare our students to meet the challenges of another field or discipline if we ourselves aren’t familiar with these fields and disciplines or how they operate? And if we can’t prepare our students for challenges they’ll face in other classes, how can we prepare them for challenges they’ll face as citizens in a rapidly changing world?

**Reason #3: Writing is critical thinking**

When I ask faculty or administrators what they want from a new curriculum, it’s not uncommon for them to say, “I want my students to become better critical thinkers.” This is an excellent answer, of course. The only problem is with that word “thinker.” Since thinking is an internal action, we can’t actually tell when it’s going on. Sure, every once in a while one of our students will have one of those “aha!” moments that are so strong, everyone in the room knows what’s happened. And certainly we can gaze around the room in the midst of a lecture or discussion and get a sense that some of our students are deep in thought—thoughts about what, we’re not entirely sure.

Properly engaged—that is, designed and supported effectively by the instructor—writing becomes evidence of critical thinking on the part of students. Chris Anson (2002, x) perhaps states it best: “As writers formulate thoughts into written propositions, their emerging texts loop back into their own thinking. Words written become words reconsidered, ideas put to new tests. Gaps in information appear, revealing the need for further learning. Accumulated knowledge takes on the voice of authority, creating in the writers a new sense of expertise.” Writing, then, is more than the communication of perfectly formed thoughts—or, as is sometimes the case, poorly formed thoughts. Rather, it’s a visible means of testing our ideas. As we put a thought or concept down on paper, we’re able to see whether our thinking “makes sense,” whether what sounded so good in the dim abstract of our minds actually survives in the light of day. More than once I’ve had the experience of searching for a passage to support my argument, only to find that, once I’d put it in on the page, it didn’t in any way prove my point.
And most academics, I've no doubt, have had the experience of watching a writing project evolve beyond our outlines in ways we hadn't anticipated, largely because we're watching our words, following our logic, and testing our ideas to see whether they're sound. As one of my graduate advisors said years ago, “If your dissertation ends up looking exactly like your prospectus, you’re probably not paying attention.”

The same is true of quantitative reasoning. The numbers on the page, the calculations, and the rationales are more than just a tracing of thought. They're a challenge to thought, an attempt to see whether our hypotheses are correct and whether our methods worked or not. And though students in the midst of a formal oral presentation generally can't pause to reconsider the veracity and logic of their spoken words, they certainly can do so as they draft, practice, and revise their presentations ahead of time.

Implicit in all of this is the idea that any well-designed program to develop students' writing or oral communication or quantitative reasoning skills across the curriculum entails more than just assigning writing or oral communication or quantitative reasoning in more places. First of all, the kinds of projects we ask students to complete will change. Papers that ask for a summary of another's point or for a simple description or narrative will perhaps be replaced by assignments requiring more synthesis, more evaluation, and more analysis. Indeed, perhaps even the traditional “pick a topic of your choice and research it” essay will become a thing of the past. Second, because we’re asking our students to use writing, quantitative reasoning, or oral communication more as a tool to aid complex thinking, we’ll need to be more thoughtful about using smaller assignments, homework, and class time to provide students with needed practice in using the skills associated with the forms of critical thinking we value.

Which means that, again, contemplation of writing (or quantitative reasoning, or oral communication) across the curriculum shouldn’t be shoved aside during efforts to reform general education. Indeed, what I’ve been discussing here is essential to making general education reform effective. In the end, if we’re to provide a truly integrated liberal education, we must not only change our curricula—the courses we offer—but we must also change what we do in the classroom, the kinds of papers and assignments and labs and projects we assign, and the kinds of test questions we ask. Only then will we really reshape the way our colleges and universities prepare students for the challenges of a changing world.

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Since March of 2009, the Utah System of Higher Education has been a partner with the Lumina Foundation for Education in the Tuning USA project, Lumina’s first experiment in introducing the European concept of degree “tuning” to American academia. Developed in the European Union as a way to create common degree standards across multiple nations, “tuning” is a methodology whereby subject-area teams develop criterion-referenced learning outcomes and competencies for particular degrees. It is a faculty-led approach that involves seeking input from students, recent graduates, and employers in order to create a common understanding of what students should know, understand, and be able to do when they finish each level of a disciplinary degree program.

