

NLII ANNUAL REVIEW

The New Academy

Virtual communities of practice. Preparing for a new academy. Knowledge management in the digital age. After nearly 10 years of advocating the quality, cost, and access advantages of information technology in higher education, EDUCAUSE's National Learning Infrastructure Initiative (NLII) is placing itself on the far side of transformation and is laying groundwork for the path that will lead there.

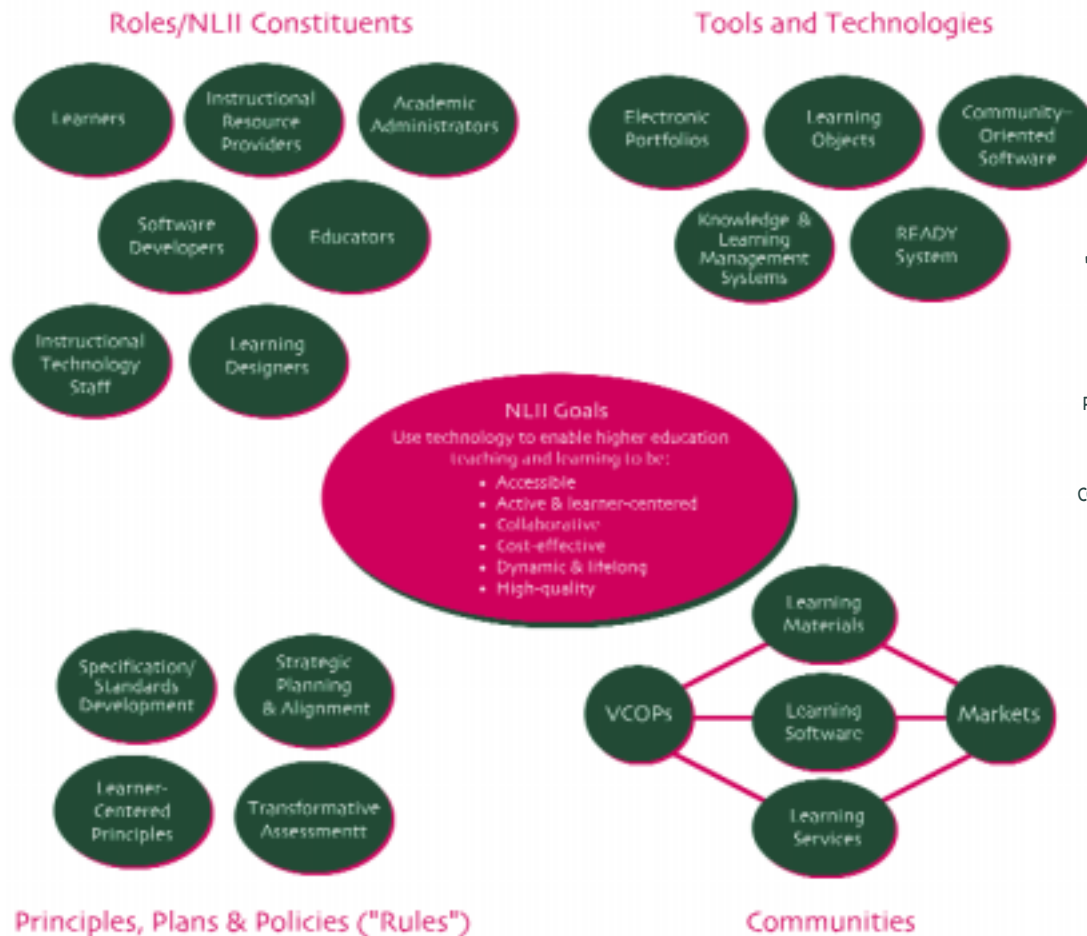
While the priorities that seeded the organization in 1994 remain in force—creating learning environments that are active and learner centered, dynamic and lifelong, collaborative, cost-effective, high quality, and accessible—the program is now wrapping its ambitions around creation of a vision for a new academy.

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Figure 1—NLII 2003 Key Themes and Framework for Action



"THE INTERACTION OF CHANGE AGENTS USING TOOLS AND TECHNOLOGIES, GUIDED BY PRINCIPLES AND STANDARDS, IN THEIR ROLES WITHIN THEIR COMMUNITIES OF PRACTICE, HAS THE POTENTIAL TO PRODUCE POSITIVE TRANSFORMATIONAL OUTCOMES."

—CAROLE BARONE

See Figure 2 for NLII Framework for Action model.

Its 80 member institutions and organizations, representing a diverse cross section of educational institutions and leading-edge technology groups, advance the program's agenda and bring value to their home institutions and organizations by engaging in projects, meetings and seminars, working groups, and virtual communities of practice. Working within the structure of the program's key themes (Figure 1), the NLII investigates ways advanced technologies can help redesign academic and administrative services so as to improve the learning outcomes of academic programs, increase the delivery flexibility of academic programs and support services, and increase the return on investment from the

perspective of those who pay tuition and fees or who hold fiduciary responsibility for the use of public and philanthropic resources allocated to higher education.

The NLII annual meeting in New Orleans in January 2003 reinforced the program's objectives via an agenda clearly focused on its key themes and driven by context pieces, case studies, best practices, and lessons learned. In an effort to keep the meeting small enough to facilitate information exchange yet wide enough in scope to embrace the range of activities regarding educational transformation, attendance was capped at 300, and concurrent sessions were kept varied, small, and conversational. According to NLII vice

president Carole Barone, who spoke at the opening session, the size and format of the meeting "give us all an opportunity to interact and be responsive to change." William Graves, chair of the NLII Planning Committee, agreed, adding that the meeting's record attendance and record number of new member institutions are two of many outward signs of the success of both EDU-CAUSE and the NLII.

Some of the benefits the new members are now enjoying include:

- Waiver of registration fee for the first five participants from their institution or organization to attend the NLII annual meeting (normally \$800 per person) and

for three participants each from their institution or organization to attend the three NLII focus sessions held annually (normally \$250 per person)

- Participation in communities of practice that benefit from and enlarge a body of knowledge
- The opportunity to beta-test and pilot new products and services
- Early access (one year) to developing white papers, books, projects, and Web resources
- Learning about emergent technology, practices, and issues related to teaching and learning

Technology, Teaching, and Learning: Convergence or Collision?

The new NLII model—born of the priorities involved in preparing for a new academy—incorporates NLII key themes (see sidebar), but now the NLII is organizing the themes to show relationships among them, put them in context, and provide a framework for action (Figure 2). The framework describes the interrelationships and interdependencies among the forces affecting behavior associated with the role of technology in transforming teaching and learning. The framework represents the complex interplay of agents, technologies, roles, communities,

and principles, reflecting the sociotechnological context of decision making on today's campus. Faculty, students, administrators, staff, and campus leaders are the agents of change in their respective roles as learners, educators, and instructional technologists, and they must participate appropriately in decision making. Tools and technologies are the instruments the agents have available to facilitate change in their realm of influence. Course management systems, learning objects, e-portfolios, and the READY system are examples of such tools and technologies. Institutionally adopted principles, plans, and policies give faculty, students, and staff a common framework within which to organize their own learning and practice and to align those activities with institutional teaching and learning goals. Transformative assessment, learner-centered principles, and specification/standards development are examples of such institutional frameworks.

Barone notes that “The purpose of the framework is to help organize the continuously evolving set of issues that are at play and to understand and shape associated behavior, so that strategic decisions reflect and respect the interrelationships among the key variables and are not based on shallow, simplistic assumptions. The interaction of change agents using tools and technologies, guided

NLII 2003 KEY THEMES

Electronic Portfolios



www.educause.edu/nlii/keythemes/eportfolios.asp

Learner-Centered Principles, Design & Practice



www.educause.edu/nlii/keythemes/learnercentered.asp

Learning Materials, Software and Service Markets



www.educause.edu/nlii/keythemes/markets.asp

Learning Objects



www.educause.edu/nlii/keythemes/LearningObjects.asp

Readiness



www.educause.edu/nlii/keythemes/readiness.asp

Specification/Standards Development



www.educause.edu/nlii/keythemes/standards.asp

Strategic Planning & Alignment



www.educause.edu/nlii/keythemes/alignment.asp

Transformative Assessment



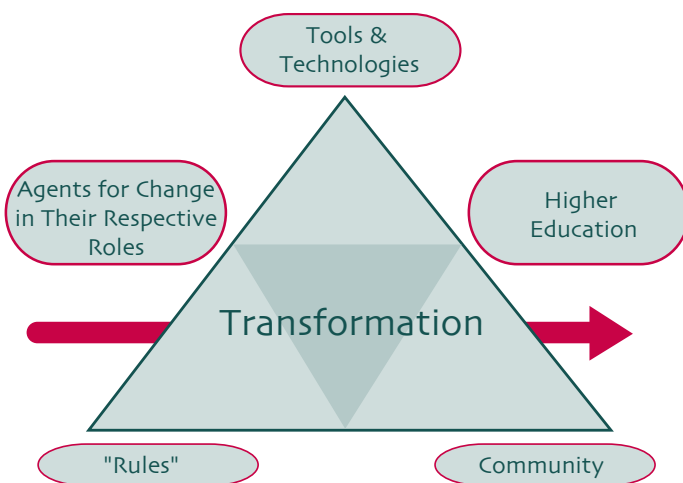
www.educause.edu/nlii/keythemes/transformative.asp

Virtual Communities of Practice



www.educause.edu/nlii/keythemes/VirtualCommunities.asp

Figure 2—NLII Framework for Action Model



Adapted January 2003 by the NLII Staff from ENGSTROM Y. (1987). Learning by Expanding: An Activity-Theoretical Approach to Developmental Research. Helsinki, Orienta-Konsultit.

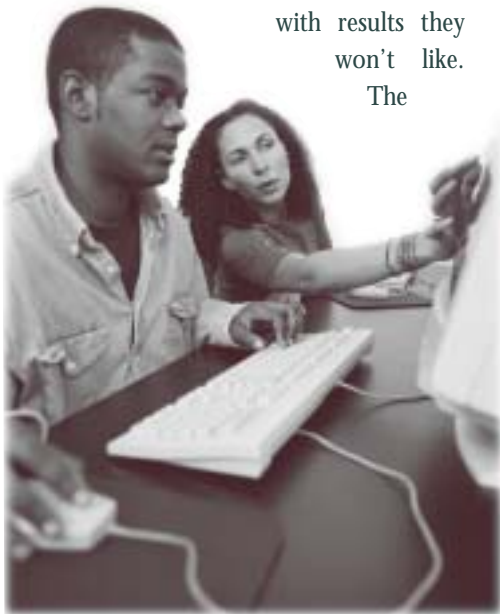
by principles and standards, in their roles within their communities of practice, has the potential to produce positive transformational outcomes, including cultural change.”

What NLII members are finding is that as the culture changes, roles, relationships, and perspectives change. “That’s why the work we’re doing is so descriptive,” said Barone. “We see changing roles everywhere. Even our leaders’ roles are changing; they can no longer stay aloof.”

Beyond culture and behavior, the NLII is seeing a clear move toward collaboration and coordination—approaches that often get discussed but that rarely get practiced in higher education. Recently, new consortia have formed for the purpose of generating new business models. “Very creative things are happening in this regard,” said Barone. “Campuses are working together, there’s new emphasis on working with the library, and we’re seeing interesting things happening in university systems.”

At the meeting, Barone also said that educational tools themselves are affecting power structures and policies. As technology becomes the driver for the tools that are facilitating dynamic new learning experiences, the NLII is encouraging educators and instructional designers to either get involved with specifications and standards development or risk winding up

with results they won’t like. The



NLII is working on new strategies to support that engagement. (See “How [and Why] to Listen to Heavy Metal,” page 24.)

New Themes

What are some of the new themes emerging within the NLII? The concept of knowledge management is gaining momentum. “Where do course management systems end, and where does knowledge management begin?” asked Barone. “The focus should not be on courses but on knowledge. We need to bridge our thinking and our knowledge.”

With knowledge at the center, the NLII envisions a new academy that incorporates a multidimensional framework operating in a volatile context. “The technology causes us to look at new structures and funding models,” said Barone. “And it points out the need for new relationships. We need to cross-pollinate our messages.”

According to Bill Graves, the new academy will force us to measure inputs and outputs in higher education. “We need to look at the value on the investment,” said Graves. “We’ll be looking at the payoff on our investment in information technology, and we’ll be trying to advance the wise use of IT in the academy.”

Conceptual Frameworks

Over the past 10 years, the NLII has come to see that collaboration and communication are key to transformation. However, higher education stakeholders and constituencies have different perspectives and understandings of their worlds. For that reason, conceptual frameworks become an essential tool for transforming institutions of higher education to focus on learning, learning outcomes, learning processes, and purposes. While conceptual frameworks are based on theoretical sources, they are locally developed interpretations of theory. Included in a conceptual framework is the set of principles by which decisions will be made as we go along.

The benefits of a shared conceptual framework at either the community level or the institutional level are multifaceted. First, the process of defining, articulating, or docu-

menting a conceptual framework engages the participants in both reflection and negotiation of meaning and understanding. Second, if grounded in the science of learning—both in substance and in form—such processes can become learning experiences themselves for the participants. Third, agreeing to adopt a conceptual framework for a particular purpose both deflects energies that might otherwise be wasted in endless argument about which views (of learning, for example) are more correct than others and turns the participants’ focus toward commonalities and relative usefulness for particular purposes and may increase institutional affiliation in the process.

Because conceptual frameworks must reflect local purpose and context, they both bubble up from below and trickle down from above. Leadership is about reconciling the differences at the institutional level and getting people to focus on what’s shared, not what’s different. For example, if there are indeed authentic—or evidence-based—disciplinary epistemologies that lead to differences in pedagogical techniques and understandings of learning, a conceptual framework would address them.

A conceptual framework about teaching and learning articulates shared understandings of how learning occurs best, and it explains relationships among learning, teaching, course and program development, application of technology, and institutional and community organization. The foundations for such a conceptual framework may range from theoretical sources such as Zelda Gamson and Arthur W. Chickering’s *Applying the Seven Principles of Good Practice for Undergraduate Education* to different models of learning—for example, ability-based models—but in any case, the conceptual framework should be rooted in faculty educational values informed by the science of learning.

Focus Sessions

Using the conceptual framework approach, the NLII had completed two focus sessions by July 2003. The spring focus session on Next Generation Course Management

(continued on page 19)

Putting the Learner at the Center

Next-generation innovation emphasizes enabling learning in classrooms and e-learning environments

Several years ago, Apple Computer ran a well-publicized advertising campaign featuring individuals whose achievements were born out of the capacity to think differently. While not a new concept—who isn't tired of the charge that we think outside the box?—

the ability to think differently is practically synonymous with innovation. And thinking differently is precisely what the NLII is proposing educators do if higher education is to lead in the development of effective learning environments that meet not only the needs of today's students but also the needs of generations to come.

Examples of true educational innovation can be found in the learner-centered design and practices that are rapidly making their way into colleges and universities in both classrooms and e-learning environments. While credit is due the psychologists, neuroscientists, cognitive scientists, and evolutionary biologists who, for the past 10 years, have been studying and researching learning and cognition, the educational innovation we're seeing today is the result of learning communities that reflect on the data and challenge the assumptions, norms, and conventions of current practices. The technology that supports and enhances those practices is a key theme and research area for the NLII.

Conceptual Frameworks and Communities of Practice

The NLII has long held that communities of practice are fertile ground for the development and refinement of conceptual frameworks, the definition of principles, and the identification of effective educational prac-

tices. In concert with MERLOT—the Multimedia Educational Resource for Learning and Online Teaching—since its formation, the NLII has worked to define, create, and sort through the vast landscape of new teaching, learning, and technology issues. Now the relationship has gone one step further with the development of joint programs to create and support communities of practice, as announced at the NLII 2003 annual meeting in New Orleans.

Beginning in 2003, the MERLOT Teaching and Technology Board will advise the NLII on refinement of the map of the learning space that is being used as a conceptual framework (see box, page 6). In return, the NLII will contribute an editor, Colleen Carmean, to MERLOT's nascent Teaching and Technology discipline community (merlot.org/Home.po?discipline=Teaching_and_Technology), a crossdisciplinary community of practice for faculty and faculty-support professionals that addresses knowledge, productivity, and professional effectiveness when teaching with technology.

The community will build and review a body of reflections, best practices, instructional support ideas, resources, and materials that advance the pedagogical understanding of teaching with technology, whether in the classroom, online, or in blended models. Two types of resources will be featured:

those that target academic disciplines—such as simulations, animations, tutorials, drills and practices, quizzes and tests, lectures and presentations, case studies, and reference materials—and those that target faculty development, such as workshops and training materials, policies, software and hardware evaluations, and templates (taste.merlot.org/communities/faculty_development).

Identifying the Key Principles Is Not Enough

In the past 10 years, advancements in what we know about learning have been remarkable. Unfortunately, utilization of those advancements has not kept pace. That lack of progress, according to Virginia Tech's Terry Wildman, who spoke at the NLII 2003 annual meeting, demonstrates "how incredibly wasteful we are in how we deal with the body of knowledge of learning theory." As research develops, said Wildman, educators focus primarily on the latest, high-profile ideas about learning, often at the expense of older but still powerful frameworks.

How do we hold onto educational insights that are unlikely to lose relevance? Wildman suggests sticking with three facets of learning that have yet to be disproved: construction, action, and the role of time. "It is very hard to honor these themes in our curriculum," said Wildman. "Program requirements of the core curriculum often become checklists, which makes it easy to miss the point that learning is a building process."

