

Advancing Diversity in Higher Education

DIVERSITY



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Science, Diversity, and Global Learning: Untangling Complex Problems

By Kevin Hovland, program director of global initiatives, Office of Diversity, Equity, and Global Initiatives, AAC&U

A fundamental goal of liberal education today is to produce global thinkers—students who reach beyond the classroom to apply their developing analytical skills and ethical judgment to concrete challenges in the world around them. At the heart of such an education are the kinds of questions central to the mission of *Diversity Digest*—questions about difference and democracy, identity and community, privilege and oppression, and power and responsibility.

Too often, these questions are the subject only of humanities and social science courses that emphasize multiple cultural perspectives. In the real world, however, such questions are tangled up with complex issues that require students to understand and apply scientific analysis. Lack of scientific literacy can foreclose responsible civic and ethical action on such issues as the HIV/AIDS pandemic, global warming, nuclear proliferation, environmental sustainability, economic development, and energy policies. Is higher education creating sufficient curricular opportunities for students to engage these tangled problems?

Diversity and global learning, as articulated in the Association of American Colleges and Universities' Shared Futures initiative, seeks to engage students with some of the most pressing questions of our time: What does it mean to be a citizen of an interconnected and unequal world? And what responsibility does such a citizen have to act in the face of large unsolved global problems?

Of course, such questions cannot simply be laid at the feet of our students. As educators, we must ask them of ourselves as well, and we must examine our institutional structures and habits in light of their ability to generate creative answers. We underemphasize the role of science in helping to address such questions at our own peril. Diversity and global learning can—and must—thrive in a genuinely interdisciplinary environment where analysis, ethics, and action intersect.

This issue of *Diversity Digest* grows out of one recent effort to raise the visibility of science in diversity and global learning initiatives. "Recentering: Science and Global Learning in the Undergraduate Curriculum" was a pre-meeting symposium held in conjunction with the 2006 annual meeting of the Association of American Colleges and Universities. Two hundred educators gathered at this symposium to share promising practices that cultivate the scientific and civic aptitudes college graduates need to thrive in a future marked by global interdependence. Participants explored ways to effectively use large global frameworks to reinvigorate introductory-level science courses. They discussed the roles of research and civic engagement in creating global general education science requirements. And they shared strategies for effectively addressing scientific questions as they emerge in non-science courses. In short, participants engaged in rich discussions of the need for, and difficulty of, genuine interdisciplinary teaching and learning. But they also gave evidence that such programs are possible—indeed are thriving—on some campuses. ■

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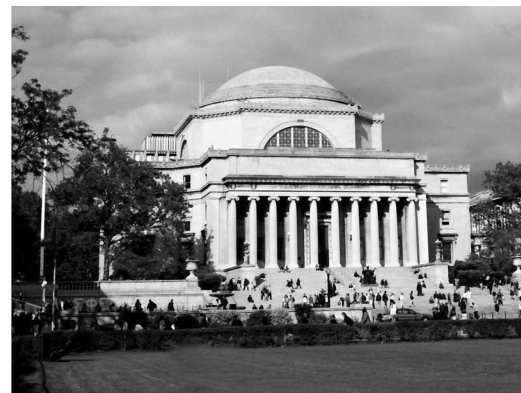
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Breaking the Pyramid: Putting Science in the Core

By Darcy Kelley, Howard Hughes Medical Institute Professor of Biological Sciences, Columbia University

Editor's Note: Darcy Kelley delivered one of the keynote addresses at the AAC&U 2006 Annual Meeting Pre-Conference Symposium, "Recentering: Science and Global Learning in the Undergraduate Curriculum." This article is adapted from that presentation. A longer version of the article appears in the Summer 2006 issue of Peer Review.

IN 1919, COLUMBIA COLLEGE OF COLUMBIA UNIVERSITY BEGAN TO DEVELOP A SET OF COURSES THAT INTRODUCE STUDENTS TO ESSENTIAL IDEAS OF MUSIC, ART, LITERATURE, PHILOSOPHY, AND POLITICAL THOUGHT. THE CORE CURRICULUM IS THE HALLMARK OF A COLUMBIA EDUCATION, BUT IT LACKED A SCIENCE COMPONENT UNTIL FALL 2004, WHEN A NEW COURSE FOR ALL ENTERING STUDENTS—FRONTIERS OF SCIENCE—BEGAN AS A FIVE-YEAR EXPERIMENT.



Columbia University

The Pyramid

Why was science left out of Columbia's core curriculum for so long? Why is teaching a broad course in science so hard? One factor was the general consensus among the faculty about what a proper science education should be, a consensus adopted and reinforced by the professional schools, particularly medical schools. This consensus has been most vividly described by Princeton University President Shirley Tilghman's metaphor comparing traditional training in science to a pyramid. In this model, students must complete a foundation of introductory science courses before they can progress to more specialized courses and more engaging scientific questions.

Let's say, for example, that a student is interested in the way the brain handles language. What must she do to take a course on that subject? If she pursues her

interest via a biology perspective, she must first take a year of chemistry, then a year of introductory biology, an introductory sequence in neuroscience, and then, finally, she is allowed to enroll in the course that interested her in the first place. However, that first year of chemistry often discourages all but the most determined, which means our hypothetical student might never make it to her original goal.

Suppose that we could break the pyramid. Suppose that it were possible to present the neurobiology of language in a rigorous and insightful way along with other topics at the frontiers of science: global climate change, the origins of the universe, quantum mechanics, molecular motors. This attempt to "break the pyramid" is a defining characteristic of Frontiers of Science. It is at the heart of faculty excitement about the course, but it is also the aspect of the course that arouses

the strongest opposition from members of the science faculty.

Steeped in the guild-like tradition of the sequence of courses required to become a physicist or a chemist or a biologist, many science faculty members think that it is impossible to be both interesting and rigorous in presenting difficult subjects to entering students. Further, many view the prospect of teaching outside of their own disciplines (having a biologist teach quantum mechanics or an astronomer teach neuroscience) as either pointless or extraordinarily difficult from the point of view of faculty expertise. As a scientist advances in training, his or her expertise tends to become narrower and narrower. For example, many astronomers, though well versed in mathematics and physics, have not taken a biology course since high school.

Interdisciplinary Scientific Habits of Mind

What has changed recently is the acceptance of the idea that, to be optimally effective, scientists must acquire cross-disciplinary skills. Nanoscience, the realm of 10^{-9} m, is a superb example of a cross-disciplinary forum: at this scale, physics, biology, and chemistry meet and scientific interactions can produce truly novel insights. Most scientists would agree on the importance of educating their replacements; such an education will have to be cross-disciplinary. Students at Columbia can begin to be trained that way through Frontiers of Science. This kind of scientific collaboration, moreover, can be tremendous fun for the faculty, and teaching Frontiers provides a built-in collaborative forum for some of Columbia's best scientists.