Tuning arrived in Utah at an opportune time for us. We had already been engaged in system-wide faculty dialogues that we call “majors’ meetings” and in an annual conference, known for the past fourteen years as “What is an Educated Person?,” that concentrates on general education outcomes and assessment. Moreover, having worked closely with the Association of American Colleges and Universities through its Liberal Education and America’s Promise (LEAP) initiative, Utah was becoming a “LEAP State.” All of Utah’s colleges had adopted the LEAP Essential Learning Outcomes, and the Utah System of Higher Education had been actively promoting access and authentic assessment. Consequently, when Lumina invited us to participate in a faculty-driven process of defining degree outcomes, it made perfect sense to us. We already had developed many of the mechanisms needed for tuning; and the general education task force was an established voice on all our campuses—so we knew who to call to get things done. We were ready to work toward tuned degree profiles.

At the core of successful degree tuning are three considerations that make every experience unique. I think of them as visions, trust, and mechanics. If these three are not attended to, you cannot successfully tune. And although tuning may go a long way in one or two areas, unless the three are brought into tune with one another, it will not be possible to complete the process.

Visions
What do I mean by “visions”? I mean the metaphysics of the process—the “why” of tuning. For thirty years, I have been engaged in conversations about higher education reform and assessment, and I have seen most attempts fail because they impose a “why” that means nothing to the faculty in the classroom. They do not invite disciplinary faculty into a conversation that allows them to voice their own values. Faculty in all disciplines have professional values, and they have ways of teaching and assessing those values that they can articulate. But too often, externally imposed reforms and assessments fail to link to the “why” of faculty efforts. This is why tuning has such promise. It takes seriously the professional values of disciplines and disciplinary communities.

By professional values of disciplines, I mean those parts of professional self-understanding created by indoctrination (used in its classical sense) into the academic field. Adherence to these values marks one as a member of the
discipline and guides one’s practices. After years of doctoral training, one literally become a
disciple, one who follows the discipline. For instance, as historians, my colleagues and I
do not believe in tests that do not include written analyses of primary documents. We
are fierce in our commitment to careful documenta-
tion, despising presentists, antiquarians, politicians, and movie makers who distort
and abuse historical evidence. We are generally suspicious of theories, and we do not trust
a priori hypothesizing. We believe in the power of jargon-free writing. In short, we know what
we value, and we have a centuries-old tradition of evaluation. Any system of assessment that
ignores our vision of our professional responsibility will fail because we will dismiss it as
untrustworthy and as an enemy of our professional mission.

Tuning asks disciplines to identify their larger
communities and find a common language for
the outcomes of the discipline. These com-
munities are made up, most obviously, of the
people inducted into the discipline by taking
a degree in it. We call them alumni. A proper-
ly indoctrinated major is a credit to the
department that shaped her and an asset to
her employer. The vision of her employers is
also formed by, and helps form, disciplinary
values. The external disciplinary community
includes the workplaces in which people
prepared in particular disciplines find work,
since those employers often share the vision
of the discipline held by the faculty and grad-
uates. They seek to hire graduates because of
their disciplinary preparation.

Envisioning these disciplinary communities is important, and there is a great danger
in too simplistic a notion. Some disciplines
have presumed obvious employers. Whole
disciplines have been named after employers—
accounting trains accountants to be hired by
accounting firms—or so the simplistic logic runs.
But even in these, the alumni upset the cal-
culation with their behavior. And in many
disciplines the uses of the alumni skill set
create a very broad, even generic, community
of employers. History represents one of these
disciplines, with so many employers that
imagination is required to identify the disci-
plinary communities. Of course, there are
obvious employers—schools, libraries, museums,
publishers, and others—but there are many
less obvious ones, such as those that need
researchers, analysts, and writers but do not have jobs with “history” in the title. And then there are the others: graduate schools, law schools, medical schools, business schools, and, importantly, the self-employed. Nor should we forget that there are public consumers of history who depend on historians to tell them the truth about the past in all sorts of venues for all sorts of public purposes. This is one of the important lessons of tuning. There are shared visions and values that transcend academic boxes and can inform the way we think about disciplinary degrees.

The tuning process creates the opportunity to identify the members of these disciplinary communities and to express the vision inherent in degree preparation on both the philosophical and the practical levels, expressing these as outcomes that can be measured according to the values of the discipline in ways that are acceptable within the disciplinary community. For those disciplines that do not have obvious constituencies, it is more difficult to determine the values of the disciplinary community. Early attempts at using surveys to learn about employers' desires and understandings taught us that surveys are very poor instruments. It is much more effective to convene professionally mediated focus groups that can explore the usefulness of the outcomes in settings that allow probing discussions. Focus groups are not cheap, but they are very effective—even to the point of being cost-effective.