To help us understand the extent to which our pedagogies and our use of technology support this building process over a long period of time, Vicki Murrell of the University of Tennessee Health Science Center encourages educators to shift their attention to those moments in their own experiences when things clicked for learners. "Those are probably the moments when you were really active," she said. "Keep in mind that learners remember 80 percent of what they use

MAPPING THE LEARNING SPACE: AN NLII CONCEPTUAL FRAMEWORK

With teaching and learning at the heart of the NLII's agenda, creating a conceptual framework that adds value to its work requires a unique blend of research and vision. This past year, NLII 2002 cofellows Colleen Carmean and Jeremy Haefner put their vision and research skills to work to create a conceptual framework for learning and cognition. Carmean's visual map of today's learning territory gives entry into the ideas, practices, and relationships that form the basis of deeper-learning principles, teaching practices, design implications, learning activities, and technology uses (www.educause.edu/nlii/keythemes/lcp). The conceptual framework was used in guiding the NLII spring 2003 focus session (see related article, "Next-Generation Course Management Systems," page 12) and will continue being refined and repurposed throughout the year.

and do in real life and 95 percent of what they teach someone else. So, the question is, How can we support active learning by using technology?"

Murrell says faculty development is a critical area for the adoption of technology. "We must keep in mind that we're dealing with adult learners," she said at the NLII annual meeting. "They know what they want, so it's important to help them take the path of least resistance to get it." That path of least resistance, says Murrell, means just-in-time delivery—not delivery when they have no need or use for help. And it must involve access to an expert in their field with whom to share the information and guide its use.

A Model for Online Learning Environments

If we know that learning is socially constructed, then what do we know about successful learning in online environments? At the SUNY Learning Network (SLN), the systemwide program for the delivery of complete online degree programs for the 64 colleges of the State University of New York and efforts to assess teaching and learning have resulted in a model for e-learning that takes into account good educational practices, recognized principles of learning, and what we know about how people learn in largely text-based asynchronous environments.

As success stories go, the SLN is a shining star: it has seen explosive growth in participation among SUNY campuses (55 of the 64 institutions), complete online academic programs (55 degrees and certificates), courses (more than 2,500 annual offerings), and students (more than 40,000 enrollments annually out of SUNY's 400,000). The SLN was recognized by EDUCAUSE in 2001 with a Systemic Improvement in Teaching and Learning award and by the Sloan Foundation-supported Sloan-C Consortium with awards for both excellence in ALN faculty development in 2001 and excellence in institution-wide ALN planning in 2002.

SLN's e-learning model, according to interim director Peter Shea and lead trainer Bill Plex, illustrates how learner centeredness must be wed with knowledge building, assessment, and community in higher education, as suggested by the how-people-learn literature.¹ Most important, in order to understand what makes for good online learning environments, especially those that lack face-to-face interaction, one must understand what makes for good learning environments offline.

The model that Shea and Plex presented at the NLII annual meeting focuses on teaching presence (instructional design and organization, facilitating discourse, and direct instruction), social presence within a virtual community of inquiry (the ability of participants in an online course to project their personal characteristics into the community to

present themselves as real people), (for a discussion of social presence, see cade.athabascau.ca/vol14.2/rourke_et_al.html), and cognitive presence (the extent to which students are able to construct and confirm meaning through sustained discourse in a community of inquiry). As part of their research on the impact of those forms of presence on learning in an introductory psychology course, a rubric was developed that includes each form of presence and that is tied to students' participation in a student-led discussion. For example, each student asks a question concerning the chapter and moderates a discussion, and the rubric measures the quality of the question posed by the moderator as well as those who are responding. For a copy of the rubric, contact bpells@snl.suny.edu. More information, including the slides from the presentation, is available at www.educause.edu/asp/doclib/abstract.asp?ID=NLI0332.

Navigating Learning Theory for Instructional Technology Use

In addition to creating new organizational collaborations that leverage resources, some institutions of higher education are implementing online support systems, many of which are embedded in the campus learning management system. The University of Arizona, for example, has designed and is in the process of implementing a knowledge-based system built around learning principles to provide online support for individual faculty members.

The Module Organizer and Teaching Suggestor (MOATS) (moats.arizona.edu) offers guidance in developing learner-centered practices across a variety of instructional technologies. Instead of teaching faculty how to use technology, MOATS focuses on the learning problem the faculty member wishes to address and then offers templates and use-case examples of how to apply the technology in accordance with the learning principle. The University of Arizona developers are looking for institutional collaborators to further this work.

New Strategies and Roles for Supporting Teaching and Learning

Any talk about being learner centered demands an understanding of the learners and the learners' relationship to technology, particularly among new learners. At the NLII annual meeting, Kathy Christoph and Carrie Regenstein of the University of Wisconsin-Madison looked at how student expectations are pushing the boundaries of campus information technology.

"As new technology competencies emerge, our culture is being redefined," said Christoph. "For students those competencies include games, Google, Napster, streaming video, PDAs, and instant messaging." But what's really shaking up information technology departments across campuses, she said, is the emerging technology known as middleware—the means by which personalization, authorization, and authentication are made possible. As students, faculty, and administrators integrate online information systems into their teaching and learning environments as well as into their work, middleware, in essence, provides access to the server infrastructure.

These days, students arrive on campus expecting to use technology to conduct all of their personal and school-related activities. They expect to be able to communicate from anywhere, anytime, at high speeds, and without failures, and they expect the kind of personalization capabilities they get from MyGoogle. Faculty, on the other hand, are concerned that the pace of and the changes in teaching and learning are based solely on the allure of technological advancements and not on the demands of pedagogy. The problem is, none of the customers—the students, the faculty, or the administrators—are talking to middleware developers, even though middleware controls many of the changes in teaching and learning. The NLII recognizes the inherent disconnect in this equation and is encouraging faculty and staff to become more involved in the development of standards and specifications, particularly as they involve courseware, course management sys-

tems, and middleware (see page 24).

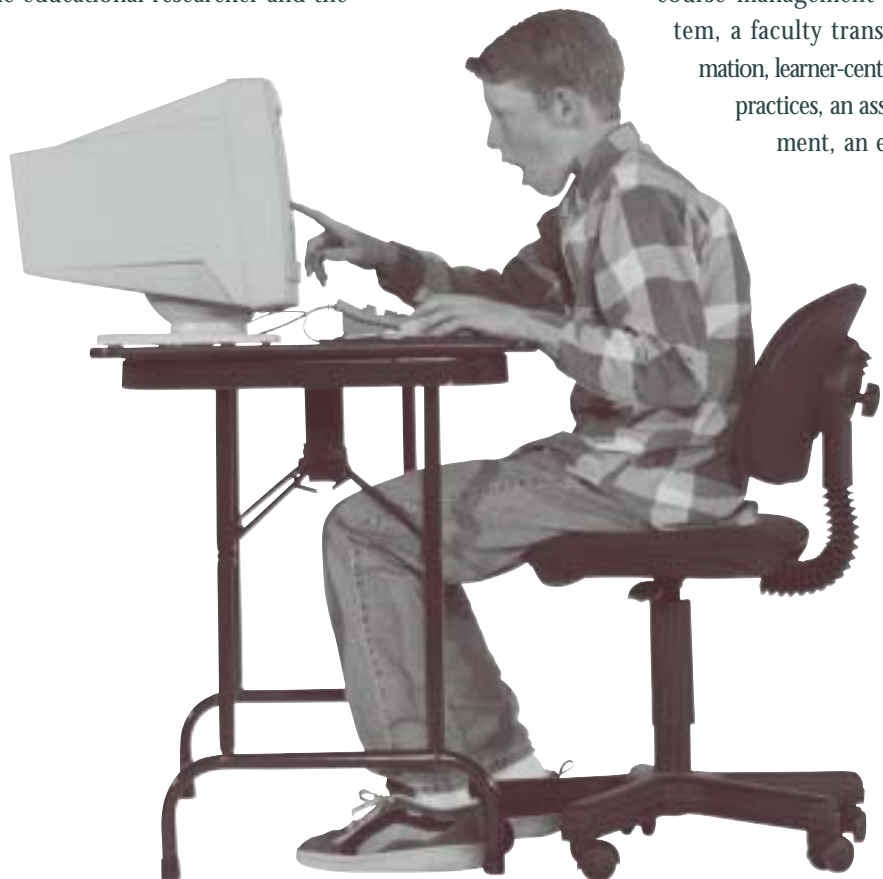
What's next for information technology departments as they prepare for the future? According to Christoph and Regenstein, a rising issue will be advocating for the student. "Currently, we advocate for the faculty or for the infrastructure," said Regenstein, "but not for the student." While that's beginning to change, models don't yet exist that provide technology solutions under the umbrella of academic technology. "Institutional organizations that see themselves as representing the student—or advocating for the student—are leading the way in new demands for services as well as in planning for technology innovations," said Christoph.

Building the Linkages between Educational Research and Everyday Practice

There's no doubt that educational research is essential to the development of successful learner-centered practices, but there's a considerable disjuncture between the worlds of the educational researcher and the

instructional developer. At the University of Southern California, inspiration for bridging those worlds happened at an international conference on learning sciences in Ann Arbor, Michigan, a few years ago. It was there that USC director of teaching and learning services Sue Gautsch and program managers/learning technologists Rick Lacy and Otto Khera heard keynote speaker Linda Roberts comment on a more-than-500-page proceeding, which she referred to as a "fabulous, relevant, and meaningful work," adding that "no one who needs to read it will read it."

According to Gautsch, "While we know the vocabulary of learner-centered practices, we need to go deeper into the intersection between research and everyday practice so that we can absorb the findings of educational research and at the same time contribute to the findings of educational research." The result is a multitiered program of curricular redesign grants that models that intersection of research and practice as a six-pointed star that includes an institutional course management system, a faculty transformation, learner-centered practices, an assessment, an eval-



uation, and, finally, a culmination in institutional transformation.

The first point of the star illustrates USC's experience with a course management system as a necessary but not sufficient step, providing as it did a scalable technology for the masses, a motivation for information technology units to consider learning and teaching as a core university function, and creation of what they call "a learning technology middle class." While the course management system fosters teaching efficiency, its main benefit was its ability to create opportunities for transformational experiences among faculty and students.

How does an institution create transformational experiences for faculty? According to Gautsch, Lacy, and Khera, there must be sufficient opportunities for faculty to experiment and reflect, iterative engagement in development cycles, flexible and redundant approaches, and appreciation for different faculty needs. In response, USC put into place a set of activities that scale from a jump-start phase designed to get faculty started, to a "barn raising," which brings faculty together as a community to build something.

Learner-centered design is an explicit aspect of the USC grant program and process. At all times, sound pedagogy and instructional design occupy center stage and are made accessible in a conceptual framework organized around 10 institutional principles of instructional design. Five of the principles are derived from learning science and are based in part on M. David Merrill's "First Principles of Instruction," submitted for publication to *Educational Technology Research & Development* (id2.usu.edu/Papers/5FirstPrinciples.PDF). The other five are locally developed principles. Chickering and Gamson describe an additional seven principles of good practice in "Seven Principles for Good Practice in Undergraduate Education," which appeared in the *AAHE Bulletin* in March 1987 (aahebulletin.com/public/archive/sevenprinciples1987.asp). For more information, see www.usc.edu/cst. The slide presentation and other resources can be found at www.educause.edu/asp/doclib/

[abstract.asp?ID=NLI0325](http://www.educause.edu/asp/doclib/abstract.asp?ID=NLI0325).

Another resource for linking learning sciences and technology research to everyday practice may be found in LESTER (the Learning Science and Technology Repository), which acts as a forum and a clearinghouse for leading projects, researchers, research organizations, and funding agencies. Developed by Rice University's ETRAC (Educational Technology Research and Assessment Cooperative) and sponsored by Microsoft Research, this robust, Web-accessible database inventories learning science and technology initiatives, including their research priorities, time lines, funding sources, personnel, and sponsoring organizations. According

IN ORDER TO UNDERSTAND WHAT MAKES FOR GOOD ONLINE LEARNING ENVIRONMENTS, ESPECIALLY THOSE THAT LACK FACE-TO-FACE INTERACTION, ONE MUST UNDERSTAND WHAT MAKES FOR GOOD LEARNING ENVIRONMENTS OFFLINE.

to Lisa Spiro, "LESTER aims to enable the educational community to track emerging technologies, implement learner-centered tools and methods, and formulate an informed agenda for future research." See lester.rice.edu for information on LESTER. The NLII slide presentations are available at www.educause.edu/asp/doclib/abstract.asp?ID=NLI0320. Those interested in partnering with this effort should contact Lisa Spiro at lspiro@rice.edu.

Adult Learners, E-Learning, and the Learning Enterprise

Joel Hartman has questions. Like just about every other academic administrator, the vice provost of information technologies and resources at the University of Central

Florida wants to know whether it's possible for staff to extend the gains of active, online learning to faculty who are on the fringe of institutional support, whether systemic support can be made available to faculty who wish to teach online for less-than-optimal reasons, and whether adoption of institutional processes that support e-courses can yield measurable results in student-centered learning compared with other types of online courses. In addition, what are some of the new administrative and academic policies and procedures that ensure quality in learner-centered approaches?

At UCF, an ever-shrinking budget coupled with rising enrollment has significantly increased the demand for online courses. In fact, more than half of all UCF faculty are engaged in the university's three types of online courses: W (Web only), M (mixed, meaning, face-to-face time and Web based), and E (enhanced courses, meaning, face-to-face courses with Web-based assignments and resources). With demand for support increasing—usually after the course already has an online component—the university now offers faculty a six- to eight-week development program—complete with a \$2,000 stipend for participation—in an attempt to increase effectiveness and encourage learner-centered practices in online environments. For more information, see cdws.ucf.edu or UCF's Learning Online at learn.ucf.edu.

As e-learning becomes a key part of the learning enterprise, faculty and staff development and support become more critical, as evidenced by presentations made at the NLII annual meeting by Hartman and representatives from SUNY Empire State, at which a comprehensive faculty development and support program has been organized around creating communities of practice to facilitate professional development and collaboration. Like UCF, Empire State has a core student population among adult learners. At the NLII annual meeting, Empire State's Carole Carnevale and Patricia Lefor discussed the needs of the online adult learner and presented a set of approaches used at the

institution, including a model for asynchronous discussions to engage the students as discussants and facilitators, the use of self-assessment and reflection activities for students to assess their progress, the development of learning activities that link course concepts with students' backgrounds, the use of student and peer facilitators and teaching assistants, and the development of multiple-use resources to support the learning activities. Empire State is also looking into e-portfolios, or outcomes portfolios, to enhance learning.

Carnevale and Lefor say that engaging adult learners and facilitating transformation means incorporating individualized and independent study as much as possible. "Adults need learning activities that are linked with experiences," they say, "so use simulations with specific learning outcomes built in." For more details about the SUNY Empire State approach to adult learners, see the presentation at www.educause.edu/asp/doclib/abstract.asp?ID=NLI0327 or www.esc.edu/cdl.

Vignettes about Learner-Centered Design and Practice

Sometimes a short vignette about a specific application of learner-centered design and practice is worth more than an hour-long presentation or a hundred pages of research. Such was the case at two sessions at the NLII annual meeting.

In the first case, University of Arizona graduate research assistant Andrew Clark reported that the university had launched its GISWeb project to address the needs of a campuswide minor in geographic information systems by using WebCT-based interactive learning modules with lab-specific classroom instruction. The idea is to integrate online learning and classroom-based education for use in teaching geographic information sys-

tems to students. The GISWeb project has also been structured to enable students to give feedback on the course so as to aid in enriching the learning process for future students. The feedback will benefit students and faculty by addressing the way in which information has been disseminated over the Web and in the classroom. The overall structuring of the GISWeb project should prove



to be a rich, evolving source of information for students in the minor both now and in the future.

In the second case, representatives from the University of British Columbia described how a presidential-level committee, mandated to explore the use of learning technologies, is funding two mixed-mode e-learning development projects: one in arts (English 111, writing) and one in science (Chemistry 121, laboratory). The projects focus on exploring how new learning technologies could be integrated with the pedagogical objectives of the respective course offerings and thereby improve the learning outcomes for students.

According to UBC's Skylight research associate Cyprien P. E. Lomas and UBC's arts instructional support and information technology director Ulrich Rauch, strategies for teaching and learning—partially imposed by

the culture and constraints of a discipline—require a variety of differing strategies to fully explore and exploit the power of technology to support teaching and learning. There are challenges both common and unique to an arts and science approach to e-learning, and particular disciplinary premises may determine the implementation of e-learning. Some of the challenges include the effectiveness of teaching an experimental science with simulations and engaging students through the use of multifaceted approaches to English prose themes.

What do the University of Arizona and the UBC approaches have in common? Both of them assert that sharing information across an institution or across institutions is key. They demonstrate that diverse teams bring a multiplicity of perspectives to tackle particular problems. This is a great model for students. They discovered that pedagogy must drive the learning tools that get selected and that there's still a need to go beyond commercially available software. They found that print-based course materials must be modified once you go to a more deeply structured learning perspective and/or when you go to the hybrid/mixed mode (scaffold for deep structure). And they found that assessment and learning outcomes must be embedded into the project from beginning to end and then on into the next development cycle.^{NLII}

Reference

¹Bransford, J., Brown, A., Cocking, R. (eds) (2000). *How People Learn: Brain, Mind, Experience and School*. Washington, D.C.: National Research Council; available online at nap.edu/openbook/0309070368/html/3.html.

Supporting Learning through Technology

Principle-based technology and learning environment design

Technology that supports and enhances learner-centered practices is a key theme and an important research area for the NLII and one of the reasons Margaret Haughey, editor of the Journal of Distance Education and professor at the University of Alberta, was asked to tackle three questions at a plenary session of the NLII 2003 annual meeting.

What do we know about learning and cognition that should be applied to the online environment?

Learning itself cannot be designed. It can only be designed for through the design of learning environments that catch learners' attention, incorporate their experiences, demand practice, follow their growing understanding, and provide feedback in order to avoid the cracks they didn't see and to help them avoid falling into new ones.

Research tells us that learning occurs best in an environment that is resource rich. It should support active and collaborative learning; incorporate authentic, real-world problems; and provide ongoing assessment. Fundamentally, learning is about moving from a state of disequilibrium and into a state in which we are searching for new resolutions, new meanings, and new connections. It is about making connections—both within our brain and among ideas—through experiences with others and with the help of learning materials.