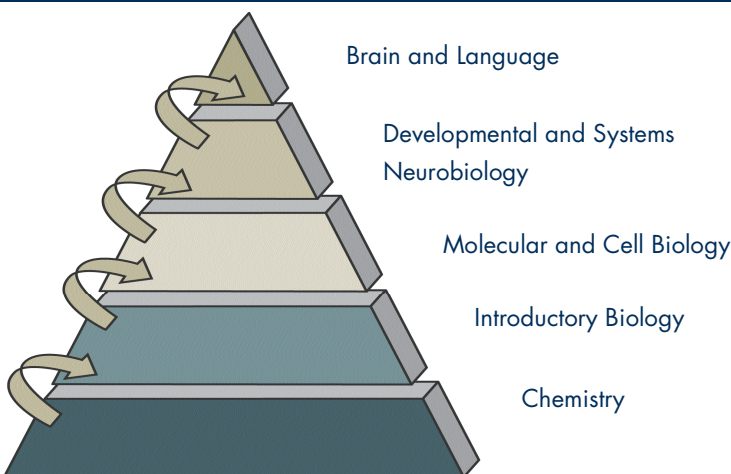
A second impetus for the creation of Frontiers was provided by the realization that all students should learn about the analytical tools that scientists use. We all need the ability to critically examine scientific evidence if we are to make wise

choices about today's most pressing issues—climate change, stem cells, nuclear technology, transplants—and the problems that we cannot now imagine but that we will have to solve in the future. This set of tools is outlined in Frontiers Codirector David Helfand's Web-based text, *Scientific Habits of Mind*. This text provides a unifying theme across the physical sciences and life sciences components of the course. The students meet in seminars to use these analytical skills to tackle scientific problems from the current literature.

A running joke in Frontiers is that we must have a *New York Times* spy; it is

uncanny how the paper's weekly *Science Times* section tracks Frontiers topics and themes. This coincidence demonstrates that it is possible to enrich faculty members' interdisciplinary knowledge while teaching cutting-edge science to eighteen- and nineteen-year-olds. We acknowledge that the caution of generations of Columbia science faculty was well placed: teaching Frontiers is probably the biggest educational challenge that any faculty member has ever faced. A seminar that includes an Intel science winner and a student who is afraid of math is difficult to get right; it is worth attempting, though, and is tremendous fun. ■

The Pyramid Model of Science Education

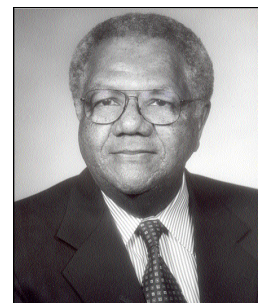


In Memoriam Edgar F. Beckham

1933–2006

Edgar F. Beckham, an influential and beloved leader in higher education, died Wednesday, May 24, 2006. In his many roles at Wesleyan University, the Ford Foundation, and AAC&U, Edgar guided far-reaching change in higher education and worked tirelessly to help the entire educational community engage diversity—in our communities and in the college curriculum.

Edgar taught us all that engaging diversity in higher education enriches every student's learning while reinvigorating democracy. The AAC&U community mourns his passing and continues to work with renewed commitment to honor his vision.



Science and Citizenship: Habits of Mind for Global Understanding

By Grant H. Cornwell, vice president of the university, dean of academic affairs, and professor of philosophy, St. Lawrence University

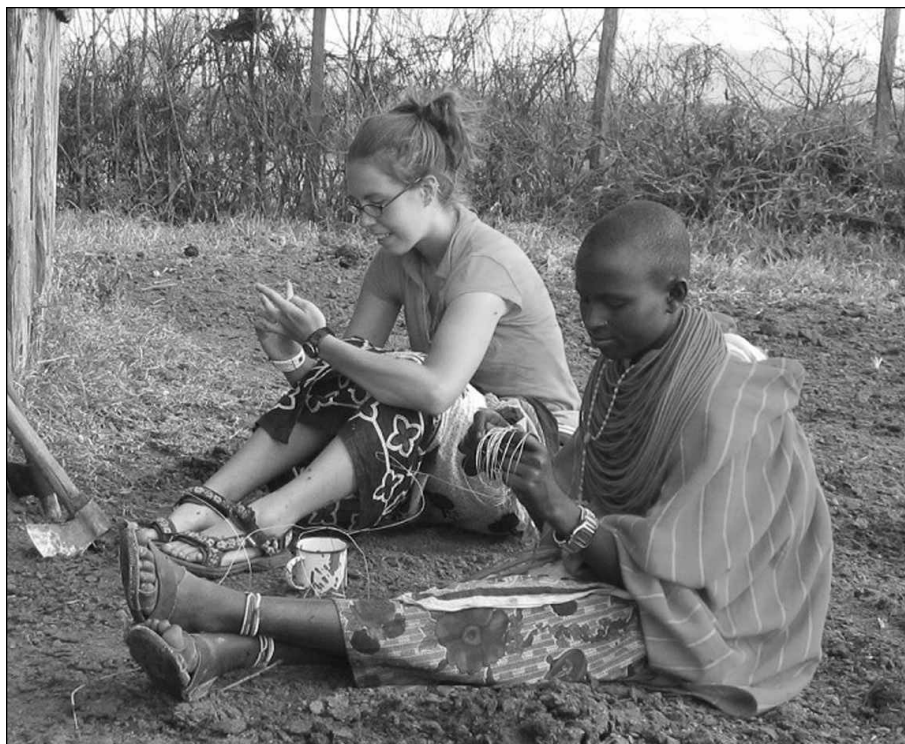
I WANT TO SHARE TWO SHORT STORIES ABOUT GLOBALIZATION THAT ILLUSTRATE THE KIND OF ANALYTIC AND PROBLEM-SOLVING SKILLS OUR STUDENTS NEED TO ENGAGE THE WORLD IN ALL OF ITS COMPLEXITY. NEITHER STORY IS UNIQUE; THERE ARE HUNDREDS OF SIMILAR STORIES THAT COULD BE TOLD. THESE TWO HAPPEN TO BE SET IN KENYA BECAUSE I HAVE JUST RETURNED FROM THERE AND THEY ARE STILL NAGGING MY CONSCIENCE.

The Elephants of Amboseli

The first story illustrates scalar thinking, or what might be called “Google Earth reasoning.” Google Earth is a Web-based application that uses satellite imaging technology to provide users with an adjustable perspective on the earth’s surface. A user begins with a very large-scale view of the globe, but can zoom in and out and move to different places. At each scale, different features and relationships emerge. Zooming in illuminates detail with great clarity, while zooming out exposes larger contexts and relationships.

The story is set in Amboseli, a wildlife refuge in southeast Kenya that is home to some 1,400 elephants, one of the largest populations in Africa. Conservation policies and practices have enabled the elephant population to grow—a good thing if you are an elephant or a human concerned about wildlife conservation. Some argue, however, that the elephant population has grown to about three times the sustainable carrying capacity of the land. The result has been both deforestation—elephants knock over acacia trees to eat them—and conflict with local farmers who are trying to eke out a living along rivers just outside the reserve.

It would be a mistake to conjure up a Western image of these farmers. I am talking about very poor people who lease small, one-acre plots in what is Maasai land to grow maize, tomatoes, or onions. They till and tend the land entirely using hand tools, they live in small huts right on the field, and if they are lucky and there is



Kenya Semester Program, St. Lawrence University

no drought, they will yield two harvests a year. When brought to market, these two harvests might earn a farmer an annual income of \$1,000. This might not sound like much, and it isn’t. But for perspective, the minimum wage in Kenya is around \$50 a month, or \$600 a year. The poverty level—and over half the population falls below this—is approximately a dollar a day, or \$360 a year.