If we listen to the community of the discipline, the outcomes of a degree quickly become visible. If the articulated outcomes have these people nodding their heads in agreement, you know that you have captured the visions of a group that wants what the discipline teaches.

Trust
We learn the vision by listening to the faculty and the disciplinary constituencies, but that only generates warm feelings amongst the people who have reconfirmed their self-image. If tuning is to begin and succeed, we have to pay attention to the trust necessary to get it off the ground. What do I mean by “trust”? I mean that the discussion of outcomes, their formulation, and their enactment must be valued and supported by academic leadership. The disciplinary faculty must trust that their leaders value and will support the effort tuning requires. The faculty must be heard, and their vision must be allowed, even if it seems contrary to institutional habits. In tuning, we have to understand the politics of the process, identifying the people and organizations that have the power to convince the faculty that they will not be harmed if they articulate their values and base their assessments upon them.

Think of the arguments faculty members are likely to make when asked to undertake any assessment process. Experienced academic leaders can name several instantly, many turning around the fear that efforts to identify the outcomes of a degree and assess its success are tools of the evil upper administration/politicians/pundits/lazy students to punish the faculty and increase its work load. If we make obvious what we do, and if we discover we don’t always succeed in doing it, faculty members say, terrible things are likely to happen. The department may be denied funds or have faculty lines taken away, or teaching loads may be increased. Worst of all, external actors who do not understand or value the discipline may interfere with the faculty's duty to its profession. After all, it is not just laziness that prompts historians to resist lecture sections enrolling hundreds. It is because their professional values tell them that they must make students write, and you cannot require and assess writing in classes that large. If you ask faculty to betray their profession, they demur.

Moreover, most assessment systems do not care about content, yet content is at the heart of professional preparation. Institutions are even more uninterested in content. The American system of higher education runs on credit hours, facilely accepting the credit unit as the measure of achievement. We all can do the sums. Accumulate 120 hours and you should have a degree. If students don’t have a degree in 120 hours, the institution has failed to be efficient. Sixty hours should provide you with an associate’s degree; general education can be met in thirty, or forty, or fifty hours, but should be “completed” so it can transfer whole. A major is much the same, a checklist of courses that add up to a specified number of credits. But if you ask whether the outcomes of the degree are met, it undermines this beautiful, Henry Ford–inspired system. Mr. Ford knew you could use an assembly line to speed up production, with each worker performing a particular task and then passing it to the next worker. Carefully planned, the
production line supplied parts when needed, and they were assembled with a clear outcome. At the end of the line, the car was driven away.

We in academia have pretended for the past century that degrees are like Fords. We accept that once a particular part—call it Math 1050 or English 2010—is installed, it will always work well when the next part is installed, even after years of rust. A conversation about degree outcomes has the potential to highlight the untenable nature of this assumption. What if the disciplinary outcomes make changes to the curriculum necessary? A discipline that announces that its outcomes require more hours, a tighter curriculum, increased time to graduation, decreased accessibility, and even more students rejected for graduation, justly fears retribution. Faculty members recognize that too much honesty can endanger their departments, and that the administrations of their institutions are likely to reject their professional values if they propose major changes. They have to have permission, trusted permission, from their academic managers if tuning is to be taken seriously.

But even if they trust their dean to understand their deep commitment to professional outcomes, an individual department can seldom do it alone. There are other academic masters larger than a single institution that must be supportive of the effort. Tuning requires a conversation about outcomes that includes many institutions. In Utah, we focused...
on two disciplines, history and physics, across the state’s system of higher education, including all history and physics programs—from the research universities with large specialized faculties, to community colleges with one or two people in the discipline. This is essential because it gives a discipline the right to think as a discipline, rather than as a department subject to the local pressures of particular institutions. After all, differences in mission, enrollment demographics, and attitudes can undermine the right of the disciplinary faculty to enact their professional values. When multiple institutions stand together, their degrees articulate better, and their professional outcomes are easier to impose. But there is the danger that the local administration will reject the implementation of professional outcomes if they cost money, or if they introduce complications in the larger curriculum. That is why systems have to stand together; no individual department is exposed to the charge of having capriciously high expectations.