What stimulates learners to want to seek the connection? As far as we know, it is some disjuncture, whether among the new ideas we are hearing or with our own prior knowledge. The desire to seek resolution must balance opportunity and challenge, and it must provide the opportunity to apply and reflect. Learners need to be directly involved through discovery, construction, transformation, and transfer. Learners must also be encouraged to go beyond the information itself. The possibilities for new learning (1) must be kept open

in order to deepen what learners understand and (2) must encourage them to be lifelong learners. Such learners know how they learn and in what areas they need support. They know how they approach new knowledge and how to assess their own learning.

FUNDAMENTALLY, LEARNING IS ABOUT MOVING FROM A STATE OF DISEQUILIBRIUM AND INTO A STATE IN WHICH WE ARE SEARCHING FOR NEW RESOLUTIONS, NEW MEANINGS, AND NEW CONNECTIONS.

How can existing technologies be used in the design of effective teaching and learning experiences?

At a minimum, existing technologies can provide a visual architecture to the information associated with a course that is not always evident from a course outline: in other words, make evident the structure of the information of a course and how it's related to the discipline. However, if technologies were simply for providing and structuring information, they wouldn't be all that learner centered. Information in the form of facts and ideas isn't what we seek as learners; we look for meaning and understanding by making connections. Technologies enable us to choose authentic issues and problems. They enable learners and teachers to enhance their learning and to learn different things in different ways. Technologies make it possible for us to envisage different strategies that help learners learn and to organize learning experiences that address areas likely to be difficult to master. This is why we bother with technologies:

they have the potential to expand choices about how we teach and learn.

Now that we know that learning is socially constructed, we can begin to see the importance of interaction between teachers and learners and between learners and their peers. Networked environments inspire community, which is the context for social learning. As we think about designing new learning environments, the social context forces us to consider the identity of learners, their histories and present cultures, how they communicate with others in that culture, whether they are receiving frequent feedback, whether they practice in supportive environments, and whether they're engaged in intellectual inquiry.

Often, when institutions of higher education look at designing change, they focus on the faculty part of the equation. Out of that have come some successful strategies, including partner programs; departmental-level task forces; decentralized, discipline-related centers; student guides and helpers; and pushed mailing lists. One of the common characteristics of successful faculty-focused strategies is immersion, whereby ongoing, sustained contact in a community of learners is supported.

Other change strategies focus on the curriculum: specific areas get targeted by discipline, department, program, or niche. This provides students with better services and a more-integrated learning experience because design occurs outside the course box, and it maps more naturally to a body of knowledge. Still another set of strategies focuses on students. These are strategies that focus on learners and on providing learners with an effective learning environment. It may take the form of universities that provide students with laptop computers and wireless classrooms, online student records, and e-access to library resources from anywhere on campus. One likely result of such a strategy is additional pressure on institutions to accommodate tech-

nology-based learning.

Based on learning principles and the challenges the academy faces in changing the learning environment, one way of thinking about designing for learning is to look at four different approaches to the use of technology [Figure 3].

What are the next challenges higher education will face in moving from the transfer model of learning to the design of rich, Web-based learning environments?

The process of designing for change brings with it countless challenges, but there are also things we can do:

- Set quality standards.
- Foster interinstitutional collaboration to encourage best practices.
- Build our understanding of learning based on evidentiary research.
- Reinvent the rewards for teaching, whether in design, facilitating learning, or pedagogical research.
- Manage workload issues.

- Promote partnerships in research and development and in learning provision.
- Be clear about our choices and why we are making them.
- Support the shift to active, authentic, resource-rich, supported e-learning environments for faculty as well as for learners. [NMI](#)

Figure 3—Use of Technology in Education

APPROACH	DESIGNS FOR LEARNING	TECHNOLOGIES
Information-based + Interaction	<p>Provide a visual architecture for the course through one of the technologies at the right. Such architecture is not always evident from a course outline. (Note: None of these technologies are interactive.)</p> <p>Emphasize situations in which the learner interacts with ideas and information through the technology by using guided practice, comparison, and critique.</p>	<ul style="list-style-type: none"> • Web pages • Course outlines • Assignments and dates • Frequently asked questions and frequently given answers • Powerpoint lectures • Sample tests and answers • Additional references • Simulations • Tutorials • Mentoring • Hypertext • Critical analyses of materials
Interaction-based + Information	<p>Enhance individual understanding or group cooperation through the use of the technologies at the right. (Note: These technologies are not typically well-designed for collective understanding.)</p> <p>Enhance collective understanding through negotiation and mutual agreement (requires significant pedagogical support).</p>	<ul style="list-style-type: none"> • E-mail • Conferencing (online discussion, role-play, debate, expert opinion, panel) • Collective understanding (synchronous, asynchronous) • Collaborative knowledge building (Knowledge Forum, Whiteboard)
Knowledge construction + Interaction through collaborative work	<p>Provide information resources that are reusable, accessible, and interoperable and that include content.</p> <p>Provide information resources that focus on and guide process, including pedagogy.</p>	<ul style="list-style-type: none"> • Knowledge (learning) objects • Repositories • Metatags • Learning Shells • Templates • Can be built into the course management system
Integrated + Learner centered	<p>Organize and orient the institution around learners rather than faculty.</p> <p>Organize around teams to create a seamless experience for students.</p> <p>Ensure that all supporting systems are in place.</p>	<ul style="list-style-type: none"> • Fully multimedia-based courses • Fully online supporting systems (registrar through library)

NEXT-GENERATION COURSE MANAGEMENT SYSTEMS

Cosponsored by the University of Arizona

Readings, materials, agenda, and meeting proceedings available at www.educause.edu/nlii/meetings/nlii032/

Applying the conceptual framework developed by NLII 2001 fellow Colleen Carmean (see Mapping the Learning Space, page 6) participants at the NLII spring focus session on next-generation course management systems (CMSs) were able to identify problems that inhibit the use of course management systems to promote deep learning. Participants also tackled the next-generation CMS features, functionality, and implementation improvements that would address those problems. Participants met in four groups: teaching and learning, technology and architecture, management and systems, and the NLII CMS Observation Tool and Glossary review group.

Features important to teaching and learning are:

- *Cross-course functionality*: Enables students and teachers to share content, tools, and spaces across courses.
- *Course is no longer the container*: Improves connections to materials, and facilitate interaction across courses.
- *Peer interaction*: Creates new and better tools to support peer feedback, evaluation, group work, and exchange of resources.
- *Collaboration tools*: Empower students to collaborate with each other and to coteach with the instructor.
- *Learning tools and student wizards*: Use artificial intelligence techniques to customize the learning experience by offering suggestions and content based on a student's use of the system.
- *Blogging and journaling tools*: Create tools for public and private journaling and reflection and build in mechanisms for peers and teachers to respond.
- *Faculty pedagogy advising*: Uses agents and wizards to help faculty create courses that promote deep learning and that provide flexible content to address the diverse needs of learners. Supports locally developed wizards.
- *Equation editing*: Gives better support for mathematical notation systems.
- *Persistence and portability*: Create student and teacher access to courses and artifacts across systems and beyond the time boundaries of a particular course in order to extend learning over time.
- *Access*: Increases content-authoring capabilities for all types of users.
- *Annotation tools*: Make it easier for students to annotate documents, add associated reflections to a document over time, and control access to their comments.

Features important to technology and architecture are:

- *Integration and extensibility*: Improve interoperability via e-mail, student information, and other administrative computing systems; integrate third-party tools, such as electronic portfolio systems and digital library clients; and build custom tools that access the core services of the course management system.
- *Intelligent agents*: Make the system recognize and automate repeated tasks to help learners and teachers become more efficient.
- *Digital rights management*: Enables student work to be student owned. Students should be able to control access to their work, export it to other systems, and download it in a form that captures its context to be reusable elsewhere.
- *Multiple levels of authoring interface complexity*: Provide new users with templates and other scaffolding to make it easy for them to author pedagogically sound course content and structure. Enable advanced authors to access and modify the business logic and user interface in more-sophisticated ways in order to accommodate pedagogies such as problem-based learning.
- *Content interoperability*: Enables learning objects and other interactive content objects to plug into multiple applications.

Features important to management and systems are:

- *Organizational structure and institutional structures*: CMS success is dependent on alignment of institutional structures and processes. Such alignment requires a clear institutional vision, which leads to clear statements of policy about how the institution will report, reward, and support technology products and services development. The policies should balance a hierarchy for efficiency and autonomy to encourage innovation. The CMS must accommodate that balance across organizational models and departments.
- *Copyright issues*: Standards for copyright are needed and should address the use of student work for assessment. Move beyond ownership and controlling access to more open licensing policies.
- *Consortia*: Institutions need to find new ways to work together.

During summer and fall 2003, the NLII staff and Course Management Systems working group will be refining those issues and working with various communities of practice to develop a final draft of a consensual set of functional requirements for next-generation course management systems.

Focus session: Work products and next steps:

- Refine the conceptual framework (see www.educause.edu/nlii/key_themes/lcp) that was designed to provide a common framework so diverse participants could have productive dialogues about the use of technology. Final draft due fall quarter 2003.

NLII ANNUAL MEETING SCORES HIGH

The NLII 2003 annual meeting in New Orleans scored high marks among attendees, according to evaluation results released by EDUCAUSE in April. For the second year, the meeting was at capacity, and a record 136 organizations were represented.

Overall, the meeting scored a mean rating of 4.16 out of 5 on a scale of 1 to 5, with 5 indicating the greatest satisfaction. Debra Friedman's general session on the University of Washington's Student Learning Objectives initiative was the most highly rated general session. A panel on learning objects led by Susan Metros earned the highest marks for a featured session.

So what are NLII conference attendees saying could improve the annual meeting? For one, they'd like to see less emphasis on the hour-long, lecture-style PowerPoint presentations and more emphasis on active-learning sessions. They also said they'd prefer a less conventional conference style overall—perhaps one that more closely resembles the NLII focus sessions. The NLII 2004 planning committee will look into opportunities for increased interactivity as it plans next year's meeting. NLII members interested in being presenters in the interactive track should contact vsuter@educause.edu.

Attendees expressed satisfaction with the location of the meeting, though several commented that the current budget crisis may necessitate a less expensive location. Future NLII annual meetings will alternate between New Orleans and San Diego. In terms of other meeting logistics, respondents seemed pleased with the wireless access in the session area, though several mentioned the need for high-speed access in the hotel rooms. Respondents also asked for one program that lists all sessions.

The NLII will work with members and staff during the coming year to respond to the feedback.

The NLII 2004 annual meeting is scheduled for January 25–27, 2004, at the Westin Horton Plaza hotel in San Diego.



NLII SPRING 2003 FOCUS SESSION

- Create a glossary of terms (an updated glossary can be found at educ3.utsa.edu/pmcgee/nlii/NLII_glo.rtf), purpose of which is, again, to facilitate productive dialogues about the use of technology, in particular course management systems. Final draft due fall 2003.
- Learner-Centered Principles Observation Tool (an updated version can be found at educ3.utsa.edu/pmcgee/nlii/CMS_V2.htm), designed to help an observer be reflective about deeper learning

principles in the context of an actual course supported by a course management system. Final draft due fall 2003.

- Prioritized set of issues and recommendations associated with features of next-generation CMSs according to learner-centered principles. First draft is currently available in meeting notes, but CMS work group will extract and refine the list and share it with the appropriate communities of practice and the NLII membership by the annual meeting in January 2004.

When Assessment Is about Deep Change, Not Grades

Pressure from stakeholders leads to breakthroughs in tracking student and institutional progress

It was no accident that the keynote speaker at the January 2003 NLII annual meeting was asked to discuss transformative assessment, even if few realized at the time that it was the topic. During the first two years of development of the NLII's Transformative Assessment Project (TAP) (see box below), NLII

director of projects Vicki Suter frequently lamented the lack of models available to describe the project's intentions. "I'd love to explain transformative assessment by example," she'd say, "but there just aren't many examples yet." When the Student Learning Objectives (SLO) system (washington.edu/slo) at the University of Washington (washington.edu) came on the radar, Suter knew she'd found an early model.

She also knew that assessment is the one topic that can send higher education administrators running for cover. When Debra Friedman, University of Washington associate provost of academic planning, took the podium, she managed to do what few believed was possible: she brought the topic of assessment to life, making it compelling, relevant, and accessible.

With roots in undergraduate education and educational innovation, Friedman has a unique perspective on educational transformation as it applies to real faculty, real students, and real university needs. She was involved in the development of the groundbreaking SLO system, which identifies learning objectives for undergraduates across the university. Powered by a Web front end that represents a significant techno-

logical advancement, the system is designed to facilitate—rather than restrict—the transformation agenda. Quite simply, it offers a new set of metrics for student learning that expands on the limited metrics currently available to keep track of student progress.

Understanding the learning process is noth-

ing new to educators, many of whom have been attempting to measure it, model it, and understand it since the early days of classroom-based education. As Friedman points out, learning defies easy capture. "It happens in its own way and in its own time," she said in her keynote speech. "We've been chasing it, but we still don't really know what students know while in college."

Today colleges and universities are under considerable pressure by state legislators and accrediting organizations to capture and quantify what students know. "We are partly responsible when asked to report on things like retention and graduation rates," said Friedman. "We complained that the demands for these reports missed the point of our mission. We said our job was to focus on what students learn. And the result is, they called our bluff."

The University of Washington is a public research university of roughly 28,000 students and 4,000 faculty spread among 18 colleges and encompassing 170 curricula and

TAPPING TRANSFORMATIVE ASSESSMENT

The NLII envisions transformative assessment as institutionwide assessment strategies that are based on institutional goals and integrated across all levels—including courses, programs, and the institution at large—to systematically transform teaching and learning. The NLII's Transformative Assessment Project (TAP) (www.educause.edu/nlII/meetings/nlII014/tap.asp) is a joint project of the National Learning Infrastructure Initiative, the Flashlight Program of the TLT Group (tltgroup.org/programs/flashlight.html), the Coalition for Networked Information (CNI) (www.cni.org), the American Association for Higher Education

(aahe.org), and the Center for Teaching, Learning and Technology at Washington State University (www.cctl.wsu.edu). The project is designed both to elicit new ideas about assessment practices and systems that will transform teaching and learning and to help institutions of higher education put those ideas into action. TAP activities to date have included three focus sessions and a six-week online workshop, two new branches of the READY system (www.educause.edu/ready), Alignment in Planning and Transformative Assessment, and two reference documents: the Transformative Assessment Rubric (www.educause.edu/ir/library/pdf/EDU0251.pdf) and the Transformative Assessment Conceptual Framework (www.educause.edu/ir/library/pdf/NLI0348.pdf).

130 programs. The breadth of academic programs, departments, research initiatives, and administrative functions that drive its mission underscored the challenge of identifying learning objectives and creating a mechanism for achieving academic success. Friedman's team of developers began with a unit of analysis composed of the instructor plus the learning experience because, as she points out, "if I teach intro to psychology and someone else does too, it is fundamentally a different course from mine, and this is a good thing."

The SLO initiative was born out of the discontinuity that exists between the demands of educational innovation and accountability and accreditation, which, she said, exist in paramount tension. "The challenge is to serve two masters—the university and the legislators—while preserving faculty control over the definition of teaching and learning," she said.

Rather than build an SLO system, Friedman attempted to purchase one, but that resulted in a failed shopping trip. The building process was governed by a set of principles not unfamiliar to colleges and universities across the board: it needed to be consistent with the goal to improve undergraduate education; it needed to allow for disciplinary differences from music to biochemistry; it needed to provide meaningful feedback for units, faculty, and students; and it needed to allow faculty to control the definition of learning outcomes. "Rubrics that substitute third-party judgment for a professor's judgment are doomed to fail," said Friedman. "And they should." Most important—though certainly most difficult to achieve—the system had to be simple, efficient, and scalable.

Staff set to work collecting data and encoding learning experiences, which meant providing the means for faculty members to enter learning objectives for their courses. The sys-

tem was coded in two parts: university learning objectives and department/program-specific learning objectives. The university learning objectives are recognizable—including analytic, intellectual, communication, interpersonal, and similar types of information—as they're used in numerous national surveys, including alumni surveys. "These are not UW learning objectives," said Friedman. "They were drawn from



national surveys, and they run across all institutions. They are agreed upon, tested, and used."

In keeping with the goal of allowing faculty to control the definition of learning outcomes, all faculty members could add any learning objectives they wished to the department- or program-specific set of objectives for any course they teach and without argument or justification. The genius of this arrangement is that the energy that faculty expend attempting to come to consensus about learning objectives is now used instead for reflection about their own objectives. Over time, as more and more faculty actually spend

time reflecting on their objectives, there is greater potential for meaningful discussion at the departmental level.

Students are also benefiting from the system. Not only can they measure their progress in courses, but also they can see how the knowledge they're gaining applies to careers in their fields of study and they can make adjustments to their learning strategies if necessary. They can choose particular courses taught by particular faculty on the basis of the learning objectives for that course as set by that faculty member, because such learning objectives are now public. And they can make their own judgments about how well the course helped them meet the learning objectives.

"The SLO is a metric that changes as the goals change," said Friedman. "And it allows faculty to measure what they think is happening against what is really happening. It is designed to honor professors' teaching identities and disciplinary differences while summing meaningfully across diverse units of the university." See NLII annual meeting keynote presentation, "Student Learning Objectives (SLO) and the Transformation of the Learning Experience" at www.educause.edu/asp/doclib/abstract.asp?ID=NLI0337.

In the session titled Transformation through Program Evaluation, representatives from the University of New Orleans (www.uno.edu) discussed various types of evaluation and presented a case study initiative aimed at enhancing student learning by providing faculty with laptop computers and associated training. Now in use by 860 faculty members from across all of the university's colleges and all faculty ranks as well as the vast majority of departments, the program, which was launched as a pilot, was so

successful that the original goal of engaging a hundred faculty members was expanded to engaging the whole faculty. For more information, see www.educause.edu/asp/doclib/abstract.asp?ID=NLI0303.