So these are poor farmers and their production is very small-scale, but they subsist. Except, that is, when elephants show up. Elephants are wonderful and intelligent creatures, and wildlife conservation is

an important endeavor, both as science and as policy. But where does a bull elephant go when hungry? Anywhere he wants. Farmers tell us that there can be no sign of elephants in an area, but when a crop is just ripe they might appear and in one night consume the product of six months’ labor. Farmers try to chase them off, but this can be dangerous—more Kenyans are killed by elephants each year than by any other animal. Farmers complain that there are too many elephants and argue that the government has yielded to international pressure from tourist and conservation groups. The government,

they believe, cares more about the survival of the nation's elephants than its citizens.

These issues are complex and look very different from different points of view. Zoom in on elephants, population dynamics, and habitat conservation, and Amboseli looks one way. Zoom in on farmers, poverty, and land use, and it looks very different.

In the Kenya Semester Program at St. Lawrence University, our students engage these conflicts; they study them in the classroom and in the field. They live and work with *both* the wildlife biologist *and* the farmer. Their learning task is to understand the issues at the very local and specific level, but then to be able to zoom out to a point where their field of view encompasses both. Global problem solving calls for this kind of scalar thinking. It is a kind of intellectual and ethical agility to be able to go from the local to the global, the detail to the context, and back again.

What Could Be Wrong with Flowers?

The second story illustrates systemic thinking. It is in the very nature of global problems that they require us to bridge the divide between science and the humanities that C. P. Snow identified almost a half century ago in *The Two Cultures*. The problems of globalization—the problems our students must engage as they make their way in the world—are an intertextual tangle of scientific, social-scientific, and humanistic issues.

Driving out of Nairobi one passes massive greenhouses that stretch for acres. Given the extent of poverty noted above, one might assume these greenhouses are used for food production. They are not. These greenhouses produce cut flowers for the world market. In the 1990s, the Kenyan government built a water pipe, with world development dollars, to carry water from the springs at the base of Mount Kilimanjaro to Nairobi. The springs, and the two hundred kilometers of arid land the pipe



Kenya Semester Program, St. Lawrence University

crosses, are in Maasai land. The Maasai are a pastoralist people whose lives and sustenance revolve around their cattle. Just now, they are in the middle of a drought that will likely kill cattle in large numbers, and as cattle die, the Maasai suffer. The government was to have provided spigots along the pipeline—access points for the Maasai to obtain water for themselves and their cattle—but these never materialized.

You might think, at least, that the pipe brings water to the four million people of Nairobi, half of whom live in ghettos without sewers or access to water except for sporadic standpipes. The fact is that the Kilimanjaro spring water first stops at the flower farms, to satisfy their massive needs. The ironies pile up. Minimum-wage workers, who live in huts outside the fenced compounds, without access to running water, provide the labor for the flower farms. They suffer occupational illnesses from the comparatively unregulated use of pesticides and herbicides, and lack medical insurance. The springs are likely not sustainable, as the glaciers on Kilimanjaro are receding as a consequence of global warming. The final irony, per-

haps, is that the jet fuel burned to distribute flowers around the world market contributes to the global warming that is drying up the springs of Kilimanjaro that make the flower growing possible. So how can flowers be bad?

Habits of the Mind

My point, of course, is not to make you feel bad about flowers and elephants, nor to induce despair. Rather, I think these short tales illustrate the way global problems are a tangle of issues that call for scientific, social-scientific, and humanist analyses that are not undertaken in isolation or in competition, but instead are done with a kind of mutually informing systematic collaboration.

The good news is that scientific methods of inquiry and analysis foster habits of scalar and systemic thinking. Seeing how very small parts function in larger wholes, and understanding relationships in complex systems, are habits of mind well cultivated in the sciences. The world—its elephants, its flowers, and its people—desperately needs that kind of thinking. Our task is to produce graduates who are capable of it. ■

Geologic Science for Global Citizenship: Under the Radar, but on the Web

By Garth Massey, director of international studies, and James D. Myers, professor of geology and geophysics, University of Wyoming

"OIL AND TRIBAL CONFLICT IN NIGERIA," "GOLD MINING AND HIV/AIDS IN SOUTH AFRICA," "NUCLEAR POWER IN IRAN AND WMDS," "CHINA, COAL, AND THE KYOTO ACCORDS," "PERU'S INDIGENOUS PEOPLES VERSUS MULTINATIONAL COPPER COMPANIES"—THESE COULD BE HEADLINES IN THE *NEW YORK TIMES*, BUT THEY'RE NOT. RATHER, THEY ARE TOPICS THAT HAVE UNITED AN IGNEOUS PETROLOGIST AND A COMPARATIVE SOCIOLOGIST IN SEVERAL YEARS OF PEDAGOGICAL COLLABORATION.

Two realizations, arrived at independently, are the basis for our collaboration. One, students learn very little from the traditional pedagogy of information delivery and recall testing. Two, the future is too important to be left to scientifically myopic citizens who rely on uninformed opinion to make decisions. Three years ago the University of Wyoming's Ellbogen Center for Teaching and Learning received a grant from the Fund for the Improvement of Postsecondary Education that enabled six faculty members to develop innovative approaches to student learning. This gave us the opportunity to translate our realizations into practice.

We decided to develop Earth resources courses that would prepare students for global citizenship by helping them become active participants in decisions affecting their lives. The commitment to create an interdisciplinary, internationally focused pair of courses has been a huge undertaking, one that has gone largely unnoticed by our colleagues and university administrators.

For many years James D. Myers taught Earth resources as a one-semester class; he developed most of the teaching materials on the Web. The course incorporated problem-based group learning that actively involved students in Earth resource issues. Laboratory case studies required that students find and estimate the extent of ore deposits and energy reservoirs and identify the most economical means to extract these resources.



University of Wyoming

Myers incorporated formal and substantive assessments into his course as he focused more and more on what students were actually learning.

Missing, however, was the sense that students' learning would help to inform their behavior beyond the classroom and outside the usual narrow confines of geologic science and practice. Students were not examining the political, social, or cultural aspects of resource exploration, extraction, and use, and they were paying insufficient attention to the impact that such resource development has on the environment.

Habits of Thought for Global Citizenship

Our collaboration has produced a pair of four-credit Earth resources courses, one focusing on energy and the other on minerals, taught within the typical thrice-weekly lectures and once-weekly two-hour lab. Because there are no prerequisites for the courses, many students from across the campus enroll solely to satisfy the global awareness and Earth science requirements of the university's general education curriculum. The mix of students from geology and other sciences as well as the humanities, arts, social sciences, and inter-

disciplinary programs has proven one of the most intriguing and satisfying features of the course. Through group problem solving, presentations, and written reports, students teach each other and bring their own discipline's viewpoint and knowledge base to bear on course content. They use their scientific, technological, and economic learning to negotiate complex issues raised by specific resource cases. In these negotiations, students are assigned roles that may be unfamiliar and uncomfortable for them. As students assume the role of a corporation, government, citizens group, resource consumer, labor union, or environmental activist, they must take into account interests that may differ from their own, offer new approaches, and find common ground.