However, this protection from local resistance can still fail if the larger structures do not grant permission to impose the outcomes. The system has to express its support for the effort. The least it can do is to express its expectation that the outcomes developed in tuning will be used in the system.

A discipline standing together and blessed by the system in which it is embedded is powerful, but professional organizations, professional accreditors, and regional accreditors must be recognized as having authority over the future of the outcomes. From the beginning of the tuning process, disciplines need to look at the values of their own professional organizations. There is seldom a difference in their visions, but their ways of measuring outcomes may make tuning difficult. Regional accreditors present a different sort of problem, since their assessment requirements do not necessarily make the use of degree outcomes easy.

Of course, the ultimate expression of trust is reward. To prove that the effort is valued, investment can send a strong message. Tangible rewards can create trust.

There are other benefits of tuning, too. We have learned that one of the largest payoffs can be in faculty morale. A discipline that tunes enjoys an increased sense of identity and purpose. It may also find it easier to wrestle with the monsters of assessment—but only if the mechanics of academic change are understood and incorporated into the assessment process.

**Mechanics**

Even if disciplines and administrations are willing to tune, there still remains another consideration. The mechanics of the process of curricular development are local and systemic. By "mechanics," I mean the processes of implementation within institutions and systems. Before a discipline begins to tune, it has to think about what it can achieve within its own institutional structures. In particular, it and its upper administration must be very aware of how a discipline nestles within the larger curriculum. Tuning a discipline has implications across the curriculum.

Built into tuning is the concept of levels, benchmarks of performance at various points in the discipline. Obviously, one level is the bachelor’s degree. Another is the master’s degree, and a third is the doctorate. Tuning expects disciplines to indicate what accomplishments accompany each level. In the American system, however, there is yet another level, the point when students move from the general curriculum into the upper division of a discipline. This is sometimes indicated by the awarding of an associate’s degree, but it always marks the beginning of upper-division work in the major, the point at which a student is truly the responsibility of a disciplinary team in a bachelor’s degree–granting institution.

To tune successfully, it is crucial that the discipline knows what students entering the major...
should know, understand, and be able to do.

In the American world of transferring students, online courses, and concurrent enrollment in high school and college, the major must say, “When you enter this major, you must have accomplished the following.” If it does that, it knows where it starts in preparing students for the next level. If it does not, it sends the message that no preparation is necessary to be an advanced student. But when a discipline builds this starting point into its curriculum, it is also saying to the rest of the university, “This is what makes our major what it is.” In the process, it should be telling the student that there are courses that should be taken outside the discipline in preparation for success in the major.

For instance, the history department at Utah State University created a pre-major as a result of tuning. A student who undertakes the pre-major in history is told that certain lower-division history courses must be taken, that statistics are preferred to pre-calculus algebra, that philosophy and anthropology are subjects with which a history major must be familiar, and that two years of a single language are part of the preparatory education for the major. The history major is making use of courses taught by other departments, shaping the general education of its majors in ways that prepare students for successful achievement of history's outcomes. An important partner with the history department is the university library. The information literacy specialists there have become part of the larger team working with our students. The history outcomes place heavy emphasis on research and the evaluation of evidence, and we have found that librarians working with particular courses can greatly improve student mastery of research skills.

A tuned discipline also regards its students as partners. It makes its outcomes clear to the students and invites them to track their own progress toward their degree outcomes. At the same time, it gives them a vocabulary for talking about how and why they are expected to know, understand, and be able to do things associated with the major. Important allies in developing intentional student behavior in degree programs are the academic advising and career advising staffs. Tuning gives them a clearer understanding of the discipline, and they can then help the major deliver a unified message to the students. We owe it to students not only to expand their knowledge, thinking, and skills. We must also expand their very vocabulary. What words do students use to describe their own experience in a major, a college, a university? How do they answer the question that comes to them from skeptical parents and even more cynical employers: What did you learn? What practical use does your course work have? What are the skills associated with your degree?

A tuned discipline with clear outcomes, rubrics for measurement, reformed delivery, effective advising, and intentional students can solve many of the mechanical problems. But there are implications for others beyond the particular discipline. Curricula do not exist in vacuums. If four hundred history majors are suddenly clamoring for the same philosophy course, the philosophy department may have a staffing problem and history may have a time-to-degree crisis. Worse, since disciplines are tuned across systems, changed expectations in one discipline may make difficulties for other disciplines. For example, in Utah the physicists decided to add a lab to a course required by the engineers. The physicists were happy, but the engineers were upset because physics had added two credits to their students’ curricula without consultation. That lab might lengthen the time-to-graduation for engineers.

Paying attention to the mechanics of curricular relationships can be extremely beneficial, since as disciplines tune they more or less drag their colleges with them. Making more effective use of the larger curriculum creates greater efficiency, and ties general education more tightly to the major. It also opens up conversations with sister institutions and feeder schools, making transfer and articulation easier.

In the best cases, tuning can be applied to whole colleges. At Utah State, the College of Humanities and Social Sciences is creating a faculty-driven core so that students tracking toward the humanities or social sciences have a much tighter common curriculum. This curriculum is being designed, using tuning methods, to ensure that students in those fields have common literacy and skills, functioning as a springboard into the majors. The majors,
of course, get the benefit of knowing what their students should know, understand, and be able to do and can plan the curriculum accordingly. The core delivers a student to the major with appropriate preparation so the major can take him or her efficiently to bachelor’s degree level.

Levels for entry into the major raise another question: the level for college entry. What must a student know, understand, and be able to do in order to succeed in college? This question is usually answered by a vague reference to a standardized test score and a minimum grade point average, but tuning confronts the faculty with the question of whether they are teaching at the level of student preparation. Or, to put it another way, are they at the students’ “level”? Asking this question opens a Pandora’s box of issues about K-12 preparation and the design of freshman courses, but it also allows colleges to explain to high schools what successful preparation looks like and to invite change.

The mechanics of change require the disciplinary faculty to identify their “level constituencies” and to at least adapt to the limitations those impose. At best, tuning allows a fruitful negotiation that improves student preparation.

As American K-12 systems adopt the new core standards approach, it is important for colleges to articulate their understanding of levels and to work with the K-12 people to maximize the benefits of new curricula for students. One of the important unintended consequences of tuning is the value of the process to general education. If disciplines can articulate their needs, they can articulate the relationship of the discipline to the broader curriculum. In tuning the bachelor’s degree in history at Utah State, for example, it was possible to decrease the number of upper-division courses required when it was realized that better preparation for entry to the program meant that some things did not have to be taught by the department.

However, institutional choices about general education can also severely limit the attempt to impose a beginning level on a degree. If, for instance, the general education curriculum permits a very limited number of choices, the tuned discipline may have to add courses that in other cases would have done double duty in general education and the discipline. If philosophy is not a general education choice and history thinks it necessary, history students will need to take the accepted humanities course for the institution as well as the philosophy course for the history degree. Consequently, the tuned discipline may discover that it needs to increase the preparation provided in the major if it cannot find help in the broader curriculum.

Once all of this negotiating has been done, there are still three mechanical issues facing a tuned discipline: implementation of the outcomes, measurement of their achievement and impact, and faculty preparation. Implementation is a completely local issue for most disciplines, so suffice it to say that tuning must be aided by people who understand how curricular change is carried out bureaucratically. It also must have political support from the upper administration. It may take no time at all, or it may take a year or two before the tuned curriculum is in place.

Many disciplines have outcomes on paper. The difference between the stated outcomes and real effectiveness in disciplines is the way in which outcomes are measured and the conversations the measurements spark. There is no simple way to assess outcomes in tuned disciplines. In our experience, the most effective method is the use of rubrics, containing criteria and standards for measuring individual performance, tied to key moments in the degree program. Utah State’s history department has a rubric for the capstone course taken by students completing the bachelor’s degree. That rubric has also become a part of initiation into the major, appearing first in the entry course to the major. Upper-division courses frequently refer to it, as a way to tell
the students how a particular course is preparing them for the capstone. Papers written in the capstone course can be compared and rated, to discover whether students are achieving the established outcomes. Of course, it takes several years to gather enough data to be sure that the outcomes are truly being met and to know the real effect of tuning.

In the short term, the more effective assessment is qualitative research based on interviews with faculty and students. From those, we know that both teachers and students have benefited from clear outcomes. Courses are easier to plan (or at least they are planned with new insights as to their goals), and students have a much better sense of the purpose of the degree and the things they are expected to understand, know, and do.

Inherent in the tuning process is the larger community of the discipline, so any assessment of its effectiveness should continue to involve the alumni, employers, and other groups invited into the initial conversation. It should also involve university staff who help prepare students to meet the outcomes, such as librarians who teach information literacy.

The creation of the outcomes and the use of the rubrics are the result of faculty discussions, but the energy produced by that burst of disciplinary enthusiasm has to be sustained. There need to be mechanisms for both renewing the discussion about the outcomes and for socializing newcomers into their use. New faculty must be introduced to the outcomes and the rubrics and be expected to use them—but that expectation has to be linked to more discussion. Only if new faculty members catch the vision behind the outcomes will the discipline maintain the coherence established by them. New courses have to address the outcome goals, and they need to make use of the rubrics that create a coherent system of preparation for students.

This intentionality creates problems for the use of adjuncts. Departments that depend heavily on contingent faculty may find the recognition and adoption of outcomes in the classroom a difficult thing. Most professionals will share the values inherent in the outcomes, but adjuncts must be trained to understand and use the outcomes and rubrics in their teaching if the department’s courses are to work together toward the desired end. This is another reason why it is necessary to tune by systems, rather than individual institutions. Then adjuncts can teach the same course in several places and know that there are common goals—if they are taught to understand and use them!

Certainly, because clear expectations of outcomes force educators to think about degrees more coherently, tuning challenges some managerial practices common in American colleges. Like Henry Ford, degree-granting disciplines that have tuned know what the end product should look like when it rolls off the assembly line. But knowing that and making it work require a great deal of discussion by the disciplinary faculties, strong support from administrators, and deep awareness of institutional contexts. This means that faculties engaged in tuning must be accompanied on their journey by leaders and systems that are open to the change tuning engenders. If they are, exciting change can be achieved.

To respond to this article, e-mail liberaled@aacu.org, with the author’s name on the subject line.

From Jossey-Bass

Creating Interdisciplinary Campus Cultures: A Model for Strength and Sustainability
By Julie Thompson Klein
With a Foreword by Carol Geary Schneider

Sponsored by the Association of American Colleges and Universities, this unique resource is the only book focused on creating and sustaining institutional support for interdisciplinary work. Since an interdisciplinary culture is of increasing importance in higher education, this book gives administrators and faculty the tools they need to ensure their work is successful and sustainable.

Available online at www.josseybass.com.
I have been reminiscing lately, probably a sign of my age, but I came to recall an episode in my earlier life before I returned to St. John’s College as its president more than twenty years ago, when my second son announced: “Dad, I’m willing to talk with you about my college choices, but I’m not going to go to that school where my brother is (St. John’s College), and I don’t want a liberal education, whatever that is.”

This son happened to have an interest in automobiles, his uncle happened to be an automobile mechanic, and we happened to have an old junker in the driveway, a 1960-something Volkswagen bug. Almost nothing worked in the car; it wouldn’t go, and my wife and her brother were working to get the car to perform its principal purpose—going. My brother-in-law saw an opportunity to engage my uninterested son when he discovered that the windshield wipers weren’t working and asked my son to give him a hand.

“What would you do to fix this?” he asked.
“I’d get the manual out and see what it says,” my son responded.
“But there is no manual. What then?”
“Then I’d ask the guy at the repair shop.”
“But he’s not here, and we can’t get the car there. Do you think we can figure it out for ourselves?
“But I don’t know anything,” my son answered.
“Ah, that’s the thing. Let’s see if that’s true.”

Uncle Ken then opened the hood and asked my son to see if he could find the fluid lines to the wipers and discover what powered the wipers to move in the first place. Could he figure out where the wiper fluid tank was, and could he tell whether there was any fluid in the tank? My son found the tank, and it was full. He tested the line as best he could to determine that it wasn’t clogged. But there was another line leading to somewhere else.

“Can you see where the other line goes beneath the hood? Can you track that back to its origin?”

Long story short: after an hour of looking, testing, failing, trying again, failing again, and thinking out loud (“I wonder if this might work”), my son got fired up and excited. In the end, he discovered that the hose to the wipers was hooked up to the pressure valve of the spare tire, and lo and behold, the spare tire was flat.

“You think the spare tire supplied the pressure to power the wiper?” my son asked.
“Well, let’s see.” With that, my son pumped up the spare tire. Back in the driver’s seat, he started the car, and the windshield wipers worked beautifully.

Every challenge in life provides us with learning opportunities that can be liberating, if we open ourselves to the possibility and apply ourselves to the search for an answer.

Christopher B. Nelson is president of St. John’s College in Annapolis, Maryland.
seat, he moved the controls on the dashboard, and the wipers worked. I’ll never forget the glow on my son’s face when he announced, “I got it! The wipers are working!”

“You have now had an experience in liberal education,” I suggested to ears that were still deaf to the idea—ears that would be open to it a few years later. (This son did eventually find his way to St. John’s in our master’s degree program.)

Liberation

I doubt that Volkswagens are built these days to provide such simple opportunities for basic learning by seeing and doing, but every challenge in life provides us with learning opportunities that can be just as liberating, without recourse to manuals, without seasoned experts, if we open ourselves to the possibility and apply ourselves to the search for an answer.

Why do I call this experience liberating? Because the learner (my son) had to make do without the manual or the expert. Liberated from the direction and expertise of others, he was reduced to rely on himself with only a little encouragement from his tutor uncle. He was led to find for himself the answer to the problem by a series of questions alone. The turning point was his willingness to continue the search for an answer only after acknowledging, “But I don’t know anything.”

Understanding his ignorance was necessary for learning to begin because he had to be open to the possibility that he had something to learn, and that he was willing, even eager, to find the answer. He was open to an experience of truly “wondering” how he might find an answer. This wonder did not come from any knowledge that he had but from a desire to know, born not in understanding but in ignorance. This was a kind of “knowing ignorance,” an intelligent perplexity that came from embracing his ignorance and then discarding false notions and failed experiments as he went on. Our innocence or ignorance of the world about us may be the one certainty in life, and recognition of this is the pathway to learning.

Another thing happened to this blossoming mechanic. He turned from boredom with a problem that was put to him, to perplexity over the difficulty of solving it with meager tools, to excited engagement because he wanted to discover the answer. He wanted to know the answer for its own sake, not just to fix the wipers. He wanted to “get it”!

Yet one more lesson! My son had begun to discover the interconnectedness of apparently unrelated apparatuses, and this helped him understand a little better how the car was assembled, even how it was conceived to operate in the first place. (Today, he is in his residency in osteopathic medicine, still working on body mechanics.)

This case is the barest expression of what we ought to wish to see in our students at
our colleges. And it may be as good an example as any of the utilitarian or practical argument for a liberal education—the kind of education employers want to see in their new recruits: employees who have an independence of mind and openness to engage in problem solving and solution finding with others across traditional disciplines; young men and women who can make their way in a world of innovation and change; individuals who are liberated from boundaries rather than defined by them.

What has this story got to do with our project at the nation’s liberal arts colleges? Just this: the free mechanic is a subset of the free human being. We now ask ourselves not what it takes to be a free mechanic, but what it takes to be a free human being.

Readers of Plato’s dialogues will recognize the striking resemblance of my son’s path to freedom and the path followed by many of Socrates’ interlocutors. For example, in Plato’s Meno, Socrates turns Meno’s opening question from whether and how virtue can be taught to what this thing is that Meno is talking about: What is virtue? This is the kind of question we used to ask our parents or teachers when we were children but may have stopped asking when we became satisfied with the answer from a trusted authority figure—or stopped asking when we simply ceased to wonder at the world. It is these simple questions that Socrates asks as he tries to understand the nature of a thing, its being, its essence. And it is the answers his interlocutors give that founder upon further examination. They try one answer and are led to see the weakness of it, and so they try a second and a third time until they appear to be stumped and wish to go on and understand what they missed—or until they give up the argument in anger or frustration with Socrates. What appears to be an annoying mind game to one is an awakening to another—to the inquiring student or reader who has now become disturbed by a contradiction exposed about an unexamined but deeply held opinion. We then see that we must come to grips with Socrates and his questions for our own sake, for the sake of those convictions we hold dear. Will they stand up to challenge? Do we really know who we are, understand what we believe, and comprehend what makes our lives worth living?

How well does any human being—teacher or student—understand what it means to be human in its many aspects? We are political, social, and solitary beings, all at the same time. As human beings we think, weigh evidence, and judge. We reflect upon the world about us; we wish to understand it, sometimes in order to make our way in it fruitfully, and sometimes just simply in awe of the majesty of existence, the grandeur, beauty, and mystery of the universe. We have bodies, minds, hearts, and souls. We love, act, and are moved. What are we made of? What moves us and why? We have skills we use to make a living and provide for loved ones. We are members of civic, social, and religious communities and citizens of a great country. What are our duties and responsibilities toward these and others? How well do we understand our powers and limitations? How well do we comprehend the interconnectedness of things and our relationships with fellow beings so that we may make our lives richer—for ourselves and for others, too?

Before students fix upon a specialty for study or a vocation to pursue, they ought to be asked to spend a little time getting to know themselves and the world about them.

### Education

Liberal arts colleges have found many ways to help students do this. At St. John’s College, we have constructed a program of study that is designed to help our students cultivate the arts of reason and understanding and abilities in analysis, argument, and interpretation. We hope this program will enrich their imagination and nurture freedom of thought; freedom from the tyrannies of unexamined opinions, current fashions, and inherited prejudices; and freedom to make intelligent choices concerning the ends and means of both public and private life. We pursue this freedom together with our students through thoughtful conversation about great works from the Western tradition, shaped by a commitment to radical inquiry. We nourish the capacity to wonder, which stimulates such questions.
Our approach is guided by a love of wisdom that transcends the acquisition of information and even of knowledge narrowly conceived.

We want our students to be well versed in the textual tradition of reason that illuminates the chief features of modern life, including democracy, technology, and the literary and musical traditions of the West. We want them to have basic literacy in three kinds of texts: verbal, mathematical, and musical. We expect them to develop skill in logical, coherent, and correct expression. And we want them to engage in a direct study of the natural world. Though often guided by texts, they develop skills of observation, dissection, measurement, and experimentation. In asking this of them, we reject at a deep level the popular distinction between the humanities and the sciences. We want our students to be able to weigh and judge the claims of science—rather than simply deferring to them as authoritative, or rejecting them as alien.

We want our students to develop the intellectual virtues of courage in inquiry, caution in forming opinions, candor about their ignorance, open attentiveness to the words of their colleagues, industry in preparation, and meticulousness in verbal translation and mathematical demonstration. We want them to be prepared to face any occasion for new learning that comes their way. We also want them to develop a life-long commitment to pondering the question of how to live well. And finally, we want them to have the experience of living in a community of learning. We expect that the moral virtues we require of them in their life on campus—consideration for their colleagues and decent and respectful dealings with others—will prove transferable to their lives as citizens of this or any country, transferable to their places of
work and worship, to their lives as friends and neighbors and members of families.

We expect a lot of our students, and we imagine that our students would not be here if they did not wish to be held to high expectations. But beneath everything I have said about what we intend at St. John’s is our shared conviction that learning is an activity fired by the desire to know, a desire to make one’s education one’s own. Michel de Montaigne, puts it this way in his essay “On the Education of Children”: “Truth and reason are common to everyone, and no more belong to the man who first spoke them than to the man who says them later. . . . The bees plunder the flowers here and there, but afterwards they make of them honey, which is all theirs; it is no longer thyme or marjoram. Even so with the pieces borrowed from others; he will transform and blend them to make a work that is all his own, to wit, his judgment. His education, work, and study aim only at forming this.”

If students are meant to be the bees that plunder flowers to make something that they can call our own, there had better be flowers that make this possible. The flowers are not hard to recognize; they are the great works of literary, artistic, and musical imagination. Among them are mathematical, scientific, political, religious, poetic, and philosophical books that have survived the test of time because they are timeless. They form the foundation for the thoughts and discoveries that follow; they are often deeply beautiful; they speak to the great human questions that help us understand both the world about us and the world within us.

If learning materials are considered as food for digestion, students should have a banquet set before them, the opportunity to taste each morsel before deciding to accept or reject it, and the time to digest what they have taken in. To make it their own requires an environment in which their teachers exercise restraint in pressing their authority, like the mechanic in my opening story. They need to allow students the freedom to chew on their own questions and form tentative conclusions that they may later reflect upon and digest as ill considered.

**Happiness**

The reward for learning attributable to a desire to know—simply for its own sake—is something I want to call “happiness.” This is not a fulfillment that comes to an end in the gratification of a desire, but an activity, an active engagement in an ongoing project that best defines what it means to be human. Aristotle, in his *Nicomachean Ethics*, would define this happiness as “an activity in accordance with virtue.” And so, we return to that Socratic question: Just what is virtue? We wonder whether human virtue lies somehow coterminous with this strange path toward knowledge—that we human beings first must recognize our ignorance, that it will be a great struggle to attain deep understanding, and that we can better pursue this search in the company of others, fellow students, with whom we can at least share those peaks of desire and excitement that accompany the search for truth.

And occasionally, along the way, we hope that the mist will clear from the windows of our eyes and we will be able to shout out to our fellow searchers: “I got it! The wipers are working!”

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