Members of the NLII's Transformative Assessment Project team presented the results of their work at the annual meeting in a featured session titled A Rubric for Transformative Assessment Systems (www.educause.edu/asp/doclib/abstract.asp?ID=NLI0307). In the session, Suter defined transformative assessment systems as institutionwide assessment strategies—based on institutional vision, culture, and goals—that get implemented in an integrated fashion across the institution and that are intended to systematically transform teaching and learning for the purpose of improving student learning outcomes. They are used both as a tool for communicating the nature of the desired transformation in teaching and

something to be transformative, it must demonstrate important, qualitative changes in student learning outcomes as well as in the activities that lead to those outcomes, and the technology involved must support the activities effectively. “We can build a demonstrably reliable network infrastructure and provide excellent technical support, but absent an understanding of the activities that such technology supports and the relationship of those activities to the desired learning outcomes, it is difficult to bring about transformation,” he said.

Gary Brown, director of the Center for Teaching, Learning and Technology at Washington State University, said that the problem with existing assessment systems is that the data collected—such as grades (“Bring us better students!”), student evaluations (“He’s so entertaining!”), and administrative accountability (“Student enrollments in our online

term—to help the CTLT improve the Web-based course management tools it supports and to inform the course development process.

Several project findings emerged.

Faculty motivation predicts perceptions of the efficacy of online learning.

- Faculty who are motivated by interest in technology report significantly less efficacy in the online experience than faculty motivated by an interest in pedagogy.
- Faculty motivated by money are rarely satisfied with their online experience.

Students’ perception of the efficacy of grading—of all kinds—diminishes as students mature. Perception of the value of peer critiques increases as students mature. However, Brown acknowledged that against the gold standard of transformative assessment—use of the assessment data to inform change—the numbers were not yet encouraging.

A rubric—a set of well-defined criteria that includes a range of mastery for each—can also help evaluate the extent to which assessment is being applied in a variety of ways to guide and support significant institutional improvement in teaching and learning and in using technology and whether there is purposeful application of assessment and dissemination of assessment results to support deep change, all of which are characteristics of transformative assessment. To that end, Brown worked with the TAP team to develop a transformative assessment rubric. A summary appears on page 17. The latest full version of the transformative assessment rubric can be found at www.educause.edu/ir/library/pdf/EDU0251.pdf.

Joan K. Lippincott, associate executive director of the Coalition for Networked Information, summarized insights about institutional issues associated with transformative assessment and harvested by the TAP team to date. “Successful transformative assessment is a tall order,” she said. “First of all, institutions need to have a top-level commitment to the improvement of teaching and learning that is situated in the institution’s mission—which is even better if it’s also driven

“Transformative assessment works by providing students and teachers with insight into learning processes and their results. It assumes that deepened insight will lead to individual, programmatic, and institutional improvements.”

learning and as a mechanism for learning more about how the transformation can be realized. In the context of the NLII's work, such systems include the design, planning, implementation, and evaluation of technology. To explain how the systems work, Suter quoted a TAP-ONLINE workshop participant who said: “Transformative assessment works by providing students and teachers with insight into learning processes and their results. It assumes that deepened insight will lead to individual, programmatic, and institutional improvements.”

At the session, Steve Ehrmann of the TLT Group’s Flashlight Program argued that for

learning space have almost doubled in the past year.”)—are not used to inform change. He reviewed the WSU Goals, Activities and Processes Survey (GAPS) research project (www.cltl.wsu.edu/GAPS_Research_Links.asp), which was developed by WSU faculty and the Center for Teaching, Learning, and Technology (CTLT) in response to WSU’s rapid adoption of online tools. The survey was meant to provide faculty with a tool for classroom research—such as helping faculty gather feedback on their students’ learning experiences in a formative manner and providing solutions attentive to that feedback during the

by external demands for accountability. Both a systemic focus and a specific campus focus on change need to be present.” According to Lippincott, successful institutions use technology appropriately and make major investments in it, they integrate assessment into their planning for the transformation of teaching and learning, they allocate sufficient resources for assessment, and they make a commitment to act on the knowledge gained through the assessment. Hindrances to success are suspicion of assessment, lack of resources, and an interest in only narrow or incremental improvements.

In describing a transformative assessment planning process developed by the TAP team and tested during the TAP-ONLINE workshop, Lippincott underscored the importance of developing a framework for assessment and the need to focus on articulating transformative goals related to teaching and learning that are rooted in what’s important to the institution. For a useful tool to help develop consensus and an institutional framework, see the READY system (www.educause.edu/ready), in particular, the branch on alignment in planning and the branch on transformative assessment. “The most successful transformative assessment plans,” she said, “are realistic, resourced, and resilient.”

TAP Conceptual Framework

For the summer focus session (see related article, “Summer 2003 Focus Session: Building a Culture for Transformative Assessment,” page 18), three members of the TAP team—Gary Brown, Steve Ehrmann, and Vicki Suter—developed a conceptual framework for transformative assessment. As noted in the article on conceptual frameworks, the NLII sees these as constructs that are useful for creating productive and meaningful dialogue when participants are from different backgrounds and have diverse understandings about teaching and learning. They’re based on theory but are put in terms of a specific purpose and context to frame particular work—in this case, the use of assessment to transform teaching and learning. For

the full TAP conceptual framework, see www.educause.edu/ir/library/pdf/NLI0348.pdf. A summary in question-and-answer form follows.

What does transformation mean in the TAP context?

From the Latin root, *to change*, connoted by *trans-*, meaning *across*, and *forma*, meaning *shape* or *that which shapes*, or *that which has been shaped*. From our perspective, it’s meaningful that the term shares roots with *reform* and *inform*. We’re interested in institutional change that is:

- Emergent from institutional vision, mission, culture, and context.
- Focused on learning outcomes, processes, and purposes (in a way that honors learners and learning).
- Qualitative in nature.
- Based on iterative, collaborative generation and refinement of a conceptual framework that articulates shared institutional understandings of how learning occurs best and that explains relationships among learning, teaching, course and program development, application of technology, and institutional and community organization.
- Large scale, systemic, and contagious (has the potential to move through an institution or system).
- Facilitated by the intelligent and appropriate use of technology.
- Informed by assessment and a commitment to data-driven decision making.

Transformation can proceed in different directions, according to differences in mission and context, local conceptual framework, scale and complexity, and use of technology.

How does such transformation come about?

Three key elements of an effective change process are:

- *Ongoing alignment of planning and decision making*: ongoing environmental scanning, review, community dialogue, and adaptation that are built into an institution’s strategic planning and bud-

geting infrastructure at all levels.

- *Inclusion and collaboration among all stakeholders*: so that all who need to make the transformation happen or are affected by it understand the nature of the transformation as it relates to how they do their work.
- *Organizational motivation*: an institutional environment in which challenge and comfort are balanced on the edge of a state of disequilibrium, whether the pressure for change comes from external forces or internal circumstances (not unlike that described by Margaret Haughey as the motivation for learning—see the article describing her annual meeting presentation “Supporting Learning through Technology,” page 10).

Fundamentally, transformation is about individual and organizational learning.

What role does assessment play in transformation?

Because transformation is about learning, assessment has an essential role in institutional transformation. In particular, in order to help serve the engine of transformation, an institution’s assessment efforts ought to:

- Focus in a significant way on debugging, monitoring, testing, guiding, accelerating, and, if appropriate, modifying the transformational process.
- Be embedded within institutional processes and activities that the institution engages in to structure its work: activities such as strategic planning, budgeting, faculty development, program development and review, and curriculum development.

For the summer focus session, the TAP team also refined the transformative assessment previously developed out of the TAP-ONLINE workshop experience (and referenced earlier in this article). The rubric has a range of mastery from administrative through progressive to transformative, along the following four dimensions. The full version can be found at www.educause.edu/ir/library/pdf/EDU0251.pdf.

- *Assessment purpose*: The assessment plan aligns with other institutional plans

and promotes the collaboration of administration, faculty, students, and community.

- *Data acquisition and analysis:* Data from multiple and diverse sources illuminate students' learning, learning processes, and learning purposes, particularly learning as those aspects of learning extend beyond course-specific outcomes.
- *Application to transformation:* The assessment findings are used to systematically inform and reshape teaching and learning practice to improve effectiveness, efficiency, and/or value and specifically to promote an operational culture of evidence—for example, influencing promotion and tenure decisions.
- *Dissemination:* Results are reported internally and externally with plans for expanding the collaboration for transformation.

What are the strategies one might use in developing a transformative assessment program?

- Find a coalition of interests to fund and operate such a program, and make sure that any steering committee is chartered by the institution's leadership, is representative and accountable, and has its credibility reinforced through the selection of the participants.
- Look for a win-win design in early efforts so that even before the study is undertaken, stakeholders are confident that no matter what the study finds, it is worth doing. Early studies might focus on needs, on establishing baseline data, and/or on debugging early strategies and ought to provide relatively immediate, substantial help.
- Involve the stakeholders—those whom the study is supposed to help or who might be affected by the results—in design, in data gathering, and in data

analysis so that they're more likely to be persuaded and guided by the results.

Is there a particular process one might use in developing a transformative assessment program?

For complex human institutions, process is the engine that converts models, strategies, and rubrics into operational reality. Some approaches that can be adapted into structured processes for developing your institutional transformative assessment program are development of institutional portfolios (for an example, see the Urban Universities Portfolio Project, imir.iupui.edu/portfolio), participation in the Malcolm Baldrige National Quality Program (baldrige.nist.gov), and use of methods, tools, and processes from the Flashlight Program for the Study and Educational Use of Technology (tltgroup.org/programs/flashlight.html).

In addition, the TAP team, drawing from experiences in a previous TAP activity—the TAP-ONLINE workshop—and also from the writ-

SUMMER 2003 FOCUS SESSION

BUILDING A CULTURE FOR TRANSFORMATIVE ASSESSMENT

This focus session was jointly sponsored by the National Learning Infrastructure Initiative (NLII); the Flashlight Program of the TLT Group; the Coalition for Networked Information (CNI); the Center for Teaching, Learning and Technology at Washington State University; and the American Association for Higher Education (AAHE). Members from those organizations are part of the Transformative Assessment Project (TAP) team (see page 14).

While open to individuals, the focus session was designed to help institutional teams in particular that have been charged with planning and/or implementing a major change for their program or institution so as to transform teaching and learning by using technology. The invitation was extended to teams from institutions that:

- Are involved in significant institutional improvement of teaching and learning by using technology.
- Use assessment in a variety of ways to guide and support that effort.
- Share a commitment to the purposeful application of assessment and dissemination of assessment results to support deep change.

The focus session concentrated on the use of data and systematic assessment to advance such efforts. Ten institutional teams ranging

in size from 2 to 11 members were in attendance, as were 9 individuals from various organizations. A diverse audience of 56 was in attendance: more than 30 percent were faculty, 25 percent were from university administration, 17 percent were instructional technology staff, 17 percent were assessment specialists, and the rest were divided between faculty development, other information technology staff, learning/instructional designers, librarians, and students.

During the daylong focus session, participants alternated between attendance at general session presentations followed by small-group discussions and then institutional team meetings that were carefully facilitated. As an initial step in planning and carrying out a transformative assessment project at their institution, participants explored the processes and practices associated with transformative assessment. That format, using institutional teams, appeared to be extremely successful: one of the participants mentioned the focus session to an AAHE staff member at the AAHE Assessment Conference that followed, saying, "I have just attended the perfect meeting." In addition, a half dozen mentioned the format in particular in their evaluations, giving some version of the statement, "We plan on generating a local focus session based on this model and creating a planning group to address moving forward with buy-in and participation across all the key stakeholders at our institution." More than any other focus session the NLII has held, there seemed to be a strong feeling that more than one day was needed, and this format will be considered when institutional teams are to be involved in future focus sessions. For more information on the focus session, including meeting proceedings, see www.educause.edu/nlII/meetings/nlII033.

ings of Mary E. Huba and Jann E. Freed—especially Learner-Centered Assessment on College Campuses—has also designed and tested a process and a template for creating a developmental document called the Transformative Assessment Plan. The document is developmental because the activities that must be carried out to complete it can lead to development of skills, infrastructure, resources, the organization, the community, ongoing processes, and activities characteristic of a culture of evidence. The processes necessary to construct and maintain the document could be integrated into an ongoing, dynamic, institutional strategic-planning process, which is yet another approach that can be adapted for developing a transformative assessment program. The process and planning templates are available at www.educause.edu/ir/library/pdf/NLI0347.pdf.

NLII Activities and Plans

Summer focus session participants and other parties interested in transformative assessment will have an opportunity to participate in an online community of practice. The Transformative Assessment Project team will be hosting a series of follow-up discussions on the New Academy Virtual Community of Practice site (<https://worktools.si.umich.edu/workspaces/dcamrid/003.nsf>) during summer 2003. In addition, the Transformative Assessment Conceptual framework (www.educause.edu/ir/library/pdf/NLI0348.pdf) and the TAP rubric (www.educause.edu/ir/library/pdf/EDU0251.pdf) will be refined based on feedback received at the focus session and during community discussions.

TAP team members will collect information about the transformative assessment

projects that summer focus session attendees and other interested parties are undertaking and will conduct a needs assessment. A series of experimental online workshops may be designed to support those projects depending on needs. Finally, the Transformative Assessment key themes page (www.educause.edu/nlii/keythemes/transformative.asp) will continue being updated to reflect the new resources created and gathered for this topic for the focus session and by the community of practice. ^{NLII}



(Overview, continued from page 4)

Systems, cosponsored with the University of Arizona, brought together a wide range of participants, including product managers for commercial software development (who are interested in understanding market needs and translating them into software requirements), software developers on campuses (who wish to understand faculty and student needs and translate them into software requirements), faculty and instructional designers (who wish to implement learner-centered teaching practices in their design/use of course management system learning experiences and course environments), and procurement and academic administrators (who are interested in including learner-centered functional requirements in their development of requests for proposal and their selection of course management systems). Also present were instructional technology support staff responsible for instructional technology infrastructure and faculty support (who wish to use their understanding of the teaching and learning uses to configure and support course management systems), as well as educational technology, usability, and human interface researchers (who

are interested in using the requirements in designing models and prototypes). The use of a shared conceptual framework and vocabulary for learner-centered principles was a new feature of this focus session, and both contributed greatly to its success. More information can be found at www.educause.edu/nlii/meetings/nlii032.

More recently, the summer focus session on Building a Culture for Transformative Assessment was jointly sponsored by the Flashlight Program of the TLT Group; the Coalition for Networked Information; the Center for Teaching, Learning and Technology at Washington State University; and the American Association for Higher Education. This focus session was designed to help institutional teams in particular that have been charged with planning and/or implementing a major change for their program or institution as a way of transforming teaching and learning by using technology.

During the daylong focus session, participants explored the processes and practices associated with transformative assessment as an initial step in planning and carrying out trans-

formative assessment projects at their institutions. This focus session also featured the use of a shared conceptual framework that described the role of assessment in transformation. The institutional-team format of the meeting appeared to be highly successful, (see box p. 18). Appreciation for the format was a point made repeatedly in evaluations and was summed up by one participant who wrote, "We plan on generating a local focus session based on this model and creating a planning group to address moving forward with buy-in and participation across all the key stakeholders at our institution." For more information on the focus session, including meeting proceedings, see www.educause.edu/nlii/meetings/nlii033. ^{NLII}

NEW NLII CONCEPTUAL
FRAMEWORKS

Mapping the Learning Space:
(sidebar, page 6)

Transformative Assessment:
(sidebar, pages 14 and 18)

Notes from the Field

A year in the life of an NLII fellow

By Colleen Carmean

Start with an application process that challenges you to define your philosophy of teaching and learning, to imagine and describe the transformation of higher education, and to defend your current research ideas. Add to that a support letter from your provost or chief information officer. Good work. You've taken your first steps on a journey that will not only enliven your career but also forever change your perspective on the deep and widening river of educational transformation.

Fast forward to the EDUCAUSE annual meeting, where newly selected NLII fellows are immersed in introductions, presentations, and a dizzying array of acronyms that would impress even the most-seasoned government workers. No matter how diverse, innovative, or forward-thinking your career has been to date, you can't help but feel like a stranger in a strange land. And you can't help but wonder what you've gotten yourself into. Relax: the food is great, and the fellowship hasn't started yet. You don't *need* to know anything, which is also great because you're now sure that you don't—and that you never did. The only thing you do know for sure is that your head hurts.

The NLII Fellowship Program is made up of two half-time, one-year fellowships that target faculty and instructional support staff at institutions of higher education. Fellows study, analyze, and assess specific aspects of the transformation of teaching and learning in higher education that are of relevance to the NLII. But that's the short story, not unlike the blurb in a travel brochure that can't possibly convey the actual exhilarating, grueling, and belief-changing experience.

The program commences each January at the NLII annual meeting, where you spend a week attempting to decipher and apply acronyms learned in the context of attending and reporting on the presentations and panels. Warning: you may be asked to participate, as I was in 2002 in San Diego. Along with my cofellow, Jeremy Haefner, I was asked to create a panel session called The New Digital Student. For our panel, we each brought a student and gave a lively presentation on how the new digital student learns and what the student would like from the learning environments. You go home exhausted and absolutely certain you know nothing.

You'll spend the next few months exploring the NLII key themes, reading, meeting the EDUCAUSE folks at their headquarters in Boulder, Colorado, and assisting with preparations for NLII focus sessions. For me, this meant hopping aboard with the project team preparing for the March 2002 focus session on transformative assessment held in Denver. It also meant serving as a member of the creation team for an eight-week online pilot workshop that followed the session. My contributions to the focus session included creating a visual map of the course and a case study on my institution. I participated in the workshop and, as was required of participants, formed an interdisciplinary assessment project task force on my campus. The final assignment for the workshop was to submit a project proposal from our team. For my home institu-

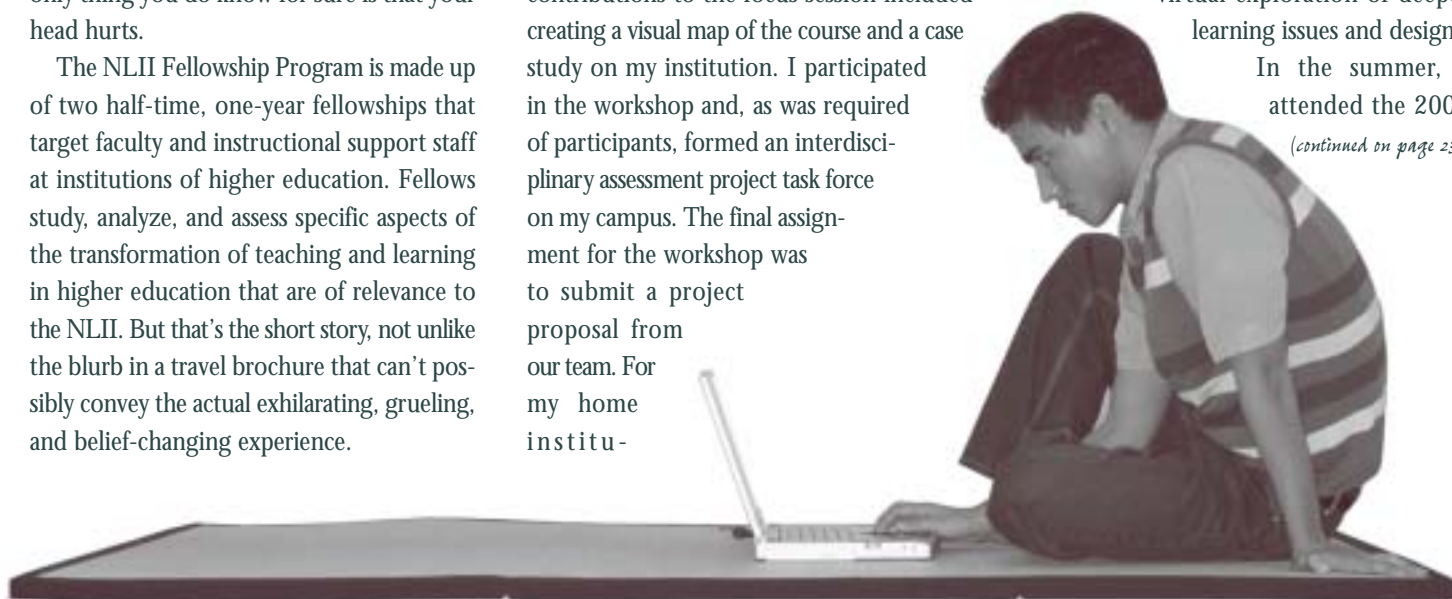
tion, Arizona State University (ASU) West, this eventually became the institution's official process for implementing hybrid classes.

When we weren't engaged in assessment, Jeremy was working on a branch of the READY system on alignment of planning (www.educause.edu/ready) and I was working on a fellows Web site documenting research directions. As fellows with similar interests, we had decided to work collaboratively on our research and had already begun exploring the topic of deeper learning within NLII's theme of learner-centered practices. We'd call into the weekly meetings a half hour early to compare findings on learning theory and the Web-based learning systems we'd been discussing at the NLII team site.

That spring, Jeremy and I arrived in Vancouver, British Columbia, two days early for the May focus session on innovative instructional design so we could work together and then write the first draft of what would become an article for *EDUCAUSE Review* called "Mind over Matter: Transforming Course Management Systems" (November/December 2002). The body of our work—including the bibliography, questions, and initial findings—was placed on the fellows Web site for comment and critique. The site was briefly presented at the May focus session, which led to a discussion of the community's interest in continuing virtual exploration of deeper learning issues and design.

In the summer, I attended the 2002

(continued on page 23)



The Digital Repository Comes of Age

How NLII members are turning learning objects into knowledge agents

Imagine a large container filled with bits and pieces of digital resources. In it you might find simulations and electronic calculators, animations, text entries, Web sites, and audio and video clips. Reach in a little deeper, and you might discover photographs, illustrations, diagrams, graphs, maps, and charts.

The bits and pieces come in all shapes and sizes. Some are large pieces of information organized from much smaller pieces. Some are simply those smaller pieces, such as a video image of a hand on a piano keyboard in a single-chord formation.

What makes the container interesting is not so much its content; that could describe almost any repository. What makes this container interesting are the following: the bits and pieces can come together in just-in-time fashion to enhance learning, they can be used and reused, they can be arranged in any number of combinations with other bits and pieces, and they can be applied to any number of learning situations or topics. Most impressive, though, is that the bits and pieces can come together in whatever form you find useful depending on what you need to know right now.

Welcome to the future world of learning objects, one of the hottest topics across disciplines and within institutions of higher education today. Three sessions at the NLII annual meeting in New Orleans pulled apart the subject of learning objects and addressed issues ranging from definitions to the challenges of technical interoperability, to learning objects' impact on the transformation of teaching and learning.

While a specific and agreed-upon definition of learning objects has been the subject of debate and discussion since at least 1997, the most common definition is by David A. Wiley of Utah State University, who in a seminal paper titled *Connecting Learning Objects to Instructional Design Theory: A Definition, a Metaphor, and a Taxonomy* (see item 1.1 on Wiley's site, reusability.org/read) defined learning objects as any digital resource that can be reused to mediate learning. Susan Metros of Ohio State University added a set of characteristics to that basic definition in an NLII featured session titled *Landscape or Portrait? An Ontology for Learning Objects*. The characteristics expand the definition of learning objects to mean pieces of information or media that are reusable; stand-alone; media independent; searchable; interoperable; sharable; digital; modular, with assigned ownership; and peer evaluated.

But learning objects are more than just pieces of information thrown into a virtual container and available through the Internet. According to Metros, the information itself is valuable only if it has some kind of outcome; that is, the data should lead to information, which leads to knowledge. "Knowledge should be our most important focus, but we don't have champions for

knowledge like we do for devices that support the management of data," she said.

With knowledge at the center, learning objects take on an expanded ontology. They become less bits and pieces of useful information and more like objects that can range from simple to complex but that are tied together by characteristics that show relationship. "By chunking the issues, we can begin to identify patterns," said Metros.

While the pursuit of knowledge may be the philosophical engine driving our visualization of the potential of learning objects, the technology that underlies their use is a subject of ongoing speculation and concern. According to copresenter Lorcan Dempsey of the Online Computer Library Center Inc., learning objects will ultimately appear in many repositories alongside other traditional resources, such as books and journals. Technical standards and specifications will enable objects to interact within a systems management environment. And because people will want to search across repositories, there'll be a need for a search intermediary. Still, there are costs involved in creating such environments and costs involved in embedding and managing the data. And the issues are likely to become even more complex.

Dempsey says learning objects will be subject to different terms and conditions for use depending on where they originate. In addition, he says, they'll curate over time in many versions and recombinations, subject to unknown long-term management and cost issues and will become "variably valuable" as part of the long-term scholarly record. "As we create these repositories, we are going to encounter a variety of management issues that will become increasingly problematic over time," he said.

While learning technologies may, in the words of Metros, "offer great value in terms of saving time and money in course development," what are the experiences of learn-

ing objects in the real world? And where do faculty—who often resist making the effort to adopt new technologies—fit in?

As representatives from OSU and the University of Arizona said in their session titled *When Learning Object Theory Meets Practice: Functionality of Emerging Standards in the Real World*, this type of technology works best within a preferred teaching practice. At Ohio State, learning objects sometimes take the form of animations that assist students in understanding complex topics and can be reused often—both for foundational knowledge and for interactive understandings. The problem, though, is that faculty are hesitant to use learning objects that are not created to be shared, even if they were placed in a repository or referatory—like MERLOT—for sharing. True reusability would mean designing objects for modularity and not simply going to an object embedded in another faculty member’s course materials.

The University of Arizona realized that in order to reach all faculty members who are interested in what they refer to as rapid instructional design, what was needed was automation of the decision-making process. A series of questions helped the university learn more about its targets and made it possible to define outcomes. The result is MOATS—the Modular Organizer and Teaching System—a dynamic system that leads faculty through the process of designing, organizing, and forming instructional models. After working on prototype ideas, the university is

now looking for partners for this experimental instructional support system. More information can be found at moats.arizona.edu.

At a session titled *Decentralized Collaborative Approach to Learning Development* and in the belief that learning objects foster “a certain interdisciplinarity,” Brian Lamb of the University of British Columbia described the university’s interest in the promise of learning objects. Faculty members got together and began questioning the idea of sharable objects. “Learning objects seem to demand radical change across the institutions,” said Lamb. “They demand new pedagogy, and new instructional design systems, sharing, possibly, even reconceptualizing relationships between learners, instructors, and content. The potential of learning objects is that they can foster the exchange of ideas and disseminate knowledge.”

Interest in learning objects has grown into a formal project at the UBC, one that can best be described as a hybrid of decentralized and centralized organizational principles. Eight distinct campus units—five faculties, Distance Education and Technology, the University of British Columbia Libraries, and Information Technology Services—submitted a joint project proposal to develop a learning object infrastructure. Recognizing the benefits of organizing itself in both a centralized and a decentralized fashion, the project is able to cater to larger faculties who wish to preserve their autonomy within the larger project and who require customized branding, interface, and experience design; specialized metadata schemata; and secure departmental hosting of resources. But the

project also recognizes that centralized solutions may be more appropriate for smaller faculties

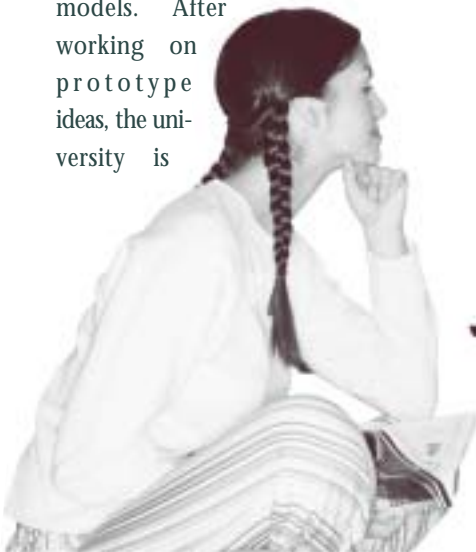
such as those that lack the resources to maintain their own repositories and that have the need for a central one-stop portal to search for objects.

According to a description of the project, the key to balancing those seemingly contradictory directions is to adapt the strategies of larger learning-object projects to the campus level, such as adhering to shared standards and developing a robust set of inter-repository communication protocols. Ultimately, the project leaders hope to achieve a robust learning-object ecology that fosters resource exchange on campus and among national and international colleagues.

Still a relatively new concept in the world of educational technology, learning objects raise a number of interesting questions for the audiences that are pushing the concept forward: How do we get to the next place where we develop information that describes learning within the object? Are learning objects simply media doohickeys? For some, that may be the case. And only when we have a way of annotating objects with a sense of purpose be associated with the object. Reusability is more than the modularization that allows an object to stand alone. The concept of reusability may also encompass the language of applicability and meaning.

Until now, the discussion around learning objects has tended toward the what rather than the how and why. Responsibility to the community of practice in teaching would mean a shift in the nature of intellectual property. Perhaps a doohickey will not be defined as a learning object if embedded in a course Web site in such a way that others would find it difficult to reuse. On the other hand, the learning should include the author’s information on learning context and instructional design as well as content. Metadata—embedded information that describes the technical and, to some extent, the instructional nature of a learning object—addresses some of those concerns, but the meaning and intent of metadata elements vary across systems.

As with all new technologies that are intended to change the way we do business, learn, and interact, the learning-objects container may for now contain more questions than content.




NLII Future Activities: Learning Objects

NLII 2003 fellow Patricia McGee is exploring how pedagogical designs support learning within objects and how objects are used within other systems. Building on NLII 2002 fellow Colleen Carmean's Deeper Learning Principles (www.educause.edu/nlii/keythemes/lcp), McGee is looking for evidence of these in the development process as well as in the design and implementation of learning objects within learning environments.

In addition, the NLII has chartered a Learning Objects working group, cochaired

by Metros and McGee, to conduct an inventory of learning-object projects and organizations with which the NLII should coordinate efforts, begin the development of a conceptual framework and extend its ontology, identify patterns and relationships, conduct informal research, and collect case studies. McGee is also cofacilitating the Learning Objects Virtual Community of Practice (LOVCOP)—which is designed for practitioners in this area—to inform and reveal strategies, policies, and solutions to the challenges of developing and using learning objects. The NLII fall 2003 focus session titled The

Learning in Learning Objects, scheduled for October 10, 2004, in Columbus, Ohio, and cosponsored with the University of Ohio, will be informed by the work of McGee, the work of the NLII Learning Objects Workgroup, the activities of the NLII Learning Objects Virtual Community of Practice, and the results of research by the EDUCAUSE Center for Applied Research (ECAR). For more information on this focus session, which by the beginning of August was near registration capacity, see www.educause.edu/nlii/meetings/nlii034. 

(Notes from the Field, continued from page 20)

AAHE Assessment Conference, where the best minds in assessment practice both share what they know and form small communities of practice. I'm so inspired, I write a brief assessment reflection on the plane home that will become, after six drafts, an article for *Technology Source* in spring 2003.

Early August sees the annual EDUCAUSE Seminars in Academic Computing, or SAC, held in Snowmass, Colorado, just outside Aspen. While it was difficult to tear myself away from the 120-degree heat of my home campus in Phoenix to spend a week in the Rockies, a few days at EDUCAUSE HQ working on my research helped me acclimate to cool weather and higher altitudes before heading up, up, up into the pines. The nightly thunderstorms and hot oatmeal were my favorite SAC memories.

Early autumn is quiet, offers a brief respite from travel, and gives a chance to catch up at the office and prepare for the fall semester. It's also a time to start making progress on your research because everything should be falling into place. The fall focus session is fast approaching, and it's likely you're on the planning or support team. Later in the fall, you travel to the EDUCAUSE annual conference, where you work and report as well as meet and greet new fellows and help them become familiar with the bottomless well of acronyms, concepts, committees, and characters. Remind

them to breathe and to enjoy the food.


A few weeks after the EDUCAUSE annual meeting, we headed to Northwestern University in Chicago for the fall focus session on electronic portfolios, where we explored the definitions, requirements, use cases, and implementations of this emerging technology. This session was the hard-labor love child of 2001 NLII fellow John Ittelson. Seems like there's always something raising the bar on what's expected from your research results.

Then it's winter and the last lap of what's been a very long-distance run requiring careful pacing and the stamina to cover a lot of varied terrain. I'm asked to take part in a Transformative Assessment panel at the Coalition for Networked Information (CNI) Task Force Meeting in December and present the ASU West project experience. It goes well, with great audience response and numerous questions. I get off the plane in Phoenix with the flu, some kind of bug bite that causes my hand to swell, and an ear infection. I'm ready to stop traveling now.

I finish my research Web site on mapping the learning space and turn it over to EDUCAUSE for adoption. I'm promised good care and nurturing. I have separation pains, but a fellow learns to let go. I finish the *EDUCAUSE Review* edits, write this article, and prepare materials for the panel discussion I'm doing with MERLOT at the NLII

annual meeting in January 2003. There, I'll also spend a few days in staff meetings, debriefings, and orientations for new fellows. Has it been a year? It feels like four.

I agree to serve as coeditor of the MERLOT Teaching and Technology Editorial Board and begin to develop a rubric for evaluating pedagogy-based resource objects and a clearer mission statement for this emerging MERLOT community. No longer a fellow, I still agree to colead the NLII March 2003 focus session called Next-Generation Course Management Systems (www.educause.edu/nlii/meetings/nlii032). Yes, I know, time to let go. The fellowship is over; new fellows Darren Cambridge and Patricia McGee wait at the door. But this is my eldest and favorite child, the product of a year's work and research. And unlike Web pages that I now give away as easily as sugar cookies, this one is my research. Mine. And I can't let go.

You see, I'm an exiting NLII fellow, a recovering fellow, a surviving fellow, and now I *do* know stuff. Sometimes, though, my head still hurts. 

Interested in being an NLII fellow for 2004? See www.educause.edu/nlii/fellowship for more information and the online application.

NLII 2004 Fellowship Program applications and letters of recommendation are due September 3, 2003.

How (and Why) to Listen to Heavy Metal

Participating in standards development enables higher education to control its destiny

Whether it's a jazz combo or a heavy-metal band, music is much more than a group of individuals playing their own thing in the same space. In fact, short of a performance piece, such a musical experience would likely send listeners running from the concert hall. Instead, each musician works with

other musicians to produce a seamless and transparent musical experience that brings together a set of individual tones, notes, and chords in a perfect, harmonic blend.

In the learning market space, there are countless individuals creating the tones, notes, and chords that are the learning materials, objects, tools, practices, and systems. Individually, they're the building blocks for and sometimes even solutions to a single problem or a single course. Until they're joined together, however, their usefulness is limited; alone, they'll never achieve the status of a completed composition.

At the NLII annual meeting, a featured session titled *How (and Why) to Listen to Heavy Metal: IMS, OKI, and other Standards and Specifications Projects*, a group of specification development specialists first discussed the need for faculty, staff, content and courseware developers, and instructional designers, to get involved in the development of standards and strategies and then described strategies that would facilitate participation. "The best music is made not when individuals play alone," said Ed Walker, director of the Instructional Management Systems (IMS) project (imglobal.org). "It happens when a group is jamming together."

Specifications and standards that facilitate

the long-term usefulness of instructional technology and interoperability across institutions worldwide are essential to the future of teaching and learning in the digital age. They should capture and sometimes facilitate practice, but they should not determine it. "There are standard ways of describing practices that allow standards makers to influence those processes," said Walker, "and we need to use

that notation."

The notation is simply a way for faculty and instructional technology staff to communicate with standards developers. According to panelists at the session, two areas must be coordinated: data structures and behaviors. "The data structures came first, and the behaviors are the next challenge," said Jeff Merriman of the Open Knowledge Initiative (OKI) (web.mit.edu/oki), which is coordinating behaviors. "We have the nouns," said Merriman. "Now we need the verbs."

OKI, which began as an initiative between Stanford University and Massachusetts Institute of Technology to facilitate resource sharing by writing to an open standard for software interoperability, has been working on ways to prevent changes in one part of a complex technological system from affecting the other parts. With that in place, educators can focus on education-related problems rather than on having to deal with "the seamy underbelly of interoperability," said Merriman. It is often thought of as a service-based archi-

SHARE AND SHARE ALIKE

Open source development continues to be a mainstay of higher education technology development. In the concurrent session titled *A Model for Successful Open Source Development in Higher Education*, Carl W. Jacobson of the University of Delaware examined the uPortal project (www.udel.edu/uPortal) as a model for open source software development. "Portals are important because they model the ways our future students will be working," said Jacobson. "It's not your student body you should be targeting; it's the students who will be coming in four years." Those students, says Jacobson, will want technologies that are always on, capable of multitasking, capable of operating on multiple devices, personalized, and consolidated.

The key principle behind open source involves sharing your efforts when the goals are the same. Pooling effort makes it possible to access expertise ("The best minds don't always work for you," said Jacobson) and to create influence ("If 40 institutions go to the department of higher education or Blackboard or Microsoft, they listen"). Colleen Carmean, NLII 2002 fellow, calls this "the authority of consensus."

One of the keys to uPortal's success has been commercializing it from the start. This enabled it to become self-supporting in three years as stipulated in its Mellon grant. By commercializing long-term support services, uPortal has been able to widen its customer base, allow people to buy various scales of service, and ensure the development plan.

ture, wherein the service could be authentication, data warehousing, or other specific aspects of data sharing. “In the future,” said Merriman, “instead of simply having the ability to share data, we could share applications and implementations.” And like music, the notation of interoperability in instructional technology will become invisible over time—like musical notations once you’ve learned them. “No one asks, ‘How did you come up with those staves and rests?’” said Merriman.

What makes standards useful? Consider the memory challenges associated with new information systems. Today a student may have 10 or 15 passwords to remember, which makes a service like Shibboleth—a system for interinstitutional user authentication—particularly useful. In the biblical story from which the name is derived, individuals who gave the incorrect passwords were beheaded. “That’s not our policy,” said the project’s Ken Klingenstein, who describes this Intranet2 middleware initiative as the “plywood” of building the higher education infrastructure. Shibboleth uses biometric authorization for so-called attribute passing between institutional firewalls so that users have to authenticate only once. Users can then be passed from digital library to digital library while protecting their privacy along the way.

A workshop on the concept of heavy-metal jamming drilled down deeper into the specification process and illuminated a number of reasons faculty and instructional software specialists should make the effort to become informed about standards and specifications and how to find avenues for influencing the process. IMS cofounder Steve Griffin explained the specification life cycle and where higher education fits in, and he discussed why higher education’s opinion counts. With a membership list that reads like a who’s who of today’s top information technology companies, IMS has mastered the art of listening to its members. “Silence allows other perspectives to dominate,” Griffin said. “If you’re silent, corporate needs will dominate and you won’t see variability.” In addition, higher education has the expertise to guide the development of

standards and specifications that will serve the educational mission. “Vendors are looking to higher education to cast the light forward,” Griffin said. “They want to meet the needs of customers.”

The IMS has a sophisticated system for listening to its constituents, thereby making it simpler for educators and instructional designers to enter its world. There are general meetings, special Internet group meetings, white papers and surveys, and a fully developed online presence. “We want to help communities express their opinions,” said Griffin.

In addition to service on the IMS board, the NLII is involved with the following phases of specification and standards development to help make that linkage between the tool-makers and the tool users:

1. *The requirements analysis phase:* By serving on the IMS Technical Board; by sponsoring or planning efforts and events that involve all of the stakeholders—including, among others, teachers and learners, content providers and learning providers, technology vendors, software developers, policy makers, administrators, and researchers—in the requirements collection phase; by participating in the development of use cases (see sidebar); and by providing professional development opportunities for members with regard to the standard methods and formats for requirements analysis. For example, see the NLII 2003 spring focus session (www.educause.edu/nlii/meetings/nlii032), an event designed to collect requirements for the design of next-generation course management systems.
2. *The specification writing and review phase:* By attempting to keep its membership informed about IMS specification development activities, by encouraging active participation by its members, and by reviewing specifications as part of the Technical Board voting member responsibilities.
3. *The implementation phase:* By keeping its membership informed about new

WHAT’S THE USE OF USE CASES?

“There are standard ways of describing practices that allow standards makers to influence those processes, and we need to use that notation,” says IMS director Ed Walker. One such methodology is the use case. A description of some activity, usually involving a person and a computer system or between two or more systems. Use cases can be informal—such as simple narrative descriptions—or very formal, such as those used in software engineering. IMS uses use cases to help capture information about the context, activity, and requirements involved in an area of specification development.

The NLII is working to translate features and functional requirements issues and needs that have been identified at NLII focus sessions—such as e-portfolios and course management systems—into standard formats such as use cases that can be immediately applied in IMS specification work. This effort is intended to improve the responsiveness of e-learning software to higher education needs in the context of learner-centered design principles. Results of this work will be submitted to the appropriate IMS Special Interest Group or to the IMS Use Case Forum, which was set up to solicit use cases from the public that will aid IMS in the areas of chartering and specification development. For more information, select Use Cases and Priorities at imglobal.org/developers/ims/imsforum/.


specifications and encouraging testing and adoption. The NLII publishes a quarterly update on technical standards and specification projects in the learning materials and software market. Check out the new key themes page at www.educause.edu/nlii/keythemes/standards

dards.asp and the Specification and Standards Organizations table. For more information, see www.educause.edu/nlii/keythemes/standards_table.doc.

4. *The feedback phase:* By providing forums for feedback from the tool users to the toolmakers. In addition to face-to-face events, the NLII actively sponsors virtual communities of practice

wherein toolmakers and tool users can interact during all phases of specification and standards development.

For examples, see the Virtual Communities of Practice (VCOP) Initiative page (www.educause.edu/vcop)—in particular, the E-Pac (electronic portfolios) and Learning Objects VCOPs.

The NLII also provides leadership for IMS special interest groups (SIGs) in key development areas; for example, NLII 2003 fellow Darren Cambridge is currently serving as chair of the Electronic Portfolios SIG. 

LEARNING MATERIALS, SOFTWARE, AND SERVICE MARKETS



If You Give a Student a Computer

Patrick McElroy offers a win-win model for managing growing demand for digital learning content

One of the NLII's top priorities is the fostering of market structures for the development and delivery of interactive learning materials. The program focuses especially on markets that provide the evaluation, acquisition, distribution, and publication of proprietary, Web-based digital learning materials.

Patrick McElroy, founder of Learning Content Exchange and NLII annual meeting 2003 general session speaker, has worked with publishers as well as courseware and technology companies in helping them create business models and distribution strategies for digital content.

Responding to Sea Changes

These days, the question of whether information technologies are transforming higher education has become more rhetorical than actual. Even so, colleges and universities continue to rely on old business practices that do little more than stem the flow of digital content into the hands of faculty members,

researchers, and students. Can higher education reengineer itself to be more responsive to learning needs and market changes? Or will it forever find itself reacting to pervasive demands for high-quality digital content and controlled by the industries that provide learning materials?

McElroy says higher education doesn't have a choice: Either it recognizes the power of collaboration or it risks losing its influence in the digital content marketplace. "There is a point in every major industry when the balance shifts from the old to the new," he said, pointing to the cultural sea changes that resulted from the transcontinental railroad in 1870, the computer industry from 1986 to

1995, and Napster in 1998. "It's often difficult to see the disruptive forces of transformation when you're in the middle of it," he said, "but as Intel chairman Andy Grove pointed out in his theory of strategic inflection points, you know it when the balance shifts from the old to the new, and it never comes back." E-learning and academic publishing, he said, are precisely at that point right now.

Today, a number of pressures are bearing down on higher education. As academic technology is growing, resources are shrinking. Students expect a technologically sophisticated environment when they enter institutions, and they expect and demand electronic interaction. And while availability of copyrighted digital content is exploding and becoming more difficult to manage, institutional cultures around those issues—and the unique nature of how institutions deal with faculty, learning materials, and student expectations—are changing slowly. At the same time, academic publishers are exerting ever-increasing power over the market.

According to McElroy, as academic publishing hits its strategic inflection point, there are as many opportunities as there are challenges for colleges and universities. The challenges will manifest themselves as the quantity and sources of Web-based digital learning materials escalate, thereby making it increasingly difficult for faculty to locate and eval-

uate the content from multiple publishing sources. At the same time, the number of technology-savvy faculty interested in and capable of producing and publishing digital content will continue to grow. Institutions that provide mechanisms to support the publication and distribution of copyrighted digital learning materials—and that account for and distribute royalties on behalf of those faculty—will have a significant advantage over those that do not.

McElroy's vision for how higher education can succeed in the new world of digital learning materials appears in a paper distributed to NLII annual meeting attendees: *Managing Digital Learning Content in Higher Education Institutions* (www.educause.edu/asp/doclib/abstract.asp?ID=NLI0338). It says that in the new, digitally rich environments, "each institution will strive to provide their faculty with services that enable them to easily evaluate and select learning materials for their students from a wide variety of publishing sources. Each institution will also strive to provide their students with Web-based learning materials for their class work and independent research. And, each institution will find it necessary to develop internal processes to support these services in compliance with the terms and conditions they have negotiated with each publisher in each licensing agreement."

Turning this vision into reality depends on whether higher education chooses to be reactive or to be proactive. If reactive, colleges and universities will continue

clinging to their current business practices and making attempts to fit the management of digital content into their traditional processes. Invariably, they'll attempt to develop an in-house solution that's more or less an extension of the current campus or systemwide business practices. By doing so, they'll fail either to respond to the unique challenges of Web-based digital publishing or to benefit from the unique opportunities the digital revolution promises.

In theory, the approach bears a striking resemblance to what former Educom vice president Carol Twigg referred to as the "bolt-on" approach to information technology—or the tendency to attach new technologies to old systems, which sabotages the potential of information technology to reduce cost, increase access, and improve the quality of higher education. Like Twigg, McElroy supports the notion of a collaborative approach to the management of copyrighted digital learning content wherein institutions of higher education abandon costly single-institution—or even single-course—solutions in favor of multi-institutional solutions that not only

enable institutions to exert influence over the industry but also infuse the higher education industry with the buying power and flexibility that are essential to its unique learning-materials needs.

The High Cost of Reactivity

According to McElroy, the cost of the reactive approach for managing digital content is substantial. Existing and incremental campus resources—such as administrative, legal, and information technology resources to develop and sustain an adequate infrastructure for the acquisition, management, and distribution of digital content—will further strain institutional budgets. It will likely mean higher prices from publishers and difficulties in sharing content with other institutions. And it could both inhibit faculty effectiveness when it comes to evaluating and aggregating Web-based content for students and minimize the ease with which students can acquire content for class and independent study. This direction, according to McElroy, means ineffective, inefficient, and costly acquisition and distribution processes for digital goods in higher education.

Perhaps more disruptive will be the increased control of the market by content providers and publishers and the higher costs that will result from the failure of colleges and universities to leverage their power as consumers. "Publishers attempting to
(continued on page 29)



The Digital Me

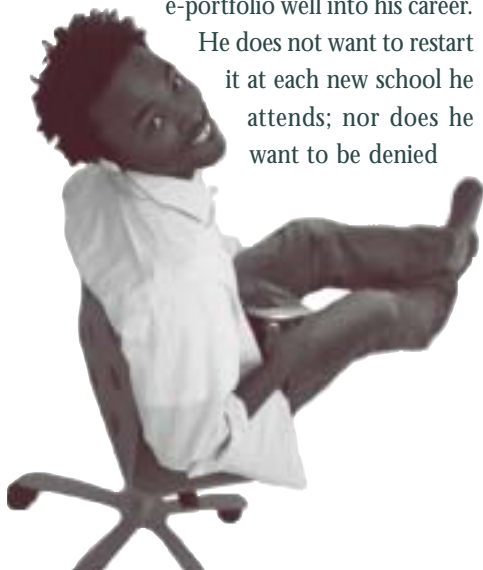
Standards, interoperability and a common vocabulary spell progress for e-portfolios

Dylan Harnick is an art history major at the University of Somewhere, a well-respected art and architecture school in the northeastern United States. A few months into his freshman year, Dylan begins work on his electronic portfolio—

a multimedia, digital container that captures and presents his educational progress, his personal perceptions, and feedback from instructors as well as artifacts and examples of his work. Within two years, Dylan transfers to the University of Elsewhere, at which he finishes his undergraduate education. Following graduation, Dylan attends the University of Wherever to get a master's degree, after which he begins work at his first job. By the time Dylan is 30, he's changed jobs four times.

For Dylan, his electronic portfolio is a life-long work in progress. He wants to easily transport its contents from each of the three schools he attends. He wants access to all of his e-collections both during and after his undergraduate and graduate education. And he wants to be able to continue his e-portfolio well into his career.

He does not want to restart it at each new school he attends; nor does he want to be denied



access to collections either by previous schools he attended or long after his disassociation from whichever institutions granted him his degrees.

What will make it possible for Dylan's e-portfolio expectations to be met? standardization, interoperability, a universally agreed-upon set of definitions, and adoption of policies that will help guide both behavior and expectations when it comes to copyright law and easy access to digital information.

Three NLII 2003 annual meeting sessions addressed varying aspects of e-portfolio advancements and challenges. In a session titled Designing an Electronic Portfolio System for Multiple Universities: Some Early Lessons, Ali Jafari of Indiana University-Purdue University Indianapolis presented a prototype developed by the ePort-Consortium (eportconsortium.org)—a collaboration of higher education and information technology institutions working to define, design, and develop software for electronic portfolio environments and systems. The prototype demonstrates where in the development of e-portfolios the need for interoperability will arise and why a common language that defines this increasingly popular form of information collection and presentation is necessary.

With its popularity rising among both students and faculty, educators can expect more than one e-portfolio management system to appear in the marketplace, ranging from commercial stand-alone systems developed by

software companies to homegrown systems developed by higher education information technology service units, to those that spring from research and development laboratories. However, without a set of standards for interoperability, students will, at best, be frustrated by the limitations imposed on their efforts to compile their work and, at worst, abandon their e-portfolio efforts altogether. To prevent the worst from happening, ePortConsortium is seeking development partners to move forward its comprehensive and ambitious e-portfolio management system, with the goal of making it easy to use, customize, and maintain. Beyond that, Jafari says, the right system would enable every user to have a URL; would allow for custom templates; would make it possible to present, manage, and even hide or keep in storage artifacts; would incorporate student learning outcomes; would allow for dynamically presented résumés and curricula vitae; would dynamically create accounts for every student, staff member, and faculty member; and would support a variety of authoring tools. At the University of California, Los Angeles, at which Ruth Sabeen and Eric Splaver are overseeing a beta test site for the ePortConsortium e-portfolio management system, one of the chief requirements is the ability to integrate the system into their existing systems, such as grade books, course management systems, portals, and systems that enable data to be taken from one campus to another.

While interoperability is essential to the future of e-portfolios, Gary Greenberg of Northwestern University says information about e-portfolios should be shared so those who want to jump in now won't get held back. He advised session attendees to get started before waiting for the time when they think they can get it right. "Too much time can be wasted trying to find or develop the perfect tools," he said. Instead, Greenberg suggests campuses get started and then inform and

guide the tool builders as they're using the tool. "All of the technology that we need for successful e-portfolio implementation already exists," he said, "but it usually can be found in course management systems, which don't always support collaboration or lifelong learning."

Jumping in is just what the University of Washington did. And the result is the Catalyst Portfolio—a tool the institution decided to build on its own following extensive surveying and interviewing of faculty and students that determined the requirements and goals of an e-portfolio system. UW's Tom Lewis and Scott Macklin said preliminary surveys revealed useful data that helped drive the development process. While students wanted ownership of their portfolios, instructors needed to be involved to invite students to participate in exercises that promote reflection. So that mechanism has been built into the tool. Both the students and the faculty saw feedback as invaluable in supporting two-way learning between instructor and student.

The surveys also revealed that e-portfolios facilitate learning when students are encouraged to take a series of steps, such as selecting relevant artifacts for inclusion, selecting artifacts for a specific purpose, taking time to reflect, designing the e-portfolio for a partic-

ular audience or purpose, and receiving feedback. Similarly, surveyors found that teaching with electronic portfolios becomes learner centered when instructors assign and/or produce relevant artifacts for inclusion, assign artifacts for a specific purpose, give clear guidelines for artifact selection, give examples of relevant or good reflection, give examples of good design, and give feedback on quality, reflection, and design.

Student and faculty support for UW's Catalyst Portfolio tool has been overwhelming—so much so that students recently voted to have a portion of their fees pay for its continuing support. One student expressed delight that "the portfolio tied the program together and forced us to reflect on what we really learned." Another added that "the portfolio shows what I have learned and thought about during my freshman year. It will be interesting to look back at it in future years."

Implementation of any new system is bound to be a challenge, and not all of those challenges are technological. Kathleen Paris of the University of Wisconsin–Madison presented the results of a student e-portfolio feasibility study that focused on needs assessment and interest level. Kathleen Yancy of Clemson University presented research that focused on

the e-portfolio as an assessment tool, looking at the question, How can technology showcase development? "You can't rely on a single course or set of courses to reap the transformational benefits of e-portfolios," she said, "but, rather, you should look at the e-portfolio as a lifelong tool that supports backward and forward reflection."

NLII Activities

Darren Cambridge, an NLII fellow for 2003, is researching electronic portfolios as just such a tool for learning across a lifetime. He's investigating pedagogical issues, such as the place of reflection in intellectual development; technical issues, such as interoperability among e-portfolio systems and with existing enterprise systems (and heading the Instructional Management Systems special interest group on e-portfolios that will develop a specification available to all developers); institutional issues, such as developing stronger bonds between types and levels of educational institutions; and policy issues, such as privacy and ownership of student work. [NLII](#)

(If You Give a Student a Computer, continued from page 27) distribute copyrighted products to a highly fragmented marketplace will inevitably incur higher costs," says McElroy. Those rising costs combined with a fragmented distribution mechanism will likely make it less attractive for publishers to create academic materials in digital form. The alternative is for higher education to embrace a collaborative—or proactive—model that McElroy refers to as a "shared resource utility," which is designed to meet seven objectives:

1. To provide learning-institution administrators with the tools to license Web-based proprietary content from publishers on behalf of their institution
2. To provide a marketplace for institutions to sell institution-owned content
3. To enable institutional administrators to

control access to digital materials in accordance with publisher license agreements

4. To provide faculty with access to a publisher-neutral, technology-neutral Web portal from which they can evaluate and aggregate digital materials from a variety of publishing sources for student and classroom use

5. To provide students with access to a publisher-neutral, technology-neutral Web portal from which they can acquire digital learning content from a variety of sources in a single, secure transaction

6. To provide publishers—both commercial and institutional—with a marketplace in which they can effectively distribute and protect their copyrighted materials and in which royalty and licensing fees are collected and paid to the publishers or distrib-

uted on their behalf

7. To provide publishers with a marketplace in which they can effectively and efficiently promote their publications

With those objectives met, higher education is served by three models: a digital bookstore, a digital library, and digital reserve stacks. "It's not enough to have a market model," says McElroy; "you need a business model." As he sees it, the market today isn't working because it's both producer and producercentric—a model, he says, that has failed in every segment of digital commerce. The proactive model would benefit publishers as well higher education because marketing costs are reduced and publishers don't have to deal with hundreds of institutions. "The reactive approach is exorbitantly expensive, and it doesn't work," said McElroy. "It only addresses internal organizations." [NLII](#)

Transforming Teaching in a Student-Centered World

True enterprisewide change means taking a good look at faculty development, support, and rewards

Limitless resources, advanced technologies, and high-speed connections aside, the learning that goes on in higher education rarely, if ever, happens without the thoughtful and watchful participation of an instructor. Everything else—from text-

books to PowerPoint presentations and from library resources to administrative services—exists to support those who are essential to the learning process: the faculty.

While institutions increasingly embrace the notion that computer-mediated, technology-driven education is the path to improved teaching and learning, what are the challenges presented to faculty by the revolutionary changes brought on not only by new teaching and learning technologies but also by the demands of students now entering the academy? And what strategies are most likely to lead faculty to buy into the belief that technology can be a vital tool for improved learning?

Five sessions at the January 2003 NLII annual meeting in New Orleans addressed faculty engagement and development, presenting case studies and findings to help guide institutional leaders in their understanding of the complex nature of faculty attitudes, motivations, cultures, and abilities.

A common theme among all of the cases is the need to create faculty support systems that are both scalable and flexible—systems that stimulate and engage faculty. And while faculty buy-in is essential to the success of technology programs intended to improve teaching and learning, it's now widely understood that faculty themselves must be willing

to see that technology-enhanced learning environments are inextricably linked to an institution's ability to fulfill its mission.

At its most basic level, the integration of technology into the learning process can mean little more than a Web-based system whereby faculty members can post information about themselves, their courses, resources that support their courses, threaded discussions, and assignments. At Colgate University, whose core liberal arts values seem to inspire faculty resistance to technology, it eventually became clear that buy-in from faculty meant technology that was simple, accessible, and not contingent on a huge engineering and technology support staff. A presentation by David Baird and David Gregory of Colgate's Collaboration for Enhanced Learning provided a glimpse into how an institution can, as its mission states, "provide coordinated support to faculty who want to explore incorporating technology enhancements into the teaching and learning process." It was by no means a sledgehammer approach to faculty engagement. Instead, Colgate's user-friendly, Web-based environment and associated professional development workshops ameliorated the resistance reflex not uncommon among faculty in nontechnical fields.

How did they manage to build such a non-

threatening bridge? By partnering faculty and librarians for discussion of teaching objectives; by adopting accessible, useful tools to improve access to information; by designing and delivering technology workshops; and by promoting successful uses of educational technology at Colgate and other campuses. For more information on the Colgate presentation, see www.educause.edu/asp/doclib/abstract.asp?ID=NLI0306.

The situation becomes much more challenging at larger and more-culturally-diverse institutions such as the University of Tennessee, whose information technology faculty development program has been expanded to serve more of its 1,500 faculty members. The University of Tennessee is now dedicating 13 full-time-equivalent staff members to the cause. And even at that rate, one-on-one support is out of the question. Four members of the university's educational technology services described their efforts to extend their reach to faculty beyond what's typical or even expected.

"How do we get beyond generalized to customized?" Educational Technology Collaborative director Jean Ann Derco asked. "We do it by trying to work smarter, not harder." The university has extended the reach and diversity of its programs by funding department-based grants, by using a variety of media, by getting input from faculty, by following varied themes and schedules, by collaborating with industry, and by working in small groups.

Part of the success of the University of Tennessee effort is credited to the university's ambitious wireless initiative, called the Wireless Instructional Initiatives program. Julie Little, executive director of the Educational Technology and Innovative Technology Center, described her own and her colleagues' efforts to "get faculty and students to think about using this network in their daily practice." Little and her colleagues decided to target particular areas, such as humanities and other areas the support staff were familiar with from a teaching and learning perspec-

tive. They engaged faculty by way of stipends and hardware and software support and conducted surveys of faculty and students who used the network to find out more about what it would take to make the network a more useful tool (see the NLII annual meeting session titled Rethinking Faculty Development: One Size Does Not Fit All, www.educause.edu/asp/doclib/abstract.asp?ID=NLI0331).

Helping faculty rethink their designs for teaching and learning is a priority at the University of Waterloo in Ontario, Canada, where efforts are under way to provide faculty with a new framework for how their classes operate. In a presentation titled Engaging Mainstream Faculty in Designs for Online Learning Tasks (www.educause.edu/asp/doclib/abstract.asp?ID=NLI0340), Tom Carey, associate vice president of learning resources and innovation, described a combined face-to-face and online workshop that provides task-oriented design models for managing online resources, learning resources for faculty communities, and new paradigms for software infrastructures.

As Carey described them, an institution's goals for new design models should assume reuse of learning objects, faculty ownership of learning design, and a dramatic transition from concept to design, or what he refers to as "getting beyond the first design wall." It should focus on learning activities supported by subject content, and it should model on-campus and online courses. It should also encourage the rethinking of learning processes. In other words, design models should place strong emphasis on activity before content, student ownership of learning, and the ability to rethink learning.

But where does technology fit into faculty roles and rewards? According to Paul Hagner, former NLII fellow and senior adviser of technology planning and assessment at the University of Hartford, there's a connection between faculty development, the transformation of teaching and learning, and faculty rewards. And depending on the type of faculty member, the rewards will be different. For

the so-called entrepreneurs, who are self-transformed, the rewards are personal. They do it because it's the right thing to do. The so-called second wave consists of faculty members motivated by the promise of equipment, support, and training. For them, the use of technology is not in itself a reward. The third group—the so-called careerists—will not use technology unless they see a direct link to career advancement. The last group—the so-called reluctant—are not interested and do not see the rewards.

Hagner, who with Perry Samson of the University of Michigan at Ann Arbor and David Starrett of Southeast Missouri State University spoke at a session titled Faculty Roles and Rewards: Where Does Technology Fit In? (www.educause.edu/asp/doclib/abstract?ID=NLI0324), said that for a university to move the faculty body forward in the responsible use of technology, development should focus on the second wave. Early on, Southeast Missouri State, which takes a centralized approach to support services, rewarded faculty with monetary incentives but later learned that faculty are willing to attend seminars and training sessions regardless of the rewards. And they've replaced long workshops with one-hour workshops offered by faculty with technical support.

Faculty engagement, though, means more than simply getting faculty members to adopt technology use. As Samson said, "Without engagement, there will be no catalyst for rethinking teaching strategies." Samson says true faculty engagement means giving faculty the ownership of choices, design, and work environments. In fact, all of the panel participants in this session endorsed the idea that the institution must clearly demonstrate commitment to and support of faculty who are taking difficult steps to include technology and embrace change. The rewards may be different at each level of technology engagement, but they must be there for successful transformation to take place.

How institutions are retooling to meet the challenge of supporting faculty also provides food for thought. In a session titled The Advanced Learning Center: A Partnership between Academic Affairs and Information

Technology to Support Faculty in Infusing Deep Learning into the Classroom (www.educause.edu/asp/doclib/abstract.asp?ID=NLI0314), John Haddock, James Penrod, and Sandy Schaeffer of the University of Memphis described the unique challenges and surprising outcomes of creating the University of Memphis's Advanced Learning Center (ALC), a faculty support unit designed to implement a campuswide technology fluency model, a deep learning initiative, the design of online and Web-enabled courses, and delivery of other academic-oriented services.

The challenge for the university was to reach beyond the traditional idea of computer literacy and use the ALC to promote a higher level of competency it refers to as fluency. Fluency with Information Technology—or FITness—is now embraced at the University of Memphis as an activity of the entire campus community—comprising faculty, students, and staff—and supported by the ALC.

Formed by a partnership between Academic Affairs (the provost) and Information Technology (the chief information officer), the ALC reports in a matrix fashion to those two executive officers. The chief information officer provides day-to-day oversight for the center's staff, and the provost provides budget oversight. A faculty-oriented advisory committee helps prioritize projects. The budgets have been consolidated and the combined operation relocated to the FedEx institute, thereby putting the organizational framework and actual resources in a strongly leveraged position with better coordination of resources. The transition, however, hasn't been without challenges. There remains some difficulty in creating full campus awareness of the center and in motivating faculty who are still on the fence about the integration of technology into the curriculum. And there's what the presentation team referred to as scope creep: the tendency of everything else to look like it belongs in the ALC.

What has the ALC experience taught the University of Memphis about faculty development? It has taught that long-term success depends on stronger faculty connec-

tion and ownership, that formal efforts to engage faculty and offer them support cannot ever be static, that a true research facet is essential to the effort, and that efforts to help and engage faculty must generate concrete results in helping the campus vision for information technology fluency.

NLII Activities for 2003

The members of the Teaching and Learning Virtual Community of Practice

(www.educause.edu/vcop/teaching_learning.asp) are interested in faculty engagement as a primary topic area and are exploring the conducting of a multiple-institution study of faculty engagement. The purpose of such a study would be to obtain both faculty and technology designer perceptions about faculty incorporation of technology into their classrooms. The idea is to compare and contrast best practices for engaging faculty in technology initiatives from initiators and

receivers. For more information about this and other Teaching and Learning Virtual Community of Practice activities, send e-mail to TeachingLearning@educause.edu. For more information about Paul Hagner's research as an NLII fellow and other resources, see the NLII Faculty Engagement Key Theme page at www.educause.edu/nlii/keythemes/FacultyEngagement.asp.^{NLII}

PARTNERING

Come Together

Campuses find the road to success lined with partnerships and collaborations

For years, institutions of higher education have operated in silos—both philosophically and in practice: each institution its own universe, each department its own country, each course its own state. Individualism looms large in higher education.

Institutional pride is rooted in ownership. And while colleges and universities frequently eye academic and technological advancements on other campuses, enterprisewide transformation in teaching and learning at home is stymied by the deeply rooted belief that only our institution can solve our institution's problems.

Today campuses are finding that the only path to success is through partnerships and collaborations that will help them leverage their resources and access expertise otherwise out of reach. The result is a slow unraveling of the not-invented-here syndrome that has dominated institutions for years, aided by fiscal constraints and new ways of doing business that are infiltrating and dismantling the silos.

Partnering is providing new opportunities for colleges and universities to reconfigure the way instruction gets funded, developed, marketed, delivered, and supported. From

interinstitutional partnerships to collaborations with commercial vendors, three sessions at the NLII annual meeting looked at how relationships are making it possible for institutions to realize their academic missions in the brave new technological world.

In some cases, the roadblock to interinstitutional sharing involves neither resistance to partnerships nor technology. More often it involves administrative issues, such as student registration, grade and credit transfers, intellectual property concerns, academic calendars, and tuition sharing. Without a method for addressing and seamlessly providing those issues, progress in technology-enabled education will slow to a frustrating and expensive crawl. In a session titled Building Economies of Scale through Collaboration, (www.educause.edu/asp/doclib/abstract.asp?ID=NLI0304), Karen Partlow of the

Committee on Institutional Cooperation, a consortium of 12 large research universities in the Midwest, discussed the universities' commitment to creating an administrative solution to the problems inherent in interinstitutional course sharing. Scheduled as a pilot for spring semester 2003, CourseShare enables participating institutions to share both online courses across campuses and the intellectual capital inherent in courseware. Pilot courses include Nursing Informatics and Online Portuguese. The system involves a set of components, agreements, and principles that facilitate the sharing, and it's capable of scaling to accommodate large numbers of courses. For more information on CourseShare, see www.cic.uiuc.edu/programs/CICCourseShare/index.shtml.

At Virginia Polytechnic Institute and State University, a collaboration with municipal governments, private businesses, K-12 schools, and a local foundation in Southside Virginia is transforming a community's distressed economy into a vibrant hub of intellectual currency and high-tech opportunities. It was, according to Ann Moore of Virginia Tech during the session titled Community Partners for the Knowledge Age (www.educause.edu/asp/doclib/abstract.asp?ID=NLI0308) a challenge to a community's imagination.

"What is succeeding in the new economy is around research universities," said Moore. "Struggling economies want research univer-

sities.” Buoyed by tobacco settlements and the vision of a Virginia Tech alumnus from the Danville area, the university presented a proposal to build both a technology and a human infrastructure in the region and to create partnerships that would regenerate its economy.

Copresenter Nancy Franklin and her husband were hired to set up a learning and resource center and to meet the challenge of turning around a community’s imagination after 50 years of operation as a tobacco-growing economy. They faced the additional challenge of setting up a university program two hours away from the university. The result is eDAN (www.ecorridors.vt.edu/pilots/danville/about.shtml), an institute for advanced training and research that is so successful that other regions are emulating it. “Extreme backwardness is born out of the inability to act together,” said Franklin. “We needed to create an intellectual hub. A knowledge economy needs people with ideas. It requires corridors of economic activity.”


The institute is now housed in a 90,000-square-foot structure that looks and feels like a high-tech building and presents itself as a statement of hope for the region. It offers research, conference, and classroom space, with an emphasis on research, which is high on Virginia Tech’s agenda.

Now the program is becoming integrated into the community and is helping students prepare for advanced degrees. A K–12 pipeline is being built, and a new magnet high school focusing on biotechnology is on the drawing board. Virginia Tech faculty successfully developed a U.S. Department of Education grant to bring faculty to the region for integration of technology adoption. In addition, a youth development initiative is in the works.

Contrary to how traditional institutions of higher education were born and raised, today’s virtual universities are more often than not children of collaboration. Western Governors University, for example—the brainchild of a number of western states—offers distance-learning courses from dozens of U.S. colleges and universities. In the session titled Statewide Virtual University in Transition, Rhonda Epper of Community College of Denver presented results of the Virtual Colleges and Universities in Transition (VCU) Project, a national study of consortium-based virtual colleges and universities for helping state policy leaders better understand and assess the role of virtual universities in meeting state education goals. Cosponsored by the State Higher Education Executive Officers (SHEEO) and the Western Cooperative for Educational Telecommunications (WCET), the study asked

questions about whether virtual universities should operate as separate organizational entities or whether they’re best seen as temporary, transitory instruments of change.

What the results reveal is that the goals of VCUs are in transition, with increased emphasis on reducing costs, centralizing resources, creating a better-educated workforce, decreasing the emphasis on expanding access, and serving underserved populations. The study also revealed VCUs’ prevailing funding models, most of which are financed by direct state appropriations, fees from services to provider institutions, tuition and fees the VCUs charge, full-time-equivalent funding from states, membership fees, and donations from and partnerships with organizations in the private sector.

The survey realized a 79 percent response rate (48 out of 61 responses were received) from a mix of systemwide and statewide VCUs. In general, respondents said they’d met their goals, but the principal investigators are still teasing out interpretations. Less than 25 percent of the respondents said their VCUs were self-supporting; another 25 percent said they plan to be. For more information on the VCU Project, see www.sheeo.org/disted/vu%2Dhome.htm 

“Partnering is providing new opportunities for colleges and universities to reconfigure the way instruction gets funded, developed, marketed, delivered, and supported.”

Citizen Campus

Higher education gets serious about digital rights management

With digital information on the Net proliferating and demands for content ownership rising, what do institutions need to do to prepare themselves for copyright protection in the digital world?

In an NLII 2003 session titled Digital Rights Management: Whose Rights Are We Protecting? EDUCAUSE policy analyst Garret Sern laid out the challenges faced by college and university presidents and information technology administrators as they attempt to balance good cybercitizenship with community privacy and the integrity of our networks.


In November 2002, the Technology, Education, and Copyright Harmonization (TEACH) Act was signed into law, amending U.S. copyright law to allow nonprofit educational institutions to use the Internet for providing copyrighted material for registered students taking part in “mediated instructional activities.” The law essentially expands the categories of works that can be performed in distance education and removes the concept of physical classrooms, which is good news for institutions that are promoting distance education. It also allows storage of copyrighted materials on a server, allows institutions to digitize works, and authorizes that distance-learning participants not be held liable for infringement for any transient copies made through digital transmission.

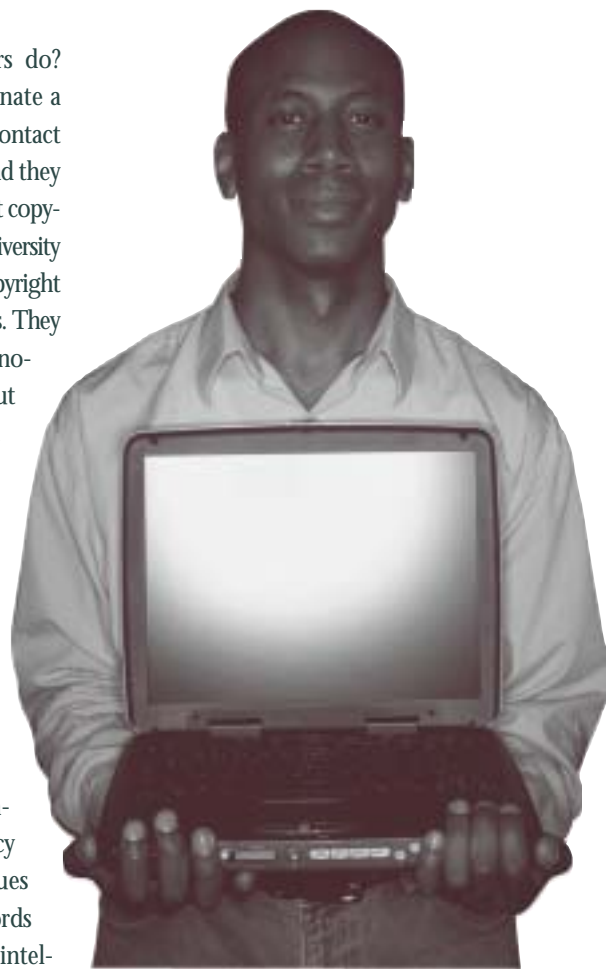
To take advantage of the TEACH Act, however, institutions are responsible for educating their communities on U.S. copyright law. They must also institute policies regarding copyright and install so-called reasonable technological protection measures to prevent the unauthorized retention and redistribution of copyrighted materials.

Sern recommends that institutions prepare themselves to take best advantage of TEACH by creating policies on the use of copyrighted materials. He also suggests that they protect themselves by copyrighting educational and informational materials and by closely examining and adhering to licensing practices and software/information contract terms and conditions.

What else can institutional leaders do? According to Sern, they should designate a Digital Management Copyrights Act contact (lcweb.loc.gov/copyright/onlinesp), and they should initiate or continue faculty-student copyright education programs, such as the University of Texas at Austin’s Crash Course on Copyright and the University of Virginia’s IT Policies. They should also implement reasonable technological protection measures. To find out more, see EDUCAUSE’s policy program at www.educause.edu/policy or visit EDUCAUSE’s Information Resource Library at www.educause.edu/ir/.

NLII staff are working with Sern and several NLII member volunteers to develop an NLII policy agenda. The agenda will concentrate on four key issues: intellectual property ownership issues related to distributed learning, assessment and accountability policy issues, learning objects and policy, issues and policy issues related to student records and electronic portfolios. Research on intel-

lectual property ownership issues is being carried out by Sara Ulius—an EDUCAUSE intern and a student at the University of Michigan—and will build upon and extend the policy issues brief on digital copyright (www.educause.edu/ir/library/pdf/NET0303.pdf) and the Current Issues resources page (www.educause.edu/issues/faculty.html). Research on policy issues related to learning objects and digital repositories is being done by Veronica Diaz, a doctoral student at the University of Arizona, who’s working with NLII 2003 fellow Patricia McGee. For more information, see the NLII Policy Issues key theme page www.educause.edu/nlII/keythemes/policy.asp. 



When Shared Vision Meets Business Planning

Successful strategic planning means alignment, opportunity, and collaboration

From the president's office to the instructional technology department, higher education campuses are littered with well-intentioned strategic plans. But how effective are those plans? And how many actually lead to institutional change?

For several years, the NLII has been exploring ways in which institutions of higher education can align action—in the areas of policy, budget, project selection, and assessment—with strategic planning for the purpose of transforming teaching and learning. Several sessions at the NLII 2003 annual meeting in New Orleans examined the elements of planning as well as the transformational outcomes that are possible. Out of those presentations emerged three characteristics of successful strategic planning: alignment of planning; dynamic, opportunistic planning processes; and collaboration.

Alignment of Planning

Take a look at any college or university campus today, and you'll find a full array of technological resources being put to good use. What's lacking are the mechanisms that would enable institutional leaders, faculty, staff, and organizational units to combine those resources so as to ensure campuswide transformation. "For optimal cost-effectiveness and maximum impact," said NLII annual meeting participant Henry Ingle, "campus communities need to focus on developing a shared vision and a shared set of strategies for their online instructional efforts."

At the University of Wisconsin–Madison, the value assigned to horizontal and vertical alignment is immediately evident on the

institution's strategic-planning Web site (chan cellar.wisc.edu/strategicplan) where a link provides substantial help in relating your plan to the campus plan. Today the central campus information technology organization and its departments are in alignment with each other as well as with the Academic Technology Solutions department, whose visions and priorities now complement plans for both the campus and the information technology organization. They also give staff a higher purpose and a much-needed focus.

With the UW approach, strategic planning amounts to more than just an abstract exercise: it's a way of keeping the fundamental values and the educational mission of the institution at the forefront. As a result, the university is closing an achievement gap by means of a program that emphasizes recruitment and retention of four targeted student populations: African-Americans, Hispanics, Native Americans, and Southeast Asians. The four-year, precollege, technology-training and access program for high school students who are deemed demographically underrepresented at the college level prepares such students for competitive universities such as UW. It builds study and standardized-test-taking skills, offers mentoring by university professionals, and incorporates a technology-training component to increase the number of students interested in and prepared to assume

information technology careers. UW hopes to inspire students who follow information technology careers to stay in Wisconsin and at the university.

The first wave of students are putting together their e-portfolios and working on community projects such as building Web sites for community organizations. Such endeavors have the dual benefits of helping students gain work experience and providing organizations with assistance they otherwise couldn't afford. The program hopes to close the digital divide by giving students computers, printers, and scanners to use during their four years in the program in addition to dial-up connections, software, and manuals for home use. Program leaders are aiming for a 70–80 percent college acceptance rate among the program's participants.

How did UW stay on track when so many strategic plans devolve into endless debate and discussion? It did it by keeping its vision statement at the forefront. Said UW's Carol Turner, "We asked ourselves big-picture questions such as, Are we addressing the divide? and, How do we level the playing field?"

Dynamic, Opportunistic Planning Processes

Like many institutions of higher education, Arizona's Maricopa Community College District has defined its high-priority strategic initiatives, which address, among other things, maximizing stakeholder access to learning and expanding dynamic learning environments (www.maricopa.edu/stratplan). In the company of a much smaller subset of institutions, the district sought to bring individual college plans, financial decisions, and budget allocations into alignment with the district's plan by adhering to an ongoing, dynamic, and integrative planning process that is both consistent and transparent. The process appears to be working. Funding opportunities, such as a 2004 bond program, are making it possible for the district to

expand its programs and improve its technology infrastructure.

“If you get rid of the complex, rigid, formulized approach to strategic planning, you can be both responsive and open to opportunity,” said Rio Salada Community College’s Carol Scarafiotti. At Rio Salada, not only must strategic plans be brought into alignment with the institution’s unique culture and distinct goals, but they also must take into account funding and resources. “It’s not just an operational approach to strategic planning; it’s a new way of looking at visioning,” said Scarafiotti.

Rio Salada now uses visioning forums as a planning tool by bringing in experts to talk about what’s going on in higher education. After a presentation, a team sets out to work on setting priorities and creating a path. A recent visioning forum netted a number of planning insights such as the desire for hybrid courses, the need for social spaces for social learning, new approaches to building architecture, horizontal learning markets, modularized learning, and data-driven decision making. Ultimately, the visioning forum generated a handful of planning realities, which led to development of the institution’s Post-Baccalaureate Teacher Preparation Program,



a curriculum that blends online convenience with on-site experience. For more information, see NLI annual meeting session, A Doable Vision, www.educause.edu/asp/doclib/abstract.asp?ID=NLI0311.

Collaboration

In a session titled Transformation through Collaboration, both East Carolina University and the University of North Carolina showcased successful strategic-planning initiatives that prove the value of collaboration as a transformation agent. In 1999, UNC developed an information technology plan for addressing a handful of high-priority areas on all 16 of its campuses. Funds were set aside for new programs that were collaborative in nature—particularly those designed to synergistically capitalize on economies of scale and serve all of the campuses. The result is the UNC Teaching and Learning with Technology Collaborative, the UNC Shared Services Alliance, and the Office of Coordinated Technology Management, which ultimately helped enable East Carolina University to transform a traditional site-based continuing studies model into an Internet-based enterprise that supports more than 20 degree/certificate programs generating approximately 100 faculty positions and a \$17-million budget.

The ECU effort began with a vision statement that outlined the university’s desire to deliver complete programs online—as opposed to random courses—and to be more strategic when it decides which programs get offered to its off-campus markets. The Strategic Directions Subcommittee was formed to identify the desired programmatic outcomes, such as expanded enrollment of student populations that could not otherwise access university-level educational programs, educational programs that address critical societal needs, outstanding quality in all programs, and academic programs that are enhanced through innovation.

What made the ECU planning process so successful? For one, its faculty are actively committed to serving distance learners. In addition, the institution has developed a dis-

tributed, decentralized funding model that enables academic units to support their distance education programs. And technological advancements offer opportunities to improve access to and delivery of educational programs. But it was partnerships that enabled all of the programs to come to fruition. According to ECU’s Darryl Davis: “In order to accomplish anything, institutions of higher education are going to have to collaborate with each other. It is one of the keystones of ECU’s [information technology] strategy.”

At Brigham Young University in Provo, Utah, localized technology planning and support units were formed into one organizational structure for enterprise technology planning. BYU officials at the NLI annual meeting made the case that in order to achieve scalable, sustainable, enterprisewide change, planning must encourage and support collaboration across an entire campus. “By creating one structure across colleges, the library and academic programs were able to focus on teaching and learning support,” said BYU’s Stephen Jones.

Centralizing its services also meant that BYU could centralize its support policies. BYU moved instructional design from production for some to service for all. Directors of all campus units under the teaching and learning support umbrella now sit on a campus council that makes decisions about sharing budgets and resources. For example, the council might decide to give a funded full-time equivalent either to another area or temporarily to a project. To reinforce that effort, a project-priority management team ranks projects according to strategic alignment criteria, which gives priority projects access to resources throughout the university. “Common vision determines common strategy,” said Jones. ^{NLI}

Strategic Planning
& Alignment



www.educause.edu/nli/keythemes/alignment.asp

Winning Systems

New ways of looking at students and resources lead to improvements in how we deliver education

To bring about systemic progress in teaching and learning, a shift in perspective is always necessary. Sometimes that shift is in institutional perspective about where critical activities and resources are, as was the case at Pennsylvania State University.

Sometimes the shift is in institutional perspective about *who* the students are, as was the case at Fairleigh Dickinson University, where the student is seen as a global citizen.

Where's the Library for This Course? Moving the Library to Where the Students Are

Every year, colleges and universities spend thousands of dollars on databases, on maintaining subscriptions to scholarly journals, and on storing and organizing print and digital information for the purpose of scholarly research. So why is it that when Jane, a typical college freshman at a local state university, is asked to research and write a paper on homelessness in 20th-century America, the first thing she does is type *homelessness* into Google?

Turning to commercial Web-based search engines is an obvious choice for students. But when Web searching replaces scholarly research, students become disconnected from high-quality scholarly materials, and their ability to use those resources to enhance their learning is diminished. John Harwood and Loanne Snavelly described an innovative Penn State plan that brings library guides straight to the student.

For years, paper versions of guides have been available to help students and faculty locate appropriate resources in the libraries' collections. As PSU discovered, even when

those guides are available on the Web, students are more likely to turn to commercial search engines, which represent their comfort level. But doing so limits development of their research skills, or, as Harwood calls it, information fluency. "We want them to use much more than Google," said Snavelly. "But to students, the library is 'over there.' They're used to having resources come to them."

Inspired by a question posed by David Cohen in a 2002 *EDUCAUSE Review* article (www.educause.edu/ir/library/pdf/ERM0239.pdf), whose title Harwood and Snavelly borrowed for the session, PSU put into motion an ambitious plan: within a year, every section of every course that uses ANGEL, the institution's course management system, will have easy access to library guides appropriate to that course. In essence, the e-reserves would be pushed to the students' desktops. "A link doesn't guarantee learning," said Harwood, "but you can wrap resources around a link."

It was an entirely new idea: provide a direct link through the institution's course management system (CMS)—which doesn't include libraries out of the box—to a set of relevant resources. "Higher education has made an enormous investment in library resources," said Snavelly, "but they weren't being connected to courses through course management systems."

To accomplish its goal, PSU identified partners among the university's Teaching and Learning, Information Technology Services, and Administrative Information Systems departments and the partners solicited librarians, who'd identify source materials that should be linked to courses. In essence, they took guides that were formerly in print and now already available on the Web and put them directly in front of the students by way of a CMS.

To push forward with the plan, Harwood's team held discussions with librarians about what was needed and what would make a good product. Then they got the ideas translated by instructional designers. "We didn't just want to link to existing guides," said Harwood. "We wanted to be able to create new guides easily. This meant we needed a flexible structure in order to be able to customize the guides according to different disciplines and users."

In the long term, PSU is anticipating that every ANGEL course will come with a library guide. But getting there is not always smooth sailing: different departments have different planning requirements, which makes it difficult to work together. "It's important to know this when you work with partners," said Harwood.

The effort required no additional funding—only a reorganization of staff time. The result, however, is that PSU is training students to use library resources and to be choosy and selective about their research rather than taking the path of least resistance. "Through this," said Harwood, "students can be shown how to save time by getting directly to the right resources." For more information, see annual meeting session *Where's the Library for This Course?—Moving the Library to Where the Students Are*, www.educause.edu/asp/doclib/abstract.asp?ID=NLI0315.

Ubiquitous Distributed Learning and Global Citizenship

According to Michael Sperling, for New

Jersey's Fairleigh Dickinson University the path toward systemic progress was a case of "transforming a mission statement into a sense of mission." When the university opened its doors at the start of World War II, it had an ambitious goal: to provide its students with an education "of and for the world." The university has reaffirmed that original goal in its new mission statement to be "a center of academic excellence dedicated to the preparation of world citizens through global education," and to reach that end, it intends to prepare students as global citizens who can operate successfully across cultures and environments in an interdependent world and in an unknown future characterized by diversity, nearly universal digital information access, global interrelationships, and rapid change.

The carrying out of that mission is requiring massive shifts in institutional budget allocations, faculty work patterns, support resources, and academic culture. And this is, indeed, systemic change.

Global citizenship is a complex issue. What does it mean? Is it a process or an outcome? Part of this university's unique answers have been (1) to require that all undergraduates take one online course per year of study and

(2) to build a Global Virtual Faculty Program, wherein scholars and practitioners from around the world partner with Fairleigh Dickinson on-site faculty in these online courses. Global education and online learning are no longer merely provocative ideas that a few niche institutions need consider. Sperling argues that "Today virtually all institutions of higher learning need to reckon with their implementation in some form, even if not using them as guiding constructs."

Going beyond the common view of distance (or distributed) learning (that includes a sense of it as a useful and convenient teaching, communication, and research tool to reach new student audiences), Fairleigh Dickinson sees it as a (value-added) learning and collaboration tool that gives access to global resources (information *and* faculty) and that helps the institution imagine the unimaginable. Such a view has helped the institution go beyond the traditional (and wrong) question—"Is distance learning better or worse than in-class learning?"—and on to the right question: Which pedagogies will produce the best student-learning outcomes in a given medium or environment?

Key systemic impacts that can be general-

ized to other institutions include (1) reevaluating pedagogical technique, (2) adopting a learning-outcomes paradigm, (3) promoting responsibility taking by students, and (4) developing global awareness. For more information, see www.globaleducation.edu and the NLII annual meeting session Ubiquitous Distributed Learning and Global Citizenship, www.educause.edu/asp/doclib/abstract.asp?ID=NLI0322.

NLII Activities

EDUCAUSE gives an annual award for Systemic Progress in Teaching and Learning (for information, see www.educause.edu/awards/tl). The award embodies the philosophy of the NLII. The application process is, in itself, intended to be educational and can be the basis for fruitful self-evaluation whether or not an institution applies for the award or receives the award. Systemic institutional transformation is a key area of NLII research toward designing education that is active and learner centered, dynamic and life-long, collaborative, cost-effective, high quality, and accessible (www.educause.edu/nlii/keythemes/systemicprogress.asp).^{NLII}

VIRTUAL COMMUNITIES OF PRACTICE

Communities That Practice What They Preach

NLII VCOP pilots tackle conceptual frameworks, definition of principles, and effective practices

There are a number of reasons the NLII has made virtual communities of practice a key theme. First, they offer an environment for professional development of faculty and staff. Second, they leverage face-to-face experiences as much as

possible and then extend effective connection and communication after meetings or

conferences have taken place. They harness technology to create environments in which

learners—whether students, faculty, staff, or EDUCAUSE/NLII members—can construct and share knowledge when face-to-face experiences are too expensive or not possible. They form the basis for an effective knowledge-management strategy and provide tools that encourage and facilitate member collaboration on task forces and working groups— or virtual teams—and then harvest the knowledge the teams create. Finally, in the NLII's Framework for Action model, communities of practice are the milieus in which agents for change need to operate, and they provide an environment for the development and refinement of shared conceptual frameworks at the institutional, system, and professional levels;



for the definition of principles; and for identification of effective practices.

As part of the EDUCAUSE Virtual Communities of Practice (VCOPs) Initiative, the NLII has set up four pilot communities to operate from October 2002 through January 2004 for the following purposes:

- To test community-building tools and to support infrastructures
- To provide new and more-flexible mechanisms that are time and place independent for information sharing and collaboration
- To integrate content and communication resources in a professional development learning environment
- To test VCOPