

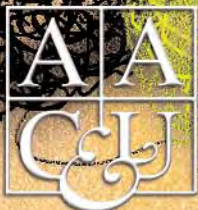
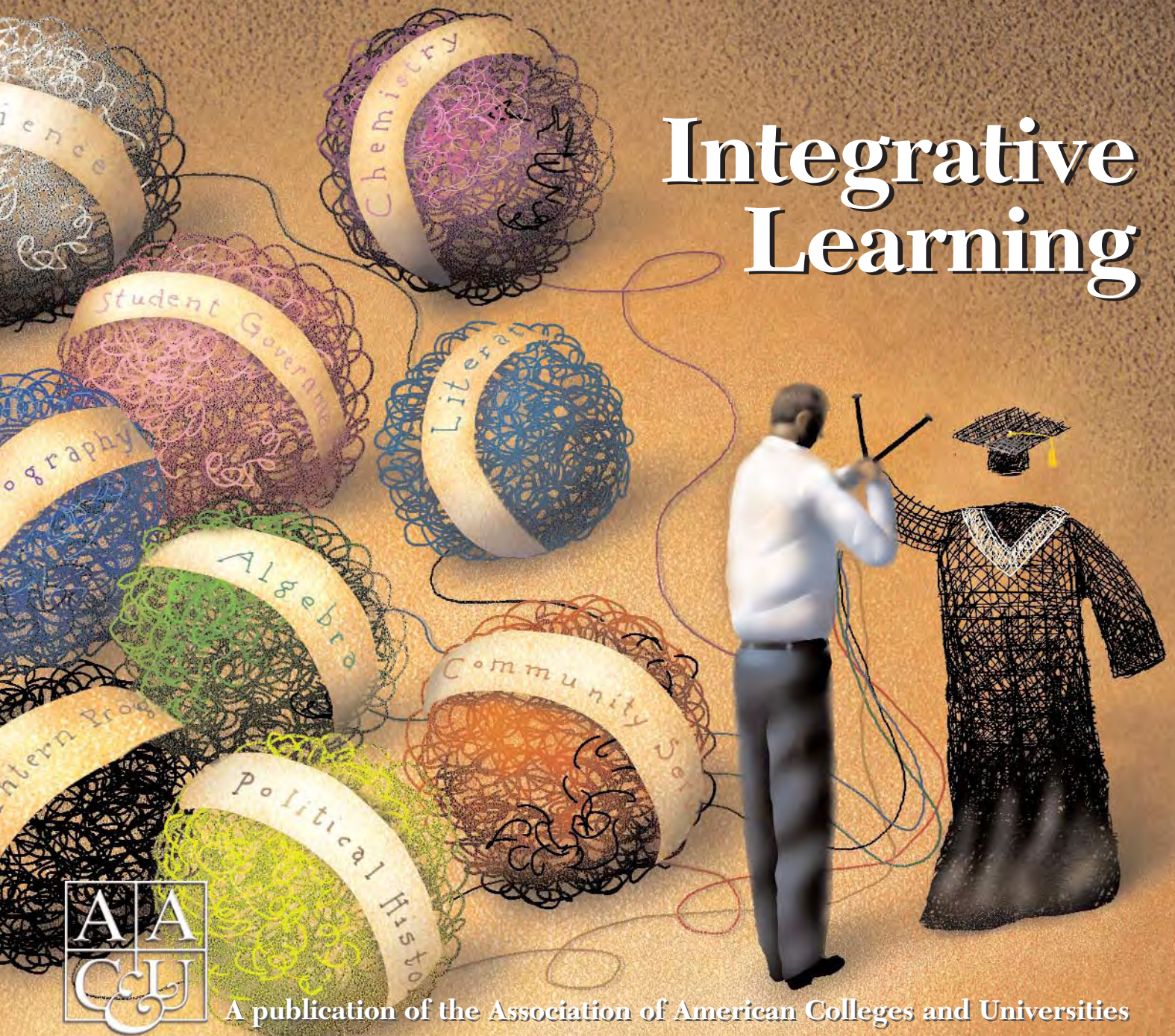
SUMMER/FALL 2005

VOL. 7, NO. 4

peerReview

Emerging trends and key debates in undergraduate education

Integrative Learning



A publication of the Association of American Colleges and Universities



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Cover Illustration by Dave Cutler for peerReview.

Fostering students' abilities to integrate learning—across courses, over time, and between campus and community life—is one of the most important goals and challenges of higher education.

—Statement on Integrative Learning, Association of American Colleges and Universities,
The Carnegie Foundation for the Advancement of Teaching

Integrative learning opportunities encourage students

to make connections between their new and existing knowledge, skills, and experiences, which in turn allows them to respond to the changing needs of society. This issue of *Peer Review* highlights the work produced by Integrative Learning: Opportunities to Connect, a joint project of the Association of American Colleges and Universities (AAC&U) and the Carnegie Foundation for the Advancement of Teaching.

As part of this project, ten campuses were selected competitively from a pool of 139 applicants to “develop and assess advanced models and strategies to help students pursue learning in more intentional, connected ways.” The ten schools selected to participate—Carleton College, College of San Mateo, LaGuardia Community College, Massachusetts College of Liberal Arts, Michigan State University, Philadelphia University, Portland State University, Salve Regina University, State University of New York at Oswego, and University of Charleston—were encouraged to develop new networks, models, and evidence-based arguments to provide students with challenging integrative learning opportunities.

This edition of *Peer Review* also draws richly on the work of the Greater Expectations Forum on Twenty-First-Century Liberal Arts Educational Practice Working Group on Integrative Learning (see box at right).

In addition to the various perspectives on integrative learning provided in the articles in this issue, I want to draw attention first to the delightful cover art, created by Dave Cutler. For each issue

of *Peer Review*, we collaborate with Dave to find the right visual metaphor that will effectively convey the issue's theme. In the process of coming to the final idea for this edition's cover, we explored the ideas of using puzzle pieces, connected dots, or tapes to represent the ideals of integrative learning. Finally we agreed on a concept that symbolizes the essence of integrative learning—a student using the threads from the many components of an undergraduate education to knit those experiences into the cap and gown of an integrated liberal education. The final artwork truly captures the spirit of the Integrative Learning Project—students who are able to integrate their learning to make informed personal, professional, and civic decisions throughout their lives.

—SHELLEY JOHNSON CAREY

**Greater Expectations Forum on Twenty-First-Century
Liberal Arts Educational Practice**

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Special thanks to Andrea Leskes from the AAC&U Office of Education and Quality Initiatives and Mary Taylor Huber from The Carnegie Foundation for the Advancement of Teaching for their guidance in planning and producing this issue.



Integrative Learning for Liberal Education

By **Mary Taylor Huber**, senior scholar; **Pat Hutchings**, vice president; and **Richard Gale**, senior scholar— all at the Carnegie Foundation for the Advancement of Teaching

Educators who follow the listserv of the Professional and Organizational Development Network in Higher Education (POD)—whose members staff and direct teaching and learning support centers—may have seen the following query pass over their screens in January this year: “Dear PODers,” wrote Victoria Mundy Bhavsar, “In my discipline (agriculture), we are very fond of talking about integrated multidisciplinary learning experiences. I imagine other disciplines do this, too. Could I get some reflections on what this might actually mean in practice? Besides making students take a whole big lot of classes in several different departments and hoping they ‘get it’ by the end!”

This is the \$64,000 question for many educators concerned with the reform of undergraduate education today. Convinced that undergraduates’ experience has become too fragmented to prepare them for the complexities of today’s world, educators across the country are designing new opportunities to help students put the pieces together. These innovations and experiments aim to help students connect their learning across fields, and also to integrate classroom work with experiences in larger campus and community contexts—and to do so in ways that strengthen learning throughout the college years and beyond.

Such work is in keeping with recent thinking by Carol Geary Schneider and her colleagues at the Association of American Colleges and Universities (AAC&U), who identify three key themes in the “reinvention of liberal education” today—themes that,

taken together, define a “New Academy that is taking shape within the old one” through a variety of campus, system-wide, and national initiatives. These include a new, across-the-curriculum focus on “inquiry and intellectual judgment,” a renewed concern with “social responsibility and civic engagement,” and a new interest in “integrative learning.” Indeed, they suggest that integrative learning may one day “take its rightful place alongside breadth and depth as a hallmark of a quality undergraduate education” (Schneider 2004, Leskes 2004).

This interest in integrative learning is the focus of a partnership between the Carnegie Foundation for the Advancement of Teaching and AAC&U—a national project involving ten campuses, each committed to deepening our understanding of this crucial aspect of undergraduate education. One of the first products of this work has been a “Statement on Integrative Learning,” which points out: “Integrative learning comes in many varieties: connecting skills and knowledge from multiple sources and experiences; applying theory to practice in various settings; utilizing diverse and even contradictory points of view; and, understanding issues and positions contextually.” Of course, developing such a synthesizing, creative cast of mind has long been a goal of liberal education, albeit one that students have been expected, more often than not, to pick up for themselves. What’s new today is that institutions are seeking to help students see the larger patterns in their college experience, and to pursue their learning

in more intentionally connected ways. To put it a bit differently, the capacity for integrative learning—for connection making—has come to be recognized as an important learning outcome in its own right, not simply a hoped-for consequence of the mix of experiences that constitute undergraduate education.

Integrative Learning for Twenty-First-Century Life

There are many good reasons for this emphasis, including a new appreciation of the importance of integrative learning for contemporary life and thought. Students headed for professional careers will still need specialized expertise. But with flexibility and mobility as watchwords in today's economy, few college graduates can expect to spend a whole career with the same employer or even in the same line of work. Further, the role of interdisciplinary collaboration and exchange is growing both within and outside the academy. In government, industry, medicine, and higher education alike, problems are vetted and solved by bringing together people who are trained in different fields. Because of changes in knowledge and communication practices, including technological advances and globalization, all of us are faced with information that is more complex, fast moving, and accessible than ever before, challenging the integrative and critical capacities of experts and novices alike. Psychologist Robert Kegan summarizes the scope of the issue succinctly in the title of his 1998 book *In Over Our Heads: The Mental Demands of Modern Life*.

This is true of civic life as well. We no longer live in a world where it is easy to feel in control or empowered to affect what's happening in one's own neighborhood, much less in the nation or the world. Yet at the same time, our personal choices, even the food, clothing, and cars we buy, have immediate consequences for those far away. Speaking about the results of a massive international study of air pollution, University of New Hampshire scientist Berrien Moore said in an interview on the *NewsHour with Jim Lehrer*, "What happens in Beijing will affect Boston, what happens in Boston will affect Paris, et cetera. And I think that's one thing that we will have . . . even as we begin to solve local problems, this connectivity of the planet will come back at us time and again" (2004). To participate responsibly as local citizens, then, people must also be citizens of the world, aware of complex interdependencies and able to synthesize information from a wide array of sources, learn from experience, and make connections between theory and practice.

Our colleges and universities can play an important role in helping students develop the "integrative arts" necessary for meeting today's challenges (Schneider 2004), and many campuses already embrace such a goal. College catalogs make powerful promises about students' personal and intellectual development as thinkers and citizens—and certainly there are inspiring models and existing proof to show what may be possible (Colby et al.

2003). To meet these commitments to integrative learning more fully, and to meet them for all students, is the difficult challenge ahead.

A Difficult Challenge

No one should underestimate the difficulty of this new direction because it runs against the grain of many of the most established features of the undergraduate experience. Consider, for example the experience of University of Kansas psychologist Dan Bernstein, who wants his psychology majors to develop "a nuanced understanding of the complex origins of human action," but worries that "individual courses typically promote specialized understanding of *one* explanatory model":

Teachers who are trying to cover as much of the course material as possible rarely give assignments that ask students to step back and compare different models of human action. Instead they typically presume (or hope) that the range of courses required for the major will provide an occasion for students to make those comparative reflections on their own (Bernstein, Marx, and Bender 2005, 40).

Clearly Bernstein's analysis applies well beyond the field of psychology, and the challenges are not only at the level of the individual course. There are structural arrangements that privilege departmental and disciplinary agendas over general education and interdisciplinary work. Administrative systems that define faculty roles and rewards have been slow to recognize interdisciplinary and applied



scholarship, not to mention the extra efforts involved in designing, teaching, and assessing courses aimed at integrative learning, and the persistent gaps between programs in the professions and the liberal arts and sciences, the curriculum and the cocurriculum, and campus and community life.

Many of the ways that courses are delivered and taken encourage faculty and students alike to think of learning as discrete, unconnected chunks. As Gerald Graff explained in the *Chronicle of Higher Education* in 1991, “The classes being taught at any moment on a campus represent rich potential conversations between scholars and across disciplines. But since these conversations are experienced as a series of monologues, the possible links are apparent only to the minority of students who can connect disparate ideas on their own.” Faculty often talk about valuing the transferability of knowledge and the meaning making that occurs when students link diverse ideas from multiple sources, classes, courses, and disciplines—but teaching for such outcomes can be difficult, and is rarely explicit.

Exacerbating this tacit message of fragmentation is the increasing complexity of students’ lives. According to the U.S. Department of Education, traditional students entering college full-time right after high school, supported by parents or working only part-time, now account for only 27 percent of undergraduates; and more than 40 percent in 1999–2000 were more than twenty-four years old. Many have families and jobs that necessarily take precedence

over schoolwork. And a growing proportion of students are attending more than one institution over their college careers (McCormick 2003). By further fracturing undergraduates’ college experience, these “swirling” patterns of enrollment make integrative learning across courses and contexts even more difficult.

They suggest, too, that while curricular changes can do a lot to help students connect the dots, such changes cannot be the only solution. We also need approaches that help students develop these capacities to make connections for *themselves*. Helping students to become more self-aware and purposeful—more intentional—about their studies is a powerful idea, and it is, in our view, the key to fostering integrative learning.

Intentional Integration

Integrative learning does not just happen—though it may come more easily for some than for others. Whether one is talking about making connections within a major, between fields, between curriculum and cocurriculum, or between academic knowledge and practice, integrative learning requires work. Of course, students must play an important role in making this happen, but their success depends in large part on commitment and creativity from everyone involved.

To support integration, many colleges and universities are developing new kinds of institutional scaffolding within and between their general education programs (breadth), their majors (depth), and—in many cases—campus and community life.

On a national tour of campuses today, one will find linked courses that invite students to take different perspectives on an important issue, capstone projects that ask students to draw on learning from earlier courses to explore a new topic or solve a problem, experiences that combine academic and community-based work, or systems of journaling and reflection like those known as learning portfolios. But these useful examples also serve to highlight one of the next challenges: to link the various sites and strategies for integration by putting in place a variety of structures and practices that enable students to connect, say, their first-year learning-communities experience to a final capstone course or to study abroad in the junior year. In order to be truly effective for students, integrative learning must be not an isolated event but a regular part of intellectual life.

As the articles and examples in this issue of *Peer Review* attest, combinations of such designs can be found in institutions of all types and persuasions. Although each has a unique approach growing out of campus mission and history, there are common threads. Most institutions that have made headway are creating new and varied opportunities for integrative learning, engaging students in reflection on their learning, involving faculty in teaching that nurtures integrative arts, and building campus-wide interest and experience in assessment.

If there is a through-line, in all these initiatives, it is the importance for everyone involved of being intentional about pursuing integrative learning goals.

Indeed, as Carnegie Foundation President Lee Shulman reminded participants in the Integrative Learning Project in July 2004, there's a sense in which all learning is integrative—the real questions are around what, for what purposes, and how intentionally integration is sought. It is hard to think of a college course or curriculum that could *not* be taught or designed—and taken—with integrative learning in mind.

We conclude by returning to the \$64,000 question with which this article began. “Could I get some reflections on what this might actually mean in practice?” This is the winning question not only because of its focus but also because it was asked in a public forum. It is a reminder that efforts to strengthen programs that foster integration need not, and should not, be pursued alone. Too often, good work in teaching and learning remains with its creators, unavailable for others to consult, review, and build on and inaccessible to those who really want the help. Colleagues—and campuses—need to work together, sharing what they are finding out about integrative learning, developing new assignments for fostering integration, creating new models for assessing outcomes, and building on one another's insights and accomplishments.

Local efforts can be reinvigorated through participation in a community of educators working toward similar goals, and that community, in turn, can contribute to building knowledge that informs efforts to foster integrative learning at colleges and universities around the

world. Such an approach will not only deepen our collective understanding of how students learn to integrate their undergraduate experiences and what that “might actually mean in practice”; it will give us the tools and knowledge and networks necessary to go beyond “hoping they ‘get it’ by the end.” ■

This article draws on a publication by Mary Taylor Huber and Pat Hutchings, Integrative Learning: Mapping the Terrain (Association of American Colleges and Universities, 2004).

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In addition to its annual meeting, AAC&U offers a series of working conferences and institutes each year. Additional information about the upcoming meetings listed below is available online at www.aacu.org/meetings.

Network for Academic Renewal Meetings

October 20–22, 2005

Integrative Learning:

Creating Opportunities to Connect
Denver, Colorado

November 10–12, 2005

The Civic Engagement

Imperative:

Student Learning and the
Public Good

Providence, Rhode Island

March 9–11, 2006

General Education and

Outcomes That Matter in a
Changing World

Phoenix, Arizona

April 20–22, 2006

Learning and Technology:

Implications for Liberal
Education and the Disciplines

Seattle, Washington

AAC&U's Annual Meeting

January 25–28, 2006

Demanding Excellence:

Liberal Education in an Era of
Global Competition, Anti-
Intellectualism, and Disinvestment

Washington, DC



Integrative Learning and Interdisciplinary Studies

By Julie Thompson Klein, professor of humanities in interdisciplinary studies, Wayne State University

Heightened interest in integrative learning and interdisciplinary studies has led many to wonder about the relationship between these concepts. “Integrative learning” is the broader of the two. It is an umbrella term for structures, strategies, and activities that bridge numerous divides, such as high school and college, general education and the major, introductory and advanced levels, experiences inside and outside the classroom, theory and practice, and disciplines and fields. “Interdisciplinary” studies is a subset of integrative learning that fosters connections among disciplines and interdisciplinary fields. This essay examines historical and pedagogical links between integrative learning and interdisciplinary studies.

Historical Perspective

Neither integration nor interdisciplinarity is new. A Working Group on Integrative Learning formed through the Association of American Colleges and Universities’ Greater Expectations initiative traced underlying ideas of connection and synthesis to ancient philosophy (2003). The earliest notable uses of the term “integration” in modern history appeared in books on principles of psychology by Herbert Spencer (1855) and William James (1896) and in Alexis Bertrand’s theory of integrated instruction (1898). In the 1800s, integration was also linked with the role schools play in promoting social unity, and the Herbartian movement’s doctrine of correlation, which supplemented the doctrine of concentration by recognizing “natural relations” among subjects (Ciccorico 1970, 60).

The meaning of integration expanded in the twentieth century. At the postsecondary level, integrating disciplines and developing the “whole” person were primary values in the general education movement that arose in the opening decades, though interdisciplinary models differed on whether the proper locus was the content of texts in a prescribed curriculum or the process of knowing and understanding contemporary problems. In K–12, integration was associated in the 1920s with the Progressivists’ social democratic vision of education centered on students’ personal and social concerns, and the term “integrated curriculum” was linked with the project approach. It also appeared in conjunction with the core curriculum movement in the 1930s, with problem-centered cores in the 1940s and 1950s, and at several points with a broad-fields approach, skills across subjects, and child-centered, activity-based, and experience-based curricula. (Ciccorico 1970, 62; Beane 1997, 2–3, 28–29; Klein 2002, 5–6).

A key distinction emerged as well. By the mid-1920s, organismic and Gestalt psychologists had introduced the notion of an integrated personality and described processes by which individuals seek unity (Beane 1997, 2). Subsequently, at a 1935 meeting, sponsored by the National Education Association, and a 1937 book called *Integration: Its Meaning and Application* (Hopkins 1937), participants concluded that complete unity was impossible. They proposed thinking in terms of “unifying,” not “unified,” approaches. At a 1948 workshop sponsored by the

Foundation for Integrative Education, participants distinguished *content integration*, in bridging physical sciences with arts and letters, from *process integration*, in the interplay of an individual and an environment. They also distinguished *integration* as synthesizing accepted postulates from *integrative* building of new conceptual modes capable of producing a holistic experience. Technical distinctions were not observed uniformly, but an important shift in thinking had occurred: from single structures or teaching methods and linking disciplinary categories to integrative learning processes (Ciccorico 1970, 60–61; Taylor 1969, 130).

In the latter half of the century, the two concepts were sometimes conflated and sometimes opposed. Writers on social science research and higher education contrasted “interdisciplinary” generalizing and connecting current knowledge formations with constructing new “integrative” concepts that raise epistemological questions, such as the paradigms of “area” and “gender.” In K–12, “curriculum integration” reappeared in the closing decades as a generic term for varied approaches that draw on more than one subject or discipline, including “thematic studies,” “multidisciplinary” and “multisubject” designs, integrated units, skills across the curriculum, a social-problems approach to science education, and combined constructs of “social studies” and “whole language.” Several groups also advocated integration, including early childhood educators and proponents of outcomes-based education who argued that sophisticated levels of

learning cannot be attained by studying subjects separately. The movement toward a “brain-based” approach in education furthered the case, buoyed by research indicating the brain is a parallel processor that makes meaning by patterning (Klein 1990, 24–25; Beane 1997, 15–18).

Three added catalysts exist today across the entire educational spectrum. The first is the “knowledge explosion.” A profound increase in the number of specialties and fields has exacerbated the problem of fragmentation, accelerating calls for connection-making. The second is heightened problem focus. As Debra Humphreys notes in this issue, complex problems in our work lives and in society require us to draw upon multiple areas of knowledge. The third is educational reform, linking the two concepts with a family of complementary pedagogies.

of disciplinary perspectives and synthesis are often missing. Additive models also unfold on the ground of disciplinary logic, preserving existing compartmentalizations, content, and procedures. In contrast, interdisciplinary models restructure the curriculum with explicitly integrative seminars and experiences that are typically theme-, problem-, or question-based. Team teaching is also genuinely collaborative.

There is no unique or single pedagogy for integrative interdisciplinary learning. Recalling the role faculty in experimental colleges played in developing both interdisciplinary curricula and integrative pedagogies, William Newell highlights intersections in collaborative and experiential learning, learning communities, living/learning communities, and multicultural learning. All of these approaches draw from multiple perspectives on a complex phenomenon for insights that can be integrated into a richer,

There is no unique or single pedagogy for integrative interdisciplinary learning.

Integrative Interdisciplinary Pedagogies

The intersection of integration and interdisciplinarity hinges on a crucial distinction. Multidisciplinary approaches align subjects or disciplines in parallel schedules or units. However, students do not necessarily have integrative experiences. Even when team teaching occurs, the teachers present their perspectives separately. Students gain breadth of knowledge, but explicit analysis

more comprehensive understanding. In integrative learning, perspectives emanate from disciplines, cultures, subcultures, or life experiences. In interdisciplinary studies, Newell stipulates, the perspectives come solely from disciplines, though today they may also come from interdisciplinary fields and paradigms. One of the distinctive features about experiential colleges, he adds, was combining strategies. A course in a living/learning community

might draw on several disciplines (interdisciplinary study), cultures (multicultural learning) and field experiences (service learning), while using collaborative and traditional learning formats (2001, 196–98).

The volume *Innovations in Interdisciplinary Teaching* underscores the “multiplicative power” of integrative strategies identified by Newell. The book highlights correspondences between interdisciplinarity and collaborative learning, feminist pedagogy, learning communities, multicultural pedagogy, team teaching, writing-intensive teaching, inquiry- and discovery-based teaching, and performance-based teaching (Haynes 2002). The following strategies also appear across all types of institutions today:

- team teaching and team planning
- clustered and linked courses, learning communities
- interdisciplinary core seminars at introductory and capstone levels
- thematic or problem focus in courses
- proactive attention to integration and synthesis, with process models theories and methods from interdisciplinary fields
- collaborative learning in projects and problem-based case studies
- integrative learning portfolios

Integrative interdisciplinarity reconceptualizes the roles of teacher and student alike. The traditional teaching functions of telling, delivering, directing, and being a sage on the stage are replaced by the models of mentor, mediator, facilitator, coach, and guide. James Davis’s image of “inventing

the subject” (1995) captures the movement teachers make beyond existing subjects and disciplines as they connect knowledge, information, methods, concepts, and theories in order to achieve a more comprehensive understanding. The process is constructivist at heart. Students are engaged in “making meaning.” Application of knowledge takes precedence over acquisition and mastery of facts alone, activating a dynamic process of question posing, problem posing and solving, decision making, higher-order critical thinking, and reflexivity.

A set of core capacities emerges from the intersection of the two concepts:

- the ability to ask meaningful questions about complex issues and problems
- the ability to locate multiple sources of knowledge, information, and perspectives
- the ability to compare and contrast them to reveal patterns and connections
- the ability to create an integrative framework and a more holistic understanding

Contextuality, conflict, and change are the defining parameters of this kind of learning. Contextuality is a different metaphor of knowledge and education than unity, which assumed consistent, logical relations within a linear framework with the expectation of achieving certainty and universality. Contextuality accepts the contingent character of knowledge and action. Students need to tolerate ambiguity and paradox if they are to take grounded stands in the face of multiple and sometimes conflicting per-

spectives. The relational skills they gain also foster the ability to adapt knowledge in unexpected and changing contexts. The answers they seek and the problems they will need to solve as workers, parents, and citizens are not “in the book.” They will require integrative interdisciplinary thinking. ■

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Integrative Learning and Assessment

By **Ross Miller**, director of programs, Office of Education and Quality Initiatives, Association of American Colleges and Universities

Integrative learning is an ambitious student learning goal, long espoused in higher education and in the world at large. It is also a goal that for too long has depended upon serendipity rather than planning in its achievement and is often not included as an element in assessments. But if a college or university is committed to integrative learning as an expected outcome, it must create intentional approaches to providing integrative experiences and assessing the quality of student integrative achievement.

For learning in virtually all disciplinary and skill areas, as high levels of achievement are reached, discrimination of levels of quality becomes increasingly difficult. What is good writing or a good musical performance according to one expert is, according to another, average or poor. Such differences in assessment may derive from tacit differences in standards or the elements considered during the assessment—differences that must be resolved for more consistent judgments to be made.

Evaluation experts pursue reliability in measurement through clear definitions, training of evaluators, and well-designed problems that elicit evidence of learning. Approaching the intentional achievement and assessment of integrative learning (or any other complex learning outcome) requires similar care. Those fostering the learning should agree upon clear definitions and desired outcomes and share their expectations with learners; create engaging, authentic assignments ripe with integrative possibilities to gather evidence of student accomplishment; and hone their skills of discrimination and explanation to provide meaningful formative and summative

feedback to students. As with any complex learning, repeated experiences over time, with expert formative feedback, are likely needed to foster integrative learning. (Teachers will also benefit from repeated experiences in assessment, which over time will improve the validity and reliability of integrative learning assessments.)

The development and use of rubrics for scoring complex student work is gaining acceptance. Grant P. Wiggins suggests that rubrics used for any purpose acquire meaning for students when they see the rubric in use on actual examples of work (1993, 53). If work is assigned to students with integrative outcomes as an expectation, instructors must have thought through what those outcomes will “look like” in enough detail to be able to separate the high-quality work from the lesser, and to explain their judgments in ways that will help students to improve. Leading students through a sample scoring process of an actual piece of work will contribute to student understanding and success.

Clear Definitions, Shared Expectations

The term “integrative learning” represents many different behaviors that can range from the simple and commonplace to the complex and original. “Making connections” among learning experiences begins in early childhood and continues throughout life. During college-level study, integrative learning can involve

- usefully blending knowledge and skills from different disciplinary areas, as in a learning community;

- putting theory into practice, as in a student teaching semester or nursing clinical practice;
- considering multiple perspectives to advance collaborative problem solving, as in a senior capstone project completed by a team of students from different majors;
- adapting the skills learned in one situation to problems encountered in another, as when a business student conducts market research to help a community agency estimate the potential client load for a new branch office;
- reflecting upon connections made over time among academic, cocurricular, and preprofessional experiences, as when a student writes reflective essays in a multiyear portfolio;
- “Across-the-curriculum” integration of skills with learning in disciplinary or interdisciplinary settings, as when writing and quantitative skills are used in history or women’s studies.

Given the variety of behaviors represented by the concept of integrative learning, a first step toward assessment of student outcomes must be to define what a particular campus or program *actually expects students to do* as integrative learners. A professional program might commit to “putting theory into practice,” while a science program might focus on connections among science disciplines. *Institutions* might commit to one kind of integrative learning for all students, while *programs* might have additional, different integrative goals specified for their own graduates. *Defining goals for integrative learning is a vital first step toward*

planning and implementing intentional learning and assessment.

Assessment Tools for Different Kinds of Integrative Learning

A few examples of assessments and conceptual frameworks used by different campuses will illustrate how some are defining and fostering integrative learning. Because each campus or program will likely define for itself what integrative learning means, these assessments are offered as potential models for adapting, not simply adopting. Aligning local assessments with the educational experiences that students have is required to assure reasonable validity of assessments.

Modest Beginnings

Checking for the presence of integrative thinking or action in student work and rating its quality is a simple tactic for assessment. In this case, assessment of integration becomes one element within a longer assessment rubric. The assessment checklist for the introductory essay of a portfolio created in a learning community at New Century College at George Mason University includes a check box for “connections across” course experiences as one element among six assessed. The portfolio assessor, in reviewing the essay, would check one of the following statements to match his or her assessment of the quality of student work:

- Excellent: consistently makes insightful connections across course
- Satisfactory: makes insightful connections across course experiences
- Adequate: makes connection between/among ideas/experiences

- Unsatisfactory: connection among readings, experiences, etc., rather general (Oates and Leavitt 2003, 24–25.)

Multi-Definition Rubric

Bowling Green State University provides faculty and students with rubrics to be used (or adapted) for assessment of university learning outcomes. “Connection” itself is not specified as a learning outcome—it is viewed as an important means of achieving specified outcomes. The “connection” rubric begins with a definition:

“Connecting” is the essence of creative problem solving, shown in synthesizing knowledge within and across courses, integrating theory and practice, linking academic and life experiences, and relating one’s self and culture to diverse cultures within the U.S. and globally. (See www.bgsu.edu/offices/provost/Assessment/Connect.htm.)

The rubric presents four levels of achievement with descriptive statements for each level that cite elements of the definition (although not verbatim). The rubric also allows multiple kinds of integrative behavior to contribute toward a particular level. Levels 1 and 4 are shown in figure 1. The full rubric also includes levels 2 (novice) and 3 (proficient). For a more analytic approach, one could alter the rubric and scoring instructions to have the assessor indicate both the kind(s) and the quality of integration observed. Such an assessment could then guide formative conversations and work about improving specific kinds of integrative behavior.

Integration During Performance

Observing students during field placements often results in seeing them integrate theory with practice. Student teaching assessment forms may list a variety of desired teaching behaviors, many of which are integrative. Following are some examples of how different institutions describe these behaviors:

- Connects lessons to learning standards (State University of New York at Stony Brook)
- Articulates connection among concepts, procedures, and applications (Pennsylvania State University)
- Demonstrates the ability to integrate content across the curriculum (University of Delaware)

- Lessons incorporate insights from other disciplines (State University of New York at Stony Brook)

Observation forms often contain Likert-style rating scales along with spaces for written comments that guide a coaching conversation following the observation.

Authenticity, Analysis, and Synthesis

In an insightful analysis of students' interdisciplinary work, Veronica Boix Mansilla suggests using three factors to assess the quality of integration (2005, 18–21). Working from a definition of “interdisciplinary understanding” as “the capacity to integrate knowledge and modes of thinking drawn from two or more disciplines to produce a cognitive

advancement . . . in ways that would have been unlikely through single disciplinary means,” she selects three dimensions as the foundation for assessment:

1. Disciplinary grounding (Have appropriate disciplines been selected for the work and are the concepts used in accurate ways?)
2. Integrative leverage (Has a new understanding been generated that would not have been possible using a single discipline?)
3. Critical stance (Is the goal of the work significant and does the integration withstand critique?)

Mansilla argues that a student's thinking must be “made visible” in order for assessment of integration to be possible, suggesting that writing about the knowledge produced and reflecting on the work are two possibilities. Given the generic nature of the areas suggested for assessment, this model could be developed for many different kinds of integrative work. While Mansilla suggests that “the goal of quality interdisciplinary student work is to produce a cognitive advancement,” the affective and aesthetic outcomes of student integrative learning can reinforce and motivate students to persist or even increase their learning efforts and should not be ignored.

More on Writing

Christopher R. Wolfe and Carolyn Haynes (2004, 126–169) developed the “Interdisciplinary Writing Assessment Profiles” to delve deeply into the quality of interdisciplinary student work. They view this tool as having potential to guide

Figure 1. Levels of achievement with descriptive statements

Level 1 Connection (Beginner)

- Describe similarities and differences in a collection or set of items
- Categorize items or observations into groups
- Recognize simple links among topics or concepts in a course
- Offer accurate definitions of terms and concepts
- Describe the setting (e.g., context, environment, culture, domain) in which connections are being made

Level 4 Connection (Advanced)

- Identify ways to reconcile diverse or conflicting priorities, viewpoints, or options
- Call attention to something that has not been adequately noticed by others (e.g., a subtle or deep relationship, novel findings or interpretations, the context or frame of reference)
- Apply frameworks from multiple domains of knowledge and practice to create something (e.g., business plan, musical composition, thesis, capstone paper, research project)
- Integrate diverse elements into a product, performance or artifact that fits its context coherently

See www.bgsu.edu/offices/provost/Assessment/Connect.htm

students in planning interdisciplinary writing as well as providing data for program assessment. The detailed procedure includes four dimensions, two of which could be adapted to assessment of integrative learning: *multidisciplinary perspectives* and *interdisciplinary integration*. Scoring statements for the

three categories assessed in *interdisciplinary integration* appear in figure 2.

Clear scoring instructions guide the details of the assessment process developed by Wolfe and Haynes. The profiles, along with scoring instructions and validity and reliability information, can be found at

www.units.muohio.edu/aisorg/pubs/reports/InterdisWritingProfile.pdf.

Toward Intentional Learning and Assessment

A well-written assessment tool represents a substantial amount of analytic and strategic thinking, all of which, when shared in thoughtful ways among students and faculty, can contribute to improved learning and teaching. The examples and conceptual frameworks presented here provide interesting possibilities for creating assessment tools for integrative learning of many kinds that will serve individual campus needs. While developing assessments is difficult analytical work, that work can be greatly leveraged to improve teaching and learning by using the assessments to alert students *at the start of an assignment to precise expectations for their work and elements critical to assessment*. Assessments can also provide formative advice as students develop their projects. Finally, campuses can use assessments to inform students and faculty of the achievements to be celebrated and the deficiencies to be improved. ■

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Figure 2. Excerpted Scoring Instructions from “Interdisciplinary Writing Assessment Profiles” (Wolfe and Haynes 2003)

INTERDISCIPLINARY INTEGRATION

Creating Common Ground (Category 1)

- Presents a clear rationale for taking an interdisciplinary approach.
- Assumptions from more than one discipline are made explicit and compared.
- Compares and/or contrasts disciplinary perspectives.
- The problem is explicitly defined in neutral terms that encourage contributions from more than one discipline.
- Creates a common vocabulary that can be applied to the object of study.

New Holistic Understanding (Category 2)

- One or more novel metaphors are presented.
- A preexisting metaphor is used or applied in a novel way.
- One or more novel models are presented.
- A preexisting model is used or applied in a novel way.
- A new theoretical interpretation or understanding is presented which explicitly draws on more than one discipline.

Application of the New Holistic Understanding (Category 3)

- The new metaphor, interpretation, or model is applied to a new situation or phenomenon.
- The new metaphor, interpretation, or model is applied in a novel way to an established “text,” situation, or phenomenon.
- The new metaphor, interpretation, or model is explicitly tested through observation, data collection, or lived experience and reflection.
- The new metaphor, interpretation, or model is used in a significant way to guide inquiry.
- The new metaphor, interpretation, or model is tested by using it to solve a problem.
- Interdisciplinary theory is used to assess the approach taken.

Note: If credit was not given for any category 2 [above] items, then credit is possible only for the last point (Interdisciplinary Theory).

Making Connections: Integrated Learning, Integrated Lives

By Paul Arcario, dean of academic affairs; **Bret Eynon**, assistant dean of academic affairs and director, LaGuardia Center for Teaching and Learning; and **J. Elizabeth Clark**, associate professor—all at LaGuardia Community College

On any given day on the campus of LaGuardia Community College, most students come to us from jobs, from other schools, and from caring for families and children. The college educates New Yorkers of all backgrounds, ages, and means and helps students become full participants in the city's economic and civic life. Approximately 65 percent of LaGuardia students are female, more than 65 percent are immigrants, and more than 75 percent are students of color. The campus bristles with energy as people hurry to classes, the library, and computer labs, and then rush off campus to their next commitment. The college serves twelve thousand matriculated students and another twenty-eight thousand in continuing education. Many students struggle under the load of full-time jobs and full-time class schedules, barely managing to meet the demands of each. In their hurried approach to education, students often miss the opportunities to find critical intersections between their personal, professional, and educational lives. As passengers on life's express train, they usually don't have time to get off and make those connections.

Working with the Integrated Learning Project (ILP), a three-year initiative of the Carnegie Foundation and the Association of American Colleges and Universities (AAC&U), LaGuardia seeks to transform the hurried, fragmented nature of our students' education by creating substantial, integrated connections between their courses and helping them link coursework to the rest of their lives. Restructuring the

first year at the college and using electronic student portfolios, or e-portfolios, LaGuardia aims to help students overcome fragmentation and make the connections that are vital for personal growth and academic success. Moreover, as LaGuardia works to explore and implement integrated learning on its own campus, it is also encouraging other City University of New York (CUNY) campuses to connect previously disparate classes into an intellectual whole.

LaGuardia's students make this task particularly fascinating and important. As the swell of new immigration has reshaped New York City, and Queens has become the Lower East Side of the twenty-first century, LaGuardia has been transformed. At last count, LaGuardia students originate from 158 different countries—including Columbia, Brazil, Zimbabwe, Pakistan, Rumania, and Thailand—and speak 108 different first languages. The institutional mission revolves around meeting the needs of this incredible student body. LaGuardia treasures its diversity, and recognizes that it translates into a campus of students who have been traditionally underserved by the educational system. In many cases, this leads to significant underpreparation in key academic areas. In 2002, for example, 90 percent of entering students required at least one developmental skills course in reading, writing, or mathematics. And many of our students are undergoing a challenging acculturation process, navigating the landscapes of college life, an intense city, and a fast-changing new society—all at the same time.



The E-portfolio Initiative

LaGuardia's work with the Integrated Learning Project seeks to serve the needs of these students from two complementary directions. The first part of the project, the e-portfolio initiative, provides students with a tool for collecting their academic work and their reflections on their learning, and for sharing their portfolios on the Internet. Students begin depositing work in the e-portfolio in their first semesters at the college and continually refine their presentations as they move forward, each time looking to reflect on and understand the process of growth and improvement. Reflective personal essays encourage students to explore their changing sense of themselves. Designed to help students connect classroom, career, and personal goals and experiences, the e-portfolio moves students toward not only integrated learning, but also more integrated lives.

Funded by the Title V program of the U.S. Department of Education, the LaGuardia e-portfolio is a multifaceted structure. It prompts students to take more responsibility for their learning while also providing faculty with snapshots of student growth that can help them better understand individual students as well as the broader process of learning and teaching. Meanwhile, at the institutional level, the e-portfolio also lays important groundwork for a more holistic outcomes assessment process that examines student work as a way of identifying and pursuing possibilities for improved instruction.

Although LaGuardia only has a three-year history with the e-portfolio project, two thousand students are already actively building their e-portfolios. Feedback shows that students are enthusiastic about this opportunity to learn new technology skills, and are particularly interested in using it to connect classroom and lived experience. Meanwhile, institutional examination of student work at the college has begun to show interesting changes. Rather than viewing our students through test scores and retention rates, we have begun to see students creating virtual representations of their lives and work. Students have inte-

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grated original paintings, drawings, oral interviews, family photographs, poetry, annotated resumes, and a range of classes and projects that represent who they are as students and emerging scholars. The e-portfolio has proven to be a versatile tool that allows a student like Kyoung Kang to

use her previous medical training at the University of In-Je in Pusan, Korea, in the context of her present work as a visual artist and as a student in art therapy at LaGuardia. Kang's e-portfolio—now in its fourth iteration—demonstrates her progress toward integrated learning as she pulls her past, present, and future into a seamless whole, building on her two passions: art and medicine. Kang's work, and the work of others like her, helps us understand the role of reflection as a key element of integrated learning. Each day, LaGuardia students find new ways to connect identity and learning.

The First Year Academies

The second part of LaGuardia's ILP complements and supports the first. The First Year Academies, a combination of linked courses and cocurricular activities, offer all LaGuardia students the opportunity to take advantage of interdisciplinary faculty collaboration in their first and their second semesters at the college. Creating innovative learning community structures designed to help new students successfully adjust to college life, the academies also provide training and support as students launch their initial e-portfolios.

The First Year Academies bring together the best of LaGuardia's history—drawing on the college's expertise with learning communities, basic skills instructions, and the first-year experience. Developed by a faculty committee, the academy structure provides students with a more cohesive academic experience and allows basic-skills students to move more



quickly toward substantial engagement with content courses. When the program is fully operational, new students will select one of three academies (Business/Technology, Liberal Arts, or Allied Health and Sciences) and take four linked courses designed by faculty to reflect the themes of that academy.

For example, students in the Business/Technology Academy will take Introduction to Business or Introduction to Computers, a themed developmental English course, and a themed New Student Seminar in their first semester. In their second semester, they'll take a Fundamentals of Professional Advancement Seminar for Business/Technology students. Their Introduction to Computers or Introduction to Business course will serve as an anchor, setting key themes and engaging students with major concepts and disciplinary thinking in their major. Basic Skills faculty recon-textualize writing as a practice associated with the major. The New Student Seminar provides support for students in critical areas such as study skills, course planning, and career planning.

The academies are growing steadily in size. In spring 2004, the college piloted four Business/Technology Academy learning communities; in 2004–5, the college has run nine Business/Technology Academy learning communities, two Allied Health learning communities, and four Liberal Arts learning communities. Over the next three years, LaGuardia seeks to move toward including all of the college's incoming matriculated students into learning communities housed in one of its three academies.

The e-portfolio will be an integral element of the academy structure, supporting students and faculty as they make connections between classes. In both semesters of the academy, students will take a "Studio Hour," in which they learn about e-portfolio technology and build initial e-portfolios to showcase their work in all of their academy classes. After the first year, students will continue their e-portfolios by collecting work created in their urban studies class, which is a required course of study for all LaGuardia students. In the future, they will create a final portfolio in capstone courses in their major, providing them with an opportunity to pause and review their growth over the entire course of their time at the college.

The national Integrated Learning Project has offered LaGuardia a chance to think, work, and connect with other colleges. In November 2004, we brought members of the Portland State University (PSU) ILP team to LaGuardia for three days to meet with our entire faculty and discuss PSU's first-year studies program, their use of e-portfolios, and their innovative assessment program. In January 2005, we visited the College of San Mateo, along with other members of the ILP group, to learn about their math learning communities. While there, one of the authors copresented with Portland State, comparing our approaches to e-portfolios. When faculty see our project in a national perspective—understanding that integrated learning is an important conceptual approach to education—they are more

willing to meet the challenges involved in transforming learning and teaching at LaGuardia.

Moreover, we have found ways to spread the benefits of the Integrated Learning Project beyond the boundaries of LaGuardia, reaching out to the entire seventeen-campus system of CUNY. In January 2005, Bret Eynon launched a six-month CUNY Research Seminar on Integrated Learning, drawing together faculty development leaders from fourteen campuses for a series of discussions exploring issues raised in the national project and considering possible applications at CUNY. In May, the CUNY Task Force on General Education and CUNY's new executive vice chancellor for academic affairs, Selma Botman, sponsored a highly successful day-long conference on integrated learning and its implications. Held at LaGuardia and featuring twenty-four workshops from sixteen campuses, the conference was keyed by AAC&U Senior Scholar Lee Knefelkamp, who spoke to a standing-room-only audience on integrated learning and integrated lives. Our participation in the Integrative Learning Project benefits not only our twelve thousand students, but all of the CUNY campuses—the nation's largest urban education system—and offers an exciting opportunity to extend our work and transform undergraduate education in New York City and beyond. ■

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Integrative Learning: Coherence out of Chaos

By Scott Bierman, dean of the college and professor of economics; **Elizabeth Ciner**, associate dean of the college and senior lecturer in English; **Jacquelyn Lauer-Glebov**, assistant director of institutional research and coordinator of educational assessment; **Carol Rutz**, director of the College Writing Program and senior lecturer in English; and **Mary Savina**, Humphrey Doermann Professor of Liberal Learning, coordinator of Perlman Center for Learning and Teaching, and McBride Professor of Geology and Environmental Studies—all at Carleton College

Carleton prides itself on its lean administration, dedicated faculty, strong programs, and impressive students. Perhaps because of these strengths, Carleton is more likely to trust its administration, faculty, and students to fulfill institutional objectives and less likely to micro-manage. The result is a creative, dynamic, well-integrated institution where everyone works very hard. Maybe too hard.

Participation in the Integrative Learning Project (ILP), cosponsored by the Carnegie Foundation for the Advancement of Teaching and the Association of American Colleges and Universities (AAC&U), has given Carleton the chance to examine how it delivers learning. Doing so has begun to show us that our casual coordination of teaching and learning, while in many ways highly integrated and successful, risks exhausting the people upon whose efforts the institution most relies. Assessment of the status quo requires concomitant assessment of the mechanisms that make the status quo possible. In our case, we are learning that our history of semi-controlled chaos often bears high costs, notably the potential for burnout among all constituent groups. As such, participation in the Integrated Learning Project challenges us to tease out the mechanisms that actually integrate Carleton's institutional values for all stakeholders.

Important Early Insights

Carleton's ILP had its origins in two observations that at first seem in opposition to one another. The first was that too often faculty were trying to deliver a complete liberal arts education to every student in every class. However—and this is the second observation—students did not necessarily connect their work in individual courses to overarching educational goals. Each course was a thing of beauty, set apart from the whole of a student's college education.

To address the first observation, we developed a skills matrix. Along one axis of this matrix are the skills and knowledge we want students to develop. Along the second axis are our classes. By identifying the correspondence between skills and classes, we can effectively identify where and how often students have opportunities to work on key skills. Information gained during the first stage of our ILP confirms that everyone is spread thin, but it also suggests that course design can be conceptualized strategically. If everyone in a department typically assigns short papers, we can depend on students having done short papers in introductory and intermediate classes and eliminate them from our upper-level classes. If upper-level classes require research, we can use a junior-level methods class to ramp up experiences that prepare students for independent research.

The geology department pioneered such uses of the skills matrix. For geology majors, the skills matrix has contributed to student satisfaction with the major, especially in terms of preparedness for the senior project. The geology department's experience demonstrates how matrix design in departments can be an important first step toward integrated learning.

“More May Be More, and Less May Be Nothing”

The above quote comes from Nathan Grawe, an assistant professor of economics at Carleton, and refers to the economics department's decision to collectively integrate their participation in a departmental review along with a variety of grant-funded, skills-based initiatives rather than separately discussing each skill. By framing a common conversation about multiple skills (such as writing, information literacy, and quantitative literacy) in the context of a broad curricular conversation, and by developing a matrix similar to the one used by the geology department, the economics department was able to systematically discuss trade-offs and relative value. Faculty perceive the attention their courses get from students to be highly constrained, which makes every moment of classroom and homework time extremely valuable. Curricular initiatives that feel like marginal add-ons are unlikely to rise to a level of importance that justifies attention to them in place of existing content. From the economics department's per-

spective, there has been substantial synergy between a holistic approach to a skills-based conversation and a broad departmental review of curriculum.

The same message came from faculty in the history department, who drew on the important distinction between invention and innovation. As Professor of History Kirk Jeffrey said, “Lots of invented things are never innovated”—a distinction largely derived from the chasm that exists between good ideas and the implementation of those ideas. Like

the economics department, the history department conducted conversations informed and motivated by a departmental review that linked the development of multiple skills with very specific courses and assignments.

One result of their discussions was a closer connection between invention and innovation within the history major. Neither department was able to identify significant curricular efficiencies as a result of their departmental conversations. However, both the economics and history departments emphasized how the conversations they had over the construction of their matrices provided important opportunities for junior faculty development in a low-stress environment.

Transferring Knowledge Is Hard for Students

Intentional learning requires clarity about the tasks we expect students to master and how we would recognize mastery, which speaks to the second observation noted above. For this reason, Carleton's work with the sophomore writing portfolio also focused on making students aware of larger learning objectives. Something as simple as using consistent terminology can have an impact on student learning. Research shows that transferring knowledge from one task to

another is hard work for students, and if students have to sort out inconsistent terminology, it becomes more difficult. According to the National Research Council's *How People Learn*, “Teaching practices congruent with a metacognitive approach to learning . . . those that focus on sense-making, self-assessment and reflection . . . increase the degree to which students transfer their learning to new settings and events” (Bransford, Brown, and Cocking 2000, 12). Getting our students to partner with us in working toward acknowledged goals should deepen their learning.

Carleton's sophomore writing portfolio was created to assess a graduation requirement in the context of writing across the curriculum. Therefore, development of the portfolio required broad faculty conversations

The portfolio's design has morphed into a local lexicon that helps unify discourse around student writing at the lower division.

about course goals, assignment design, rubrics, and feedback for student writers. The portfolio's design has morphed into a local lexicon that helps unify discourse around student writing at the lower division. Faculty use this lexicon as they assign writing in their courses.

Furthermore, faculty development programming continues to support productive talk about student writing through workshops, a speaker series, brown bag discussions, summer grants for course development, and the annual portfolio reading session—a remarkable faculty development opportunity for the more than sixty faculty members who have participated to date.

Corporately, we see what is demanded of students by faculty across the curriculum, and we also see what students can do. If port-

folios give our students opportunities for reflection that enhance their learning, workshops give faculty opportunities for reflection and revision, too. In workshops, faculty and administrators are learners, applying those same metacognitive skills. Faculty workshops function as learning communities for teachers: opportunities for us to articulate and clarify deep goals and to reflect on our work together.

One Good Idea Begets Another

At first glance, writing portfolios and quantitative reasoning initiatives may appear to have little in common. But when writing is understood as a medium as well as a learning goal, and when quantitative reasoning is defined as the ability to articulate the analysis and interpretation of data effectively, writing portfolios and quantitative reasoning share a symbiotic relationship. Informal faculty discussions about quantitative reasoning stressed that quantitative skills were not the sole responsibility of the math department; to enable students to reason quantitatively at the levels we desired would require

input across disciplines starting in first-year courses. In other words, we needed a program to foster quantitative reasoning across the curriculum.

As a manifestation of Carleton's commitment to writing across the curriculum, the writing portfolio accepts a broad variety of student work, including technical and data-driven writing.

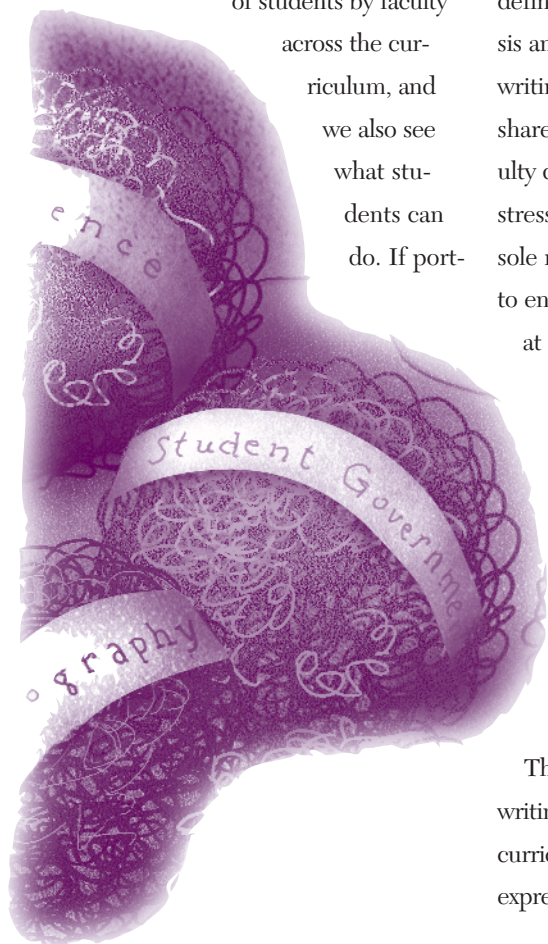
The quantitative reasoning group sampled writing portfolios to gain a sense of where the curriculum required quantitative skills expressed in writing and to test the presence

and quality of quantitative reasoning among sophomores. Readers then articulated a set of criteria for assessing quantitative reasoning skills at the program level that will be used to inventory the quantitative skills students demonstrate in our current curriculum. In addition, those criteria will guide faculty who plan to employ more quantitative reasoning in their courses. Using this inventory as a baseline, we will be able to sample future writing portfolios to assess the impact of curricular changes on students' quantitative reasoning skills. In this respect, portfolios serve as an integrative learning mechanism

Carleton's participation in the ILP has provided a means of examining multiple curricular objectives that we hope to achieve in an integrated way. Our original purpose when we submitted our proposal to participate in the ILP was to develop an algorithm for taking an inventory of learning skills that might provide curricular efficiencies. However, the ILP has been seized by our faculty as a faculty development opportunity with much more powerful implications. While faculty stress may not be reduced as a result of our participation in this project, student education will be improved as a result of intentional curricular integration. Our comprehensive review of recent initiatives helps dispel any sense of institutional chaos in favor of a coherent set of intentional, measured approaches to learning, teaching, and assessment. ■

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Integrative Learning, E-portfolios, and the Transfer Student

By **Michael J. Flower**, associate professor of interdisciplinary science studies, and **Terrel L. Rhodes**, vice provost for curriculum and dean of undergraduate studies—both at Portland State University

The participation of Portland State University (PSU) in a three-year Integrated Learning Project (ILP)—cosponsored by the Carnegie Foundation for the Advancement of Teaching and the Association of American Colleges and Universities—has involved developing and assessing advanced strategies to help students pursue learning in more intentional, connected ways. The underlying assumption of the ILP is that fostering students' abilities to integrate their learning will give them the habits of mind needed to make informed personal, professional, and civic decisions throughout their lives.

Much time and attention has been devoted to designing and implementing the first year and last year of PSU's four-year integrated general education program, University Studies. The program begins with the yearlong Freshman Inquiry course, which focuses on critical thinking skills, and culminates with the senior-year capstone. However, the middle segment of the program (the focus of PSU's project), which accommodates all students who began their college career at PSU and a large number of transfer students, has not received the same attention since the adoption of the University Studies general education program in 1994. Several groups of faculty, mentors, and students have worked on proposals to improve the integrative learning in the middle portion of University Studies during the past two years. Last year, the ideas that came from those groups went to the University Studies Committee—the fac-

ulty policy and curriculum committee for the program—for discussion and revision. The plans for redesign have been continually revised as the discussions have progressed. The current redesign of the middle part of the program was presented and discussed at the fall 2004 University Studies faculty retreat.

In the midst of these project redesign discussions, the provost resigned, but the interim provost has initiated another set of conversations about University Studies. The ideas he presented in a white paper on undergraduate education—which include enhancing internationalization of the curriculum as well as implementing the recommended changes in the middle portion of the program—are now being considered by a faculty committee that will soon make recommendations to the president and the faculty senate.

The PSU Integrated Learning Project focuses on enhancing the transition into PSU and the University Studies general education program for the approximately two-thirds of students who transfer to PSU after completing their freshman year at another institution. Through specific interdisciplinary course content, the Transfer Transition courses orient students to PSU and help them improve their communication skills, learn the process of inquiry from the perspectives of several different disciplines, and build a foundation for the effective and efficient application of information technology resources. Courses provide

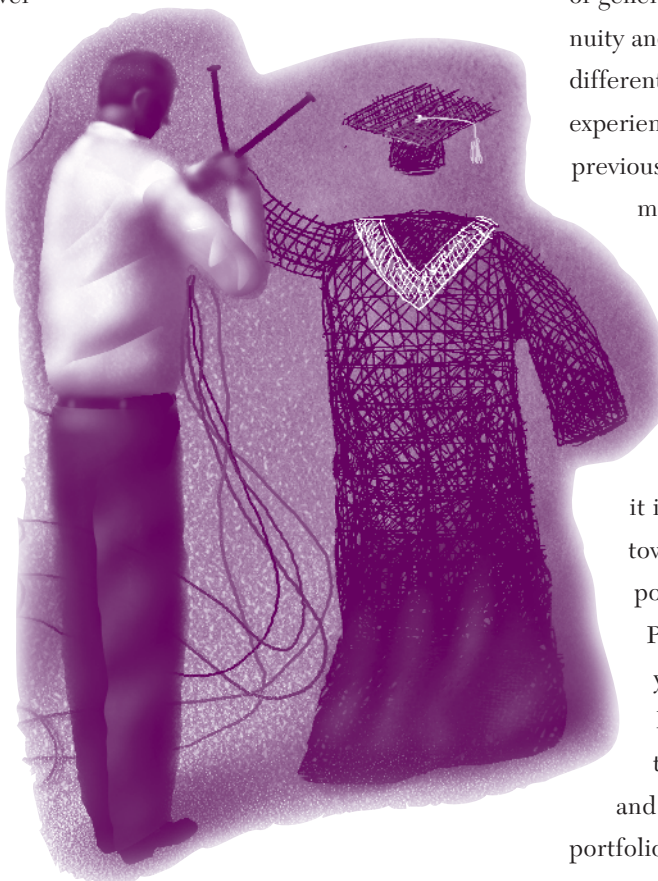
students with multiple opportunities to practice and become proficient in the four University Studies goals—communication, critical thinking, ethics and social responsibility, and the diversity of human experience.

The E-portfolio as a Reflective and Integrative Repository

It is not easy to capture and portray the varied ways in which student course work exemplifies a growing mastery of the four University Studies goals and the ability of students to integrate their learning in terms of both content and the cognitive goals of the program. The disciplinary and interdisciplinary emphases of instructors range as widely as the particular projects taken on by students. Over the past several years, the University Studies program has explored the use of electronic portfolios as a mechanism for compiling students' work samples and their reflections on the nature and quality of their work. Students who begin their university careers at PSU are now invited to construct an electronic portfolio during their Freshman Inquiry course, an invitation that has been taken up by students in useful and creative ways. Given this initial success, the University Studies program is now expanding the use of the e-portfolio through a pilot study with students in Sophomore Inquiry, with the final aim of having the e-portfolio encompass the entirety of a stu-

dent's undergraduate course work as well as cocurricular experiences.

There are many good reasons to utilize the e-portfolio as a repository of student work and as a framework for encouraging ongoing reflection and integration. Most importantly, perhaps, is the ability to store the variety of works that students produce: written text, graphics, video, and audio, as well as integrative displays of such work in the form of student-designed Web sites. Given the richness of its content, the e-portfolio serves as a primary medium for evaluating program success. A key component of every portfolio is a set of student reflections on their own learning in the context of the general education goals.



The e-portfolio also represents an economy of means; much can easily be saved to a small amount of server space. Additionally, there is easy access to an e-portfolio for a range of viewers—fellow students, instructors, graduate and professional school admissions committees, and employers.

These reasons are particularly persuasive in the context of the University Studies program. First, the general education goals of University Studies are manifested in courses of differing design and with differing content, types of assignments, and interdisciplinary emphases. Second, the program extends from the freshman through the senior year. And third, a great many students transfer to the university into a program of general education that aims for continuity and coherence—a program that is different from what they most likely experienced as general education at their previous institution(s). Thus there are

many reasons to provide an integrative learning framework of the sort that an e-portfolio affords.

Although it is a challenge to institute the e-portfolio as a reflective repository, it is easy to conceive the steps toward student production of an e-portfolio for those who begin at PSU and stay through their senior year. The full year of Freshman Inquiry provides ample occasion to develop the rationale, tools, and initial work pieces for the e-portfolio. The continuity from Freshman



Inquiry to Sophomore Inquiry underpins the expectation that students will gain in confidence and work toward reflective integration of an increasing body of repository materials. It is not unreasonable to assume that after two years in University Studies, students will have begun to see the value of their ongoing attention to the e-portfolio and its continued elaboration through their junior and senior years.

Transfer Transition

It is those students who transfer into the integrated structure of University Studies who present the greater challenge. We must provide a means for students who transfer to our institution after the freshman year to gain experience with and appreciate the value of the e-portfolio. We hope to meet the challenge in two ways. First, we will offer a greater number of Transfer Transition courses especially designed to introduce transfer students to the form and content of University Studies. This change is likely to help most of those students who transfer in as sophomores. Particular attention will be paid to the e-portfolio, where transfer students will be given the occasion to produce a reflection that ties their earlier academic work to the general education framework at PSU.

Second, we will put into place a slightly different approach for junior transfers. While it may be possible for us to field junior-level Transfer Transition courses, those students will be also taking “cluster courses” at the upper-division

level (see www.ous.pdx.edu for more information about program curriculum design). Because there are hundreds of cluster courses, we need a flexible mechanism by which work deposited in the e-portfolio can be developed. We are exploring the possibility of mini-courses for which graduate students would serve as a general resource to help junior-level

to the University Studies goals as our native students. The e-portfolio is also a promising medium for demonstrating what students learn outside the classroom, which contributes helpful information for advising and provides connections to transfer students’ cocurricular activities.

To the extent possible, we are expanding the e-portfolio throughout the

The e-portfolio is also a promising medium for demonstrating what students learn outside the classroom, which contributes helpful information for advising and provides connections to transfer students’ cocurricular activities.

transfer students move examples of their work—and reflections on that work—into the e-portfolio. Indeed, this approach promises to strengthen the e-portfolio as a tool for integrating not only general education coursework, but the display of disciplinary work as well.

Finally, we have been collaborating with partner community colleges to help students develop e-portfolios while at community college. We have learned that transfer students who initiate e-portfolios before they arrive at PSU bring with them similar levels of preparation and reflective practice in relation

undergraduate student’s experience at PSU, developing capabilities to demonstrate student learning through general education, the major, and cocurricular activities. The findings from PSU’s work to this date are also being shared with members of the University Studies Committee to inform their recommendations for revisions to the program. As always, we are engaged in a work in progress. ■



Integrative Learning Nationwide: Emerging Themes and Practices

By Deborah DeZure, director of faculty and organizational development, Michigan State University, and senior fellow, Association of American Colleges and Universities; **Marcia Babb**, program associate, the Carnegie Foundation for the Advancement of Teaching; and **Stephanie Waldmann**, secretary of the Carnegie Foundation for the Advancement of Teaching

There is a persistent concern that programming is fragmented and students are offered an array of opportunities with relatively little and inconsistent guidance in availing themselves of the offerings or reflecting on the total experience which should be “more than the sum of its parts.”

—*proposal to the Integrative Learning Project*

In the summer of 2003, the Carnegie Foundation for the Advancement of Teaching and the Association of American Colleges and Universities (AAC&U) issued a call for campus participation in a new national project to investigate and promote integrative learning in undergraduate education, *Integrative Learning: Opportunities to Connect*. While only ten campuses could be selected for this three-year effort, the pool of 139 applications revealed widespread progress and significant challenges in meeting integrative learning goals. Helping students connect skills and knowledge within and across their academic and nonacademic experiences is a priority on many campuses, and a survey of the proposed projects provides a window into the current state of integrative learning nationally.

Using the responses to the call's criteria—a description of institutional context and current accomplishments in integrative programming, a proposed project, and questions to be answered by the work—the three authors of this paper developed a protocol to collect relevant information and analyze results. In this article we highlight areas that campuses mentioned

most frequently for piloting or implementation, note other areas less frequently mentioned, and examine important themes and practices that emerged from the analysis.

Surveying the Terrain

The process of using proposals to analyze institutional efforts to support integrative learning has both benefits and limitations. Although the proposals are only five pages long and respond to specific criteria in the call, they are detailed enough to suggest the emergent nature of this work. For instance, we found that campuses do not use the language of integration consistently; the phrase “integrative learning” has limited common meaning. Even familiar concepts like learning community, capstone, first-year experience, general education, interdisciplinary (or, variously, cross-disciplinary, multidisciplinary, or transdisciplinary) courses or studies have differing applications, and we had to be flexible in categorizing project information.

Nevertheless, major lines of work are taking shape in the name of integrative learning, and the protocol allowed us to aggregate the data and observe themes

across institutions in a meaningful way. With some caution about overstating findings, this survey could serve as a baseline for contributions to larger efforts to build coherent programs of integrated undergraduate experiences in classrooms, across disciplines, and on and off campuses.

The protocol lists twenty-four primary and secondary focal points for campus projects, and single projects often had multiple foci. For example, a campus might propose assessment and faculty development as part of a new first-year learning community. The areas of activity with highest combined totals are assessment (70 percent), faculty development (63 percent), curriculum development (37 percent), capstones and first-year experiences (each 30 percent), student self-assessment and portfolios (29 percent), civic engagement (18 percent), and learning communities (16 percent). Interdisciplinary studies and courses, advising, middle years and bridging programs, honors programs, and programs for transfer students are identified in fewer than ten proposals.

Assessment is the focus for 70 percent of the projects. The range of activity varies greatly, but involves some measurement of student learning, skills and attitudes, and program outcomes; the development of rubrics; use of data from the National Survey of Student Engagement; and portfolios. In fact, nearly 30 percent of proposals center on student, faculty, and program portfolios, and of those over half are e-portfolios. Many campuses report they were already experimenting with portfolios,

electronic or otherwise, in some part of the curriculum. At the same time, many lament the lack of models for reliably measuring how well students integrate their learning.

Sixty-three percent of proposals identify faculty development as a project focus. As one campus states, “Faculty have difficulty moving outside their own disciplines.” Another campus acknowledges the challenge of teaching for integrative learning and the consequent need for work with faculty: “Our students find it hard to make integrative connections unless the faculty can model integrative thinking in the ways in which they teach their classes.”

Thirty-seven percent of campuses propose work that could be categorized primarily as curriculum development. Institutions are seeking coherence and synthesis, for example, within the disciplines, between general education and the major or preprofessional studies, in linking and bridging first-year experiences and capstones, and the like. Indeed, 21 percent focus on the integration of disciplinary course work with general education courses.

Separate from but overlapping with the focus on curriculum development are first-year and capstone experiences—both totaling about 30 percent of the projects. More than half already use one or both, and a quarter of the proposals focus on revising and expanding them. Capstones, in particular, are cited as promising sites for determining whether—and for ensuring that—students integrate their learning in the general or core curriculum with learning in

their major. Interestingly, only 3 percent of applicants submitted proposals for the sophomore or junior years, specifically middle-year and bridging programs.

One might envision integrative learning being strengthened through diversity and multicultural efforts, undergraduate research, independent study, global/international efforts, and career development. However, these are rarely mentioned as a project focus, although they are identified among existing institutional activities.

Also interesting is the preponderance of applications from doctoral/research and master’s colleges and universities (58 percent), on the one hand, and the large proportion (21 percent) from private, faith-based institutions on the other (see table 1). Although further analysis is needed to determine whether foci differ by institutional type, the work undertaken by the ten campuses selected to participate in the project suggests that most of these practices are available to campuses across the spectrum. Indeed, our experience on the project is that very different campuses are learning a great deal from each other’s efforts (see sidebar on page 27).

Table 1. Applicant institutions

Associate’s colleges	12%
Baccalaureate colleges—Liberal Arts	14%
Baccalaureate colleges—General	4%
Master’s colleges and universities	37%
Doctoral/research universities	21%
Specialized institutions	2%
Faith-based institutions	21%
Minority-serving institutions	8%

Emerging Themes and Variations

Five interrelated themes recurred throughout the proposals.

1. Institutional Context. Based on the application narratives, most of the 139 institutions are already deeply engaged in a multiplicity of reform efforts in undergraduate education, including innovations in curriculum, instruction, and assessment. Thus, the proposed campus projects emerge from dynamic institutional contexts of ongoing reform. They are not isolated activities, nor are they presented as activities that will catalyze dormant or troubled institutions. These campuses chronicle an impressive array of existing educational experiences that are themselves integrative, including learning communities, first-year programs, interdisciplinary courses, multicultural experiences, service learning, study abroad and other experiential opportunities, and general education reform more broadly.

Many campuses also identify ongoing efforts to document student learning outcomes using, for example, portfolios or capstone courses within the major. Several proposed projects build on these earlier, more limited integrative assessment efforts and take them to the next level by developing, for example, e-portfolios or capstone courses to integrate general education and the major. Thus, many of the campus projects are innovative in that they take an integrative process or activity that has been productive within a more limited frame and expand its capacity to integrate more elements of the collegiate experience, include more students, or expand its reach horizon-

tally and vertically through time. The projects emerge from and reflect the ongoing institutional commitment to educational experimentation in teaching, learning, and assessment.

2. Intentional Designs to Promote Coherence. The multiplicity of rich educational activities already flourishing on these campuses is essential to understanding their need and readiness to pursue a project on integrative learning. Campuses recognize that they are providing an array of powerful educational experiences, but are looking for more formal, systematic ways to help students make meaning of these varied and often fragmented experiences. Whether the proposed project is intended to enable students to connect liberal arts and the major or curricular and cocurricular experiences or “head, heart, and hands”—characteristic of the goals of faith-based institutions—the underlying concern is to promote coherence across the undergraduate experience. The projects are framed as the connective tissue among collegiate experiences so that the whole will be greater than the sum of its parts, and are designed intentionally to clarify and amplify what students learn to enable them to access and apply this learning more readily in the future. Stated simply, campuses want to ensure that students can “connect the dots” regardless of their unique undergraduate careers in order to maximize the aggregate experience we call “college.”

3. Prognosis for Transformational Change. One might conclude that a new capstone course or e-portfolio is nothing

more than another isolated experience to add to the litany of requirements. Carefully planned and enacted, capstones, portfolios, and other projects hold promise of being transformative by changing the expectations that students, faculty, and administrators have for the undergraduate experience as a whole. The projects support development of reflective and intentional learners who will be able to make meaning of and bring coherence to the disparate paths they take through college and into their lives beyond graduation. To accomplish this goal requires a reinvention of the undergraduate experience with collective responsibility for its coherent design, implementation, and assessment. In that sense, many of the projects, even those limited to the development of a single integrative course or assessment tool, have the potential to instigate change throughout the curriculum. For many campuses, the project is designed to serve as a change agent, mobilizing faculty and campus leaders to reflect on the need for greater integration and coherence, to consider their roles and responsibilities in this effort, and to provide “opportunities to connect.”

The projects differ in their focus, scope, and capacity to drive change, but taken together, they offer a portrait of an emerging movement in higher education. The signs have been there for several years and were captured in AAC&U’s 2002 report, *Greater Expectations: A New Vision for Learning as a Nation Goes to College*, and more recently in *Integrative Learning: Mapping the Terrain* by Mary Huber and Pat Hutchings (2004), but the Integrative

Integrative Learning Project Campuses

Carleton College (Northfield, MN) is studying how it collectively integrates important literacies into a student's education. The goals are to implement a plan to discover and articulate how faculty are defining and teaching transferable, cross-cutting skills and literacies and to free faculty from the notion that they are singularly responsible for a student's education. Carleton will use its experiences with the required sophomore writing portfolio and senior capstone projects to provide checks and guideposts for all of the literacies identified.

College of San Mateo (San Mateo, CA) is measurably expanding its learning communities program to promote "shared knowledge" and "shared knowing" among students and faculty, thus providing an overarching academic success strategy for its fragmented and transient community college population.

LaGuardia Community College CUNY (Long Island City, NY) is using electronic student portfolios that link to first-year initiatives and a college-wide assessment plan in order to investigate the integration of learning across classes, the role of digital tools in this process, and the impact of such a project at an urban community college with a student body overwhelmingly immigrant, female, and economically disadvantaged.

Massachusetts College of Liberal Arts (North Adams, MA) is developing objectives, assessment methods, and courses for the upper-level integrated capstone course in its developmental core curriculum. MCLA will add the third level of capstones to tiers already in place, and build a multimodal system of assessing student achievement.

Michigan State University (East Lansing, MI) is addressing the study abroad option for earning required credits in integrative studies. The project will connect the integrative studies and global competencies outcomes, create criteria for study abroad options that are likely to meet those outcomes, and develop an assessment protocol for measuring study abroad.

Philadelphia University (Philadelphia, PA) is promoting student integrative learning that connects its professional programs with its liberal education core by expanding the involvement of faculty from the professional majors in the general education program, creating a forum for university-wide planning for liberal-professional integration, and making curricular connections more transparent and intentional for students.

Portland State University (Portland, OR) is implementing a revision of the middle portion of the interdisciplinary general education program, University Studies, which includes designing new courses and assessing the revision and program, primarily using electronic student portfolios.

Salve Regina University (Newport, RI) is developing a senior capstone experience that both integrates liberal learning and links that learning to specialized study in the major, and an integrative learning portfolio that assesses student progress over four years of study.

State University of New York at Oswego (Oswego, NY) is modifying a first-year program, integrative interdisciplinary general education requirement, and capstone to create a core curriculum with a focus on developmentally appropriate integrative skills. Prior to this consultative program revision, it is conducting a qualitative assessment to define and develop rubrics for integrative skills.

University of Charleston (Charleston, WV) is focusing on enhancing and celebrating integrated learning assignments that are aligned with program and liberal learning outcomes in order to demonstrate growth rates equal to or exceeding the current ones.

Learning Project enabled us to see even more clearly the breadth of institutional interest and activities and the challenges inherent in this work.

4. Faculty and Faculty Development as Integral to Change. To meet the challenges and to promote transformation, the majority of campuses identify faculty engagement and faculty development as key elements of campus change efforts. The discussion of faculty involvement is prominent in several proposals, with references to the number and range of faculty across the disciplines who participated in planning the proposed projects, concern for how best to engage faculty in ongoing efforts, and discussion of why faculty engagement is both essential and challenging. Several applications note that the proposed projects had been approved by academic governance and care had been taken to vet the projects with faculty and advisory groups. All of this bespeaks the recognition that efforts to promote integrative learning should engage faculty who ultimately will do the heavy lifting of planning, implementing, and assessing its impact.

The proposed approaches to faculty development vary widely and include faculty learning communities and communities of practice; workshops; faculty conversations; collaborative development of integrative assignments, assessments, and scoring processes as forms of faculty development; and faculty mentoring. The proposals that focus on faculty development do a compelling job of establishing the need for it, although some provide

only limited discussion of their conceptual framework or plans for faculty development beyond cursory references to a method (e.g., workshops), without further explication. Nonetheless, faculty development is on the radar screen for the majority of campuses as a valued and important dimension of their change efforts.

5. Back to Basics. The theme of faculty development underscores the recognition that integrative learning requires new ways of thinking about teaching, learning, and assessment and the development of new skills. This need is particularly evident in the questions posed by campuses. The call for proposals asked campuses to identify questions that they hoped to answer through their proposed work. A few campuses indicated they would frame their questions later in the process. Several posed procedural questions—variants of “how can we do what we propose?” But one of the most frequent responses was a list of fundamental questions that go to the heart of the matter: What is integrative learning? How do you teach for it? How do you assess it? How do you prepare faculty to teach and assess it? A few campuses asked if there is a developmental sequence in integrative learning, and, if so, how colleges could promote student development from one stage to the next. Finally, a few asked questions about the impact of different approaches to integration on student learning and retention or about how faculty themselves learn to integrate across courses and disciplines.

In short, even though campuses indicated that they were eager to pursue

integrative learning as a valued goal, many nonetheless asked the most basic questions about it. What does this tell us? It reveals that institutions are just beginning the quest to understand what integrative learning means for their faculty and students, even as they pursue it with commitment in order to redress the fragmentation of the undergraduate experience. Asking these fundamental questions is a bold, honest, even audacious way to begin that quest in earnest. We recognize that our analysis is based on applications with the inherent biases of self-report and self-promotion. It is therefore all the more surprising to hear so many institutions say with candor that they are still actively grappling with the meaning of integrative learning. Both their candor and their search for understanding offer further compelling evidence of the intense interest in integrative learning on American campuses. Certainly this was so among the 139 colleges and universities vying for inclusion in the Integrative Learning Project. ■

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Highlights from AAC&U Work on Integrative Learning

RGreater Expectations Forum on Twenty-First Century Liberal Arts Educational Practice

The Forum on Twenty-First-Century Liberal Arts Educational Practice, part of AAC&U's national Greater Expectations initiative, was formed in 2002 to facilitate the achievement of four important liberal learning outcomes— inquiry capacity, global preparedness, civic engagement, and integrative learning. A working group for each outcome was charged with discovering promising practices from across the country and ways to improve student learning in these areas from high school through college. Each working group drafted working definitions of these learning outcomes and held regional seminars of faculty and administrators from both high school and college to discuss the creation of purposeful pathways to these outcomes. Exciting practices described during the regional seminars on integrative learning ranged from challenging students through short integrative projects, such as producing a video, to organizing entire institutions around integrative themes.

Integrative Learning: Opportunities to Connect

Integrative Learning: Opportunities to Connect is a collaborative project of AAC&U and the Carnegie Foundation for the Advancement of Teaching. The three-year project engages campuses in developing comprehensive approaches to provide students with purposeful, progressively more challenging, integrated educational experiences.

The project began by identifying ten campuses that have already made significant progress in developing integrative learning strategies and are committed to deepening that work. The project's aims are to create new resources, networks, models, and evidence-based arguments that can both strengthen the work of these campuses and prove useful to other institutions. See page 27 in this issue for a list of participating schools and their project descriptions. For information about and resources from the project, see www.aacu.org/integrative_learning/index.cfm.

The Center for Liberal Education and Civic Engagement

Designed as a catalyst and incubator of new ideas, research, and collaborations, the Center for Liberal Education and Civic Engagement seeks to deepen understandings of the relation of liberal education to service and civic responsibilities. Founded in 2003, the center is the result of a partnership between AAC&U and Campus Compact, the nationally known organization promoting service learning. This partnership enhances the powerful possibilities of campus work on civic engagement and illuminates how higher education's societal obligations can be integrated into the academy's core educational mission. The center's work foregrounds the ways in which civic engagement efforts can advance for students many important learning outcomes, including integrative skills and capacities. For information about and resources from the center, see www.aacu.org/civic_engagement.

SELECTED AAC&U PUBLICATIONS

Integrative Learning: Mapping the Terrain

This paper explores the challenges to integrative learning today as well as its longer tradition and rationale within a vision of liberal education. In outlining promising directions for campus work, the authors draw on AAC&U's *Greater Expectations* report, as well as the Carnegie Foundation's long-standing initiative on the scholarship of teaching and learning. This report was published as part of a joint project of AAC&U and the Carnegie Foundation's, *Integrative Learning: Opportunities to Connect*. Readers will find a map of the terrain of integrative learning upon which promising new developments in undergraduate education are built.

Mapping Interdisciplinary Studies: The Academy in Transition

This volume provides an overview of current trends in disciplinary change, interdisciplinary fields, and general education and discusses why interdisciplinarity is taking hold in the academy today. Also present are talking points for dialogue on the topics of integrating curriculum, integrative process and pedagogies, assessment, faculty development, institutional change, and support strategies.

www.aacu.org/publications

Why Integrative Learning? Why Now?

By **Debra Humphreys**, vice president for communications and public affairs, Association of American Colleges and Universities

The impulse to connect is a universal human desire and a critical component of intellectual and emotional maturity, and probably always has been. The challenges of the contemporary world, however, have brought a new urgency to the issue of connection and integration. An early cartoon in the always-insightful *Dilbert* series captures well one of the defining features of our time. In the cartoon, a character uses a teacup on its side to represent the human brain. An enormous fire hose sprays water in the direction of the cup to illustrate the information overload that characterizes so much of modern life. As one might expect, nothing stays inside the cup, while water sprays everywhere on the page. Today's college student needs more than ever a developed capacity to make sense of this flood of information flowing into his or her consciousness every day. That capacity depends fundamentally on how well she or he can see connections and integrate disparate facts, theories, and contexts to make sense of our complex world. For these reasons, in its new campaign, *Liberal Education and America's Promise: Excellence for Everyone as a Nation Goes to College*, the Association of American Colleges and Universities (AAC&U) is highlighting integrative ability as a key outcome of a quality undergraduate education today.

It is clear that integrative learning is essential to prepare students to deal effectively both with complex issues in their working lives and the challenges facing the broader society today and in the future. As the articles in this issue make clear, after years of

compartmentalizing knowledge, leaders across the educational spectrum are renewing efforts to connect fragmented learning. In fact, it could be argued that in most arenas outside the academy—from the workplace to scientific discovery to medicine to world and national affairs—multilayered, unscripted problems routinely require an integrative approach.

For these reasons, AAC&U suggested in its 2002 report, *Greater Expectations: A New Vision for Learning as a Nation Goes to College*, that schools, colleges, and universities should enable students to become “integrative thinkers who can see connections in seemingly disparate information and draw on a wide range of knowledge to make decisions.” These thinkers must learn to “adapt the skills learned in one situation to problems encountered in another: in a classroom, the workplace, their communities, or their personal lives” (21).

The *Greater Expectations* report, of course, was not the first to call for this kind of learning. Integration has become an ongoing topic of discussion among federal and state policy makers, campus and K–12 leaders, business leaders, and members of professional societies. The U.S. Department of Education's Goals 2000 project endorsed “interdisciplinary frameworks” and thematic teaching of “big ideas” (1998). The 1991 report *Science for All Americans* (Rutherford and Ahlgren) is critical of teaching scientific principles in isolation and calls for thematic approaches and for approaches that teach students to apply academic concepts to real-world contexts. The American Association

for the Advancement of Science also supports integrative learning and the application of scientific concepts to real-world situations through Project 2061.

Integration of knowledge and multidisciplinary perspectives are among the top priorities endorsed by the professions as well. In its report *Criteria for Accrediting Engineering Programs*, the Accreditation Board for Engineering and Technology argues for advancing integrative learning, including the capacity to work in multidisciplinary teams, as a target goal for future engineering professionals. The International Association for Management Education predicts interdisciplinary activity will reach a new level of sophistication as more problem-oriented courses and multidisciplinary units are developed in undergraduate and graduate business programs.

Leaders in the K–12 standards movements also advocate integrative learning. The National Council of Teachers of Mathematics includes “connections” as one of its standards, suggesting that “instructional programs . . . should enable all students to . . . understand how mathematical ideas interconnect and build on one another to produce a coherent whole; [and] recognize and apply mathematics” in contexts outside of the field (2002, 64–65). These sorts of standards are echoed in other subject areas.

The business community, too, is calling for integrative capacities in employees. As early as 1991, the U.S. Department of Labor SCANS Report (Secretary’s Commission on Achieving Necessary

Skills) argued that “workers are expected to identify, and integrate information from diverse sources” and that they “should understand their own work in context of work of those around them . . . [and] understand how parts of systems are connected” (22). The Business–Higher Education Forum’s report *Spanning the Chasm* argues that “requiring interdisciplinary courses and projects will benefit students by helping them integrate skills and by presenting them with a broader range of perspectives” (1999, 8).

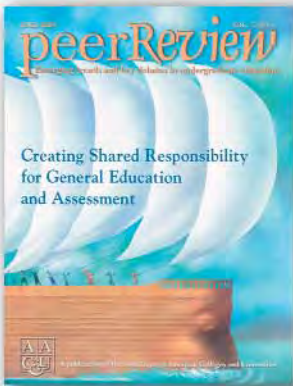
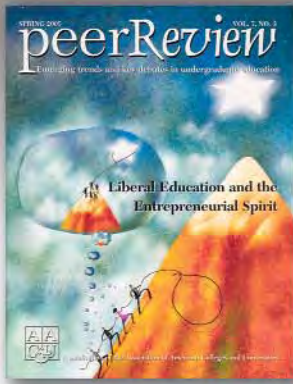
Finally, the calls for integrative learning are supported by cognitive research. The National Academy of Science report *How People Learn: Brain, Mind, Experience, and School* suggests that [in] traditional curricula . . . though an individual objective might be reasonable, it is not seen as part of a larger network. Yet it is the network, the connections among objectives, that is important. . . . to understand an overall picture that will ensure the development of integrated knowledge. (Bransford, Brown, and Cocking, eds. 2000, 139)

Given the interest from many sectors and the exciting developments in integrative and interdisciplinary scholarship that are transforming so many fields of study, support for integrative learning appears to be quite strong. The challenge remains, however, to turn promising integrative learning innovations into coherent programs of study with progressively more rigorous expectations for *all* today’s undergraduate students. ■

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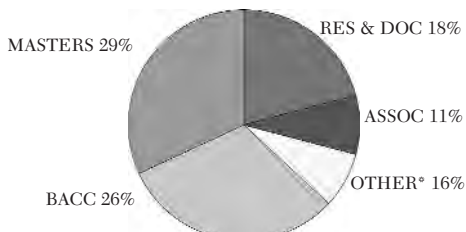
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