The overarching goal of the courses is to assist students in acquiring the habits of thought needed to be involved citizens. We are continually asking ourselves what students need to know in order to participate in a democratic society, how they can learn to sift systematically and logically through the bluster, bad science, and certitude brought to bear on Earth resource questions by various special interest groups, and how a college education can help foster a lasting sense of social responsibility.

Some Challenges of Interdisciplinary Teaching and Learning

Everyone talks about interdisciplinary learning, but the obstacles to actually doing it are formidable. For discipline-based scholars, it requires a paradigm shift in thinking about their area of expertise. It requires an appreciation for other disciplines, something those in the sciences often find difficult. For teachers, it presents the challenge not only of deciding what to teach, but also of deciding how to meld and infuse material with a compelling narrative while going beyond the comfortable theories, research approaches, and criteria for good scholarship in one's

own discipline. Because many of the course materials have to be developed by the teachers themselves, these courses take much work to design and refine.

Interdisciplinary courses are usually team taught, often in tag-team style. It is useful to consider having a single instructor teach the class and in this way model interdisciplinary learning. In our case, Myers teaches the class, with only occasional support by Massey. This approach creates a problem of workload recognition, however. It is important that everyone involved in the class be an instructor of record and, if necessary, receive the Full Time Equivalent counts. When the joint effort is not for course delivery but for course development, this is especially difficult to do.

Colleges and universities, especially research-oriented universities, may have difficulty respecting teaching innovations or even acknowledging them. Teaching in a new way means less content will be delivered, and this raises objections from fellow faculty who teach in a sequentially arranged science curriculum. Embracing the goal of developing a sense of global citizenship in a science course will probably be met with skepticism. Your work, including publications in journals outside the mainstream of science, may be ignored. This will be the case, despite the considerable effort required to develop and teach courses in a new way.

Though we have given several presentations about our efforts to link science and global citizenship, few at our university are quite sure what we are doing. We think we know, but all of this is so new, sometimes we are not quite sure ourselves. The challenges of venturing into important new territory make it difficult to gauge our progress.

To learn more, visit the class Web sites for Earth and Mineral Resources (www.gg.uwyo.edu/geol3600/index.asp) and Energy: A Geological Perspective (www.gg.uwyo.edu/geol3650/index.asp). ■

Recent Issues of AAC&U's peerReview

Undergraduate Research: A Path to Engagement, Achievement, and Integration

(Winter 2006)

This issue highlights undergraduate programs that integrate students into the research community through mentored experiences in the various disciplines. These programs strive to provide students with hands-on opportunities to partici-

pate in original research projects and to engage in creative activities and scholarship under the guidance of experienced faculty members.

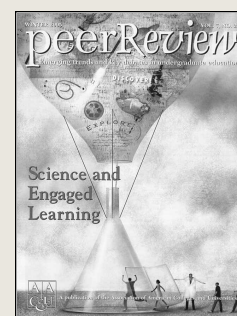


Science and Engaged Learning

(Winter 2005)

This issue explores efforts to improve science education for majors and non-majors through new forms of engaged science learning.

Included are an overview of trends in undergraduate science reform, a reflection on the multiple meanings of engaged learning, and a list of myths about engagement that prevent science faculty from adopting active learning pedagogies.



For additional information see
www.aacu.org/peerreview.

Science and Global Learning at Carnegie Mellon University

By Michael J. West, teaching professor of French and Francophone studies, and Indira Nair, vice provost of education and professor of engineering and public policy, Carnegie Mellon University

CARNEGIE MELLON WAS FOUNDED IN THE “INSTITUTE OF TECHNOLOGY” TRADITION, WITH A PHILOSOPHY OF INTERDISCIPLINARY PROBLEM SOLVING AND PRACTICAL LEARNING. WHEN PRESIDENT JARED COHON AND PROVOST MARK KAMLET RECENTLY MADE THE GLOBALIZATION OF UNDERGRADUATE EDUCATION A PRIORITY FOR THE UNIVERSITY, THEY ENVISIONED A MULTIDIRECTIONAL PROCESS THAT WOULD REQUIRE CREATING SPACE (BOTH PHYSICAL AND VIRTUAL) FOR “CARNEGIE MELLON IN THE WORLD” AS WELL AS SPACE IN WHICH TO WELCOME “THE WORLD AT CARNEGIE MELLON.” A GLOBAL WORKING GROUP REPRESENTING ALL CONSTITUENCIES WAS APPOINTED TO DEFINE A VISION FOR GLOBALIZING OUR EDUCATION AND DESIGN STRATEGIES TO ACHIEVE THIS VISION.

The working group’s mission is to create a community “that is dynamically engaged with other peoples and other cultures.” Such engagement, the group has determined, requires “an understanding of history, culture, and worldviews,” an awareness of “the interaction and transformation of the world through technology,” knowledge of “the great intellectual debates in history and in the contemporary world,” and “an ability to work with people of diverse cultures and in diverse countries.”

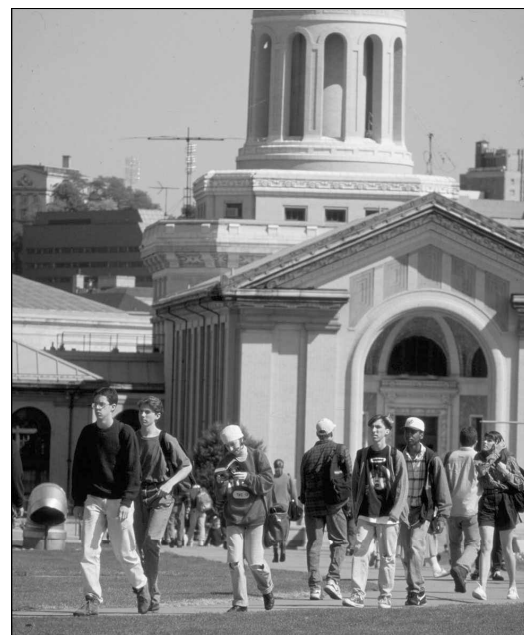
For the first implementation project of the Global Working Group, Carnegie Mellon pledged to create and fund global courses in each of the schools and colleges that offer undergraduate degrees. The group is developing an intellectual community of educators, students, and administrators through regular meetings, shared readings and discussions, and the creation of a Wiki-based Web site where faculty and students can post materials, exchange information, and participate in online discussions.

B.I.O.S.³

One of these newly funded “global courses” is B.I.O.S.³: Biotechnology Impacting Our Selves, Societies and Sphere. This course engages students with questions arising from the impact of biotechnology on individuals, societies,

Scientists of the future must be able to apply their disciplinary knowledge while also considering relevant ethical, legal, and societal concerns.

and the globe. It reflects the fact that our vocabularies must expand to include words such as stem cells, genomes, SARS, and anthrax while our hearts and minds grapple with issues such as human cloning,



Carnegie Mellon University

DNA profiling, epidemic control, and bioterrorism. Understanding and responding to such personal, societal, and global challenges requires a level of scientific literacy currently lacking in much of the general citizenry. In addition, scientists of the future must be able to apply their disciplinary knowledge while also considering relevant ethical, legal, and societal concerns. B.I.O.S.³ will foster the development of biotechnology literacy and decision making in a global context.

The B.I.O.S.³ course and its materials are being developed in a modular, Web-based format to ensure that course content is current and accessible. The guiding course design reflects the central principles of biotechnology. That approach can be described as the “transcription” of core knowledge into context, much as the genetic code of the DNA is translated into messenger RNA, followed by the “translation” of that knowledge into global perspective and personal action, just as the mRNA translates the original message into functional proteins.

With a desired general outcome of “scientific and global literacy,” the course will help students become familiar with the basic science and technology of the global biotechnology revolution. It will also encourage them to gain an appreciation of the possible impact of biotechnology at the individual, societal, and global level.

The initial six topic modules to be developed are organized around a set of complex problems:

1. Stem-cell biology: Is research and treatment potential in the U.S. being compromised by policy?
2. Bioterrorism: Are we scientifically ready and flexible enough to respond to this threat?
3. Genetically-modified foods: Do the benefits outweigh the risks?
4. Tuberculosis and malaria: Why isn't the problem solved?
5. Emerging infectious diseases: Can we keep ahead of the pathogens?
6. HIV/AIDS: Why is having a cure not enough?

All three of the faculty facilitators for this proposed course have extensive experience in science curriculum development, implementation, and assessment in biology. Their combined efforts to reframe the science curriculum at Carnegie Mellon offer a glimpse of how a globalized curriculum can promote the scientific literacy essential to socially engaged undergraduates.

For more information about globalization efforts at Carnegie Mellon University or about the proposed B.I.O.S.³ course, please contact Professor Michael J. West at mjwest@cmu.edu or Professor Amy Burkert at ak11@andrew.cmu.edu. ■

Resources for Science, Diversity, and Global Learning

Council On Undergraduate Research

The Council on Undergraduate Research (CUR) and its affiliated colleges, universities, and individuals share a focus on providing undergraduate research opportunities for faculty and students at predominantly undergraduate institutions. CUR believes that faculty members enhance their teaching and contribution to society by remaining active in research and by involving undergraduates in research. CUR's leadership works with agencies and foundations to enhance research opportunities for faculty and students. CUR provides support for faculty development.

www.cur.org

HIVCampusEducation.org

HIVCampusEducation.org is a resource of the Association of American Colleges and Universities' Program for Health and Higher Education. This Web site is designed to be an online hub of HIV prevention and education resources for institutions of higher education. The site contains a searchable syllabi database, a selection of resources, and listings of events and job opportunities.

www.hivcampuseducation.org

Howard Hughes Medical Institute—Million Dollar Professors

The Howard Hughes Medical Institute (HHMI) combed the country for leading research scientists who, through their teaching and mentoring, are striving to ignite the scientific spark in a new generation of students. Now twenty of the best will receive \$1 million each to put their innovative ideas into action as HHMI professors at eighteen research universities across the country. Some of the professors' plans include taking students to African countries to study tropical diseases and ethnopharmacology, increasing the number of Posse Program students in science and medicine fields, and taking undergraduates “bio-prospecting” for promising natural products in the world's rain forests.

www.hhmi.org

Association for the Advancement of Sustainability in Higher Education

The Association for the Advancement of Sustainability in Higher Education is a membership-based association of colleges and universities working to advance sustainability in higher education in the U.S. and Canada. Their mission is to promote sustainability in *all* sectors of higher education—from governance and operations to curriculum and outreach—through education, communication, research, and professional development.

www.aashe.org

Project Kaleidoscope

Project Kaleidoscope (PKAL) is an informal national alliance working to build and sustain strong undergraduate programs in the fields of science, technology, engineering, and mathematics (STEM). PKAL works to motivate students to consider careers in related fields, equip teams of faculty and administrators for leadership in reform at the local level, and encourage broad understanding of how strong undergraduate STEM programs serve the national interest.

www.pkal.org

Pathologies of Power: Health, Human Rights, and the New War on the Poor,

a book by Paul Farmer (University of California Press), uses harrowing stories of life—and death—in extreme situations to interrogate our understanding of human rights. Farmer, a physician and anthropologist with twenty years of experience working in Haiti, Peru, and Russia, argues that promoting the social and economic rights of the world's poor is the most important human rights struggle of our times. With passionate eyewitness accounts from the prisons of Russia and the beleaguered villages of Haiti and Chiapas, this book links the lived experiences of individual victims to a broader analysis of structural violence. Farmer challenges conventional thinking within

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Connecting Global Learning and Science Education in the General Education Curriculum

By Harvey Charles, Mildred Bray Dean for Global Education, Wheaton College (Massachusetts)

WHEN QUESTIONED ABOUT INSTITUTIONAL COMMITMENT TO GLOBAL EDUCATION, FACULTY AND ADMINISTRATORS AT U.S. COLLEGES AND UNIVERSITIES INVARIABLY POINT TO THEIR STUDY ABROAD PROGRAMS AS AN INDICATOR OF SUCH COMMITMENT. STUDY ABROAD NUMBERS ON A NATIONAL LEVEL, HOWEVER, ARE REMARKABLY LOW—LESS THAN 2 PERCENT OF TOTAL STUDENT ENROLLMENT ACCORDING TO THE INSTITUTE OF INTERNATIONAL EDUCATION (2004). THE COMMISSION ON THE ABRAHAM LINCOLN STUDY ABROAD FELLOWSHIP PROGRAM (2005) RECOMMENDS INCREASING THE NUMBER OF STUDENTS STUDYING ABROAD TO ONE MILLION PER YEAR. EVEN IF WE ACHIEVE SUCH A GOAL—A DAUNTING CHALLENGE WITHOUT SIGNIFICANT COMMITMENT OF FUNDS FROM THE FEDERAL GOVERNMENT—THE OVERWHELMING MAJORITY OF AMERICAN UNDERGRADUATES WILL COMPLETE COLLEGE WITHOUT A STUDY ABROAD EXPERIENCE. IN SHORT, STUDY ABROAD IS NOT, BY ITSELF, THE ANSWER FOR INSTITUTIONALIZING A GLOBAL EDUCATION AGENDA. IT IS BECOMING CLEARER THAT ENGAGING THE BROADEST RANGE OF STUDENTS WITH GLOBAL PERSPECTIVES REQUIRES A STRATEGY THAT IS EMBEDDED IN THE GENERAL EDUCATION CURRICULUM.

Wheaton College (Massachusetts) has responded to this challenge by developing a general education model that supports disciplinary breadth and interdisciplinary innovation. The centerpiece of this model, the Connections program, has replaced the familiar “menu” method of requiring courses from different divisions with a new vision that emphasizes how subjects and approaches connect across traditional disciplinary boundaries. All students must take at least one three-course “connection” or two two-course “connections” that include courses from at least two of the following areas: creative arts, humanities, history, social sciences, natural sciences, math, and computer science.

This structure has engaged faculty in a voluntary endeavor that has led to some of the most innovative and exciting cross-disciplinary work that has ever occurred at Wheaton. It has spanned some divides that until recently were thought impossible to bridge. While participating in the Connections program is not a faculty requirement, it is the means by which departments participate in the distribu-



Wheaton College

tion or breadth requirement of the general education curriculum. Faculty members seek out colleagues whose courses appear to make a good fit with their own and propose the creation of a connection. The proposal is then sent to the educational policy committee for review, and once approved, becomes a connection option for students. Student-initiated connections are also possible, and these too must

be reviewed and approved by the educational policy committee.

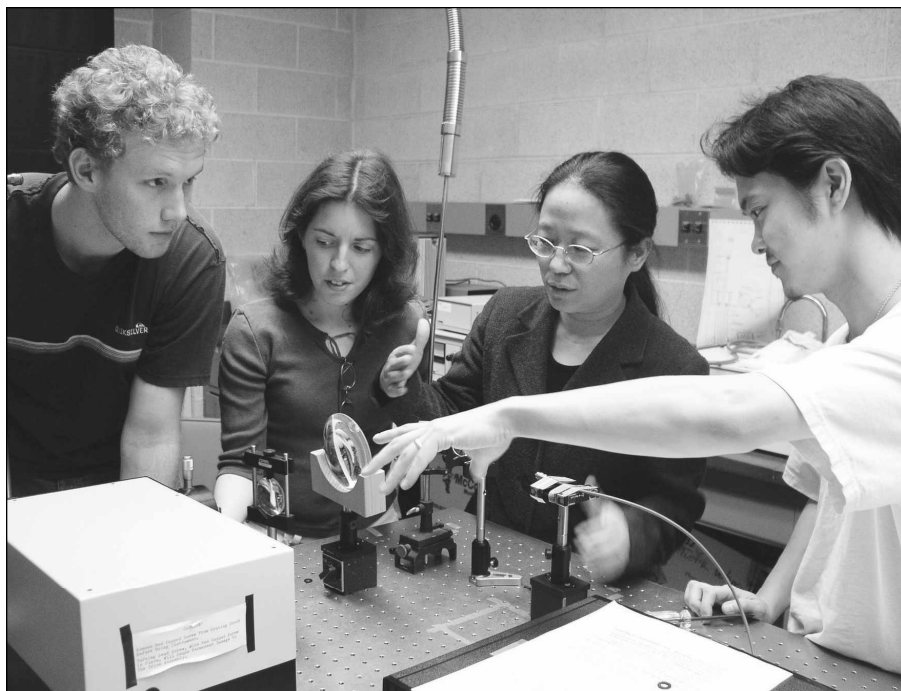
Since the implementation of the new curriculum in 2003, connections have become an important site for the infusion of global perspectives in the curriculum (see www.wheatoncollege.edu/Catalog/CONX for a list of connections). In fact, at least half of the existing connections have significant global content. A number

of this subset involve science courses, demonstrating that the challenge of infusing global perspectives in science courses can be overcome.

Although we are still in the process of collecting assessment data on the effectiveness of this strategy in terms of global and scientific learning, we remain confident that the “connections” model is engaging students in disciplines that they may otherwise shun. At the same time, it is demonstrating to students the profound and ubiquitous ways in which our world is interconnected and interdependent. ■

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needs: One million Americans studying abroad. Washington, DC: Commission

on the Abraham Lincoln Study Abroad Fellowship Program.

Wheaton Connections Linking Science and Global Issues

Politics and Global Change: This connection combines international politics with geology. Its fundamental premise is that politicians and government regulators often make decisions that affect our natural world without understanding the science that underlies these issues. Water use, desertification, air and water pollution, and climate change all cross national boundaries, but global treaties that would address these problems often prove difficult to ratify or enforce. Politics and Global Change combines relevant scientific information with the political debate needed to help students arrive at a more balanced understanding of the challenges facing the natural world as well as possible paths to resolution.

BioPharma: Combining a course called Cells and Genes with Introduction to Microeconomics, this connection pre-

sents students with opportunities to study the global pharmaceutical industry, which has grown into a multibillion-dollar enterprise merging economic principles and biomedical research to develop and distribute therapeutics around the world. Through topics such as vaccine development and distribution, drug therapy and human cloning, and the human genome project, students are able to gain insights into the economic implications of biomedical research and examine the biomedical character of the products that are marketed around the globe.

Food: The Anthropology of Feast and Famine is connected to three natural science courses, permitting students to opt for either a two- or three-course connection. This anthropology course explores topics such as eating disorders, the causes and consequences of

malnutrition, and how culture shapes taste and cuisine, as well as controversies around genetically modified food. It can be connected with a nutrition course in the biology department that examines topics such as weight control, the world food supply, the contribution of nutrients to health and disease, and the influence of advertising on food choice and availability. A second science course option is Plant Biology, which deals with the distinguishing features of each plant phylum and of selected families of flowering plants, but also looks at plants that are important as sources of food or as beverages, medicines, or even objects of aesthetic beauty. The final option is Edible Chemicals, a chemistry course that focuses on the chemical components of food as well as their behavior together in cooking and digestion.

Science, Gender, and the Environment

By Lori Bettison-Varga, associate professor of geology, and Charles Kammer, professor of religious studies, the College of Wooster

IN 2003, WE DEVELOPED A COURSE CALLED SCIENCE, GENDER, AND THE ENVIRONMENT FOR THE COLLEGE OF WOOSTER'S PROGRAM IN INTERDISCIPLINARY STUDIES. OUR PRIMARY GOAL IN TEACHING THE COURSE IS TO INCREASE STUDENTS' ENVIRONMENTAL AND GENDER AWARENESS. BY EXAMINING PROGRESSIVE MOVEMENTS, WE HOPE TO GENERATE AN APPRECIATION FOR MODELS AND PROGRAMS THAT ARE BEING USED TO EFFECTIVELY PROMOTE ENVIRONMENTAL SUSTAINABILITY AND GENDER JUSTICE AS WELL AS TO HIGHLIGHT THE IMPORTANCE OF SCIENTIFIC LITERACY TO ACTIVE CITIZENSHIP. ANOTHER SIGNIFICANT GOAL OF THE COURSE IS TO CHALLENGE TWO ASSUMPTIONS HELD BY MANY OF OUR STUDENTS: THAT SCIENCE IS A DOMAIN SOMEHOW SET APART FROM OTHER HUMAN INTELLECTUAL ENTERPRISES AND THAT ONLY TRAINED SCIENTISTS CAN POSE APPROPRIATE QUESTIONS ABOUT OR FIND SOLUTIONS TO ENVIRONMENTAL PROBLEMS. CONSEQUENTLY, WE EMPHASIZE THE NEED FOR SCIENTISTS TO WORK WITH HISTORIANS, SOCIOLOGISTS, THEOLOGAINS, ECONOMISTS, ARTISTS, AND OTHERS IN THE SEARCH FOR CREATIVE AND JUST SOLUTIONS TO ENVIRONMENTAL PROBLEMS.

The syllabus was designed to address several key questions: What is science and how is the scientific process “gendered”? Is there an inherent link between women’s sensibilities and the environment? How might scientific discourse be in tension with a feminist perspective? How does scientific “progress” sometimes adversely affect both women and the environment?

Students explore the complex relationship between gender, the environment, and science through several key texts. *Refuge*, a book by Terry Tempest Williams, is a very useful vehicle for stimulating discussions about our sense of place and the relationship between the natural world and gender. Works by Carolyn Merchant, such as *Radical Ecology: The Search For a Livable World* and *Earthcare: Women and the Environment*, also provide a variety of feminist perspectives. The paradigm that Merchant articulates helps students understand how the subordination of women is inextricably tied to the realities of class, race, and environmental degradation. This became evident in our studies of toxic contamination at Love Canal and in Woburn, Massachusetts (the subject of the book and film *A Civil Action*), of the flower industry’s exploitation of third-



College of Wooster

world women, and of Nobel Peace Prize–winner Wangri Maathai’s Greenbelt Movement. In all these cases, grassroots movements begun by women responding to the immediate realities of human and environmental catastrophes were opposed by male political and scientific bureaucracies that accused those advocating for change of relying on insufficient empirical evidence or faulty scientific method.

By focusing on a few specific issues, we are able to investigate topics in some detail and look at problems that extend

from the local to the global environment. We require students to produce an environmental assessment of the local community and then move to additional readings and projects that focus on issues in Latin America and Africa as well as other localities in the United States. Students analyze problems, present solutions, and suggest programs for implementing the solutions. Topics include local water pollution, agricultural issues, and recent work in genetic engineering to develop pest- and disease-resistant crops.

Students consequently wrestle with the multiple motivations of scientific work—for example, the desire to feed the hungry as well as the desire for corporate profits. Similarly, attention to the context of science allows students to recognize the impact of mono-cropping and of large industrial farms on sustainable communities or women in developing countries.

In class discussions, we approach science as a social construct. As a result, we present a balanced view of science, acknowledging its benefits to

We present a balanced view of science, acknowledging its benefits to society as well as its tendency to serve the dominant powers and reflect dominant social and cultural paradigms.

society as well as its tendency to serve the dominant powers and reflect dominant social and cultural paradigms. Investigating science from an ecofeminist perspective allows students to see that science, if not critically and reflectively applied, can have negative consequences. For this very reason, it is important that citizens be scientifically literate and that scientists work collaboratively with colleagues in the humanities and social sciences to develop successful solutions to environmental problems. This, ultimately, requires that the scientific community take seriously gender, justice, and sustainability concerns.

To view the course syllabus, visit www.wooster.edu/geology/PIDS20006.html. ■

Seeing the World Around You

By Daniel Utley, student, the College of Wooster

AS A STUDENT AT THE COLLEGE OF WOOSTER, I AM FREQUENTLY EXPOSED TO INNOVATIVE COURSES AND FORWARD-THINKING PROFESSORS AND PEERS. MY EXPERIENCE IN SCIENCE, GENDER, AND THE ENVIRONMENT WAS ONE THAT FULLY EMBODIED EVERYTHING I HAD HOPED TO GAIN FROM A LIBERAL ARTS CLASS. I AM A BELIEVER IN INTERDISCIPLINARY STUDIES, AND I THINK THAT CLASSES THAT COMBINE SEVERAL SUBJECTS CREATE UNIQUE LEARNING ENVIRONMENTS AND ATTRACT DIVERSE STUDENT POPULATIONS.

In our class we had a fair mix of science and humanities majors. This was positive in many ways, most notably because everyone had a chance to be an expert in at least some part of the course. As a result, we were able to teach each other through presentations and discussions, which created many opportunities for active learning. As a physics major, I learned a great deal from the women's studies majors about feminist perspectives and about analyzing environmental and scientific issues in ways that take gender issues into account. I also learned how seemingly inaccessible the scientific community can be to those educated in other disciplines. As someone who wishes to become a science educator, this was perhaps the most surprising and valuable lesson I learned from the class.

Each section of our course was organized around a different text or environmental issue. I was deeply moved by our discussions of *Refuge*, a book by Mormon feminist author Terry Tempest Williams. *Refuge* is Williams's story of her mother's battle with cancer, which plays out against a similar mutation in nature when the Great Salt Lake rises far above its usual height on the surrounding avian refuge in Salt Lake City, Utah. This was a book unlike any other I have read. It opened my eyes to a new approach to science and the environment, an approach that accepts the natural ebb and flow of the earth and tries not to harness it, but instead to embrace and love it,

even through tragedy. Our study of the issues raised by the book culminated with a campus visit from Williams, who captivated our class and left us wanting more.

Although all of the students in our class had different reactions to the course materials, we all came away from the experience having learned several very important lessons. First, be critical of what so-called experts say, because there are many scientific claims made to the general public that lack proper supporting evidence. Second, question the motives and practices of large industries; all too often the health of the environment and human workers are sacrificed for the sake of larger profits. Third, be aware of your surroundings and your community to ensure your safety. Do you know, for example, where your drinking water comes from? Finally, consider environmental issues from the perspective of those who are most adversely affected; oftentimes that means women and children.

As a result of my experience in Science, Gender, and the Environment, I feel that I am a better-educated scientist and citizen. My horizons have expanded to incorporate thinking about gender and environment issues on a regular basis. I am very glad the College of Wooster has offered such a course and hope that other institutions will realize the potential of interdisciplinary education in transforming how students see the world. ■

Developing a Scalable, Sustainable Campus Diversity Initiative

By Susan G. Forman, University Professor, Graduate School of Applied and Professional Psychology, Rutgers, the State University of New Jersey

Editor's note: Rutgers, the State University of New Jersey was one of eight institutions to participate in the New Jersey Campus Diversity Initiative (NJCDI). Launched in 2002 with funding from the Allen and Joan Bildner Family Foundation, NJCDI promoted intercultural learning and inclusive excellence. The initiative's work is described in detail in the previous issue of Diversity Digest (volume 9, number 2, 2005).

RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY IS A LARGE, PUBLIC, MULTICAMPUS RESEARCH UNIVERSITY WITH A DIVERSE STUDENT BODY. DURING THE 1990S RUTGERS DID MUCH TO ENSURE THAT THE CAMPUS COMMUNITY HAD AN OPPORTUNITY TO LEARN ABOUT DIFFERENCES. THE UNIVERSITY'S DIVERSITY WORK COULD BE FOUND IN UNDERGRADUATE MAJORS, MINORS, AND COURSES; IN COCURRICULAR PROGRAMMING FOR STUDENTS AND THE LARGER COMMUNITY SPONSORED BY FACULTY AND PROFESSIONAL STAFF UNITS; AND IN SPECIAL INTEREST HOUSING FOR STUDENTS. THE ORGANIZATIONAL STRUCTURE OF THE UNIVERSITY ALSO DEMONSTRATED A DIVERSITY OF DESIGNS IN THE FORM OF ACADEMIC PROGRAMS, ACADEMIC DEPARTMENTS, CENTERS AND INSTITUTES, STAFF OFFICES, AND STUDENT ASSOCIATIONS FOCUSED ON ISSUES OF MANY INDIVIDUAL CULTURAL GROUPS.

From Cultural Literacy to Intercultural Interactions

Despite the scope and depth of this diversity work, some administrators and faculty members were concerned that many students were using these activities, programs, and structures as a way of learning about their own culture, but not others. Although students from a variety of cultural backgrounds felt comfortable at Rutgers, there was a lack of cross-cultural participation in the majority of our culture-related programs, and a lack of intercultural interaction among our students.

Paradoxically, Rutgers had created a situation in which students had so many opportunities to stay in familiar and comfortable cultural contexts that they may well have had little incentive to look outward. There was also concern that, despite a great deal of diversity activity across the university, the lack of connection between many of these efforts diluted their impact on students and the larger community.

In order to address these issues, a university-wide task force appointed by the vice president for academic affairs and chaired by the vice president for undergraduate education examined the status

of multicultural issues in the curriculum. The task force concluded that the university needed to go beyond its emphasis on increasing student knowledge about individual cultures by increasing student understanding of cultural groups in relation to one another, of intercultural interaction, and of ways to promote positive, productive interactions. A call for proposals from the Bildner Family Foundation, issued shortly after the multicultural curriculum task force issued its report, provided Rutgers with an excellent opportunity to obtain resources to support change efforts that had been identified as important by the university community.

Mixing Intercultural and Sustainability Goals

Sustainability quickly surfaced as a primary concern. As a research university, Rutgers was keenly aware of the problem sustaining grant-funded programs. Numerous innovative projects that improve the undergraduate student experience are developed each year at universities across the nation; however, even when these projects are successful, many do not last beyond their pilot stage.

Scalability and sustainability remain unsolved problems. Rutgers was determined to address both by developing a project that would ensure a legacy of intercultural activity and learning.

The university involved numerous faculty members, professional staff, and administrators in developing the project proposal. Brainstorming and planning sessions first included potential stakeholders, and then branched out as a result of the ideas generated to include others who would be involved in implementation. In order to ensure broad knowledge of and support for implementation on all Rutgers campuses, the vice president for undergraduate education formed a leadership committee consisting of the project leader for each campus and key administrators in the central administration. In addition, we organized an intercultural steering committee for each campus, with representation from a broad array of stakeholders and individuals whose support would be crucial for project success.

Members of the steering committees included deans, department chairs, faculty members, student life professional staff, and directors of cultural centers

who provided regular input to the leadership group and were provided with feedback describing how their advice was used in project implementation. We used a variety of campus communication vehicles to publicize project activity, including letters to deans, faculty, and professional staff, articles in the faculty/staff newsletter and the student newspaper, and verbal reports to a variety of groups involved in university governance and management.

Intercultural Faculty Fellows

Our major vehicle for curriculum change was the appointment of intercultural faculty fellows who were expected to revise courses to focus on intercultural interactions. The fellows received a stipend, participated in faculty development seminars, and received technical assistance with assessing the outcomes of their work. We addressed the sustainability and scalability of the fellows' work through our selection criteria for the fellows. In addition to relevance to program objectives, clarity of project plan, soundness of proposed course or curriculum changes, and innovativeness, a peer review committee examined each prospective fellow's proposal for potential impact on students and the number of students the fellow's work would reach. Proposals were also evaluated for their potential link with our introductory writing course, the only course required of all Rutgers students and one that had been recently revised to address intercultural issues.

Rather than developing new "boutique" courses that might not be maintained after termination of the grant funds, we were interested in funding changes in existing large-enrollment courses or in the existing curricula of majors. We also wanted to support changes that would make issues of intercultural interaction central to the

undergraduate experience by establishing links between the various parts of the curriculum. To further broaden and deepen the impact of the fellows' work, we developed a process for bringing student life professional staff together with the fellows and funded student life programs directly connected to the course.

Our project reached thousands of students through multiple academic and student life venues and was both scalable and sustainable. By thinking about scalability and sustainability from the proposal-writing stage of the project, we have been able to ensure diversity and intercultural interaction each are central to the undergraduate curriculum, permeate the undergraduate experience, and are deeply embedded in the Rutgers community. ■

Resources for Science, Diversity, and Global Learning

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human rights circles and exposes the relationships between political and economic injustice, on one hand, and the suffering and illness of the powerless, on the other.

Beyond Borders: Thinking Critically About Global Issues, edited by Paula S. Rothenberg (Worth Publishers), is an interdisciplinary collection that brings today's most pressing issues into the classroom. Designed to prepare today's college students to assume their roles as members of an increasingly global community, this powerful collection includes eighty-two articles written by leading scholars, activists, and policy makers from around the world. ■

Two New Publications on Global Learning

AAC&U's global learning initiative, Shared Futures: Global Learning and Social Responsibility, has released two new publications. ***Assessing Global Learning: Matching Good Intentions with Good Practice***, by Caryn McTighe Musil, is designed to help colleges and universities construct and assess the

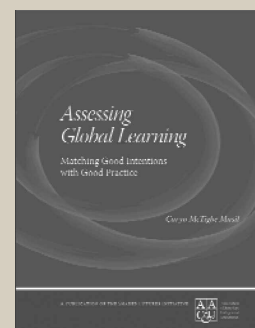
impact of varied, well-defined, developmental pathways through which students can acquire global learning.



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Shared Futures: Global Learning and Liberal Education, by Kevin Hovland, examines the evolving definitions of global learning in the context of previous reform efforts in the areas of diversity, democracy, and civic engagement. It also illuminates how global learning converges with the most powerful current models of liberal education.

Member discounts available

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Enrollment in the Associate Program provides an opportunity for individuals on AAC&U member campuses to advance core purposes and best practices in undergraduate education and to strengthen their collaboration with AAC&U's Office of Diversity, Equity, and Global Initiatives. Associates pay \$60 per calendar year and receive the same benefits as AAC&U Campus Representatives, including subscriptions to our print publications, *Liberal Education*, *Peer Review*, and *Diversity Digest*, electronic copies of our quarterly *On Campus With Women*, invitations to apply for grant-funded projects, and advance notice of calls for proposals for institutes and meetings. For more information, please visit www.aacu.org or call Renee Gamache at 202-884-0809.

About AAC&U

AAC&U is the leading national association concerned with the quality, vitality, and public standing of undergraduate liberal education. Its members are committed to extending the advantages of a liberal education to all students, regardless of academic specialization or intended career. Founded in 1915, AAC&U now comprises more than 1,000 accredited public and private colleges and universities of every type and size.

AAC&U functions as a catalyst and facilitator, forging links among presidents, administrators, and faculty members who are engaged in institutional and curricular planning. Its mission is to reinforce the collective commitment to liberal education at both the national and local levels and to help individual institutions keep the quality of student learning at the core of their work as they evolve to meet new economic and social challenges.

Information about AAC&U membership, programs, and publications can be found at www.aacu.org.

From AAC&U Board Statement on Liberal Learning

AAC&U believes that by its nature...liberal learning is global and pluralistic. It embraces the diversity of ideas and experiences that characterize the social, natural, and intellectual world. To acknowledge such diversity in all its forms is both an intellectual commitment and a social responsibility, for nothing less will equip us to understand our world and to pursue fruitful lives.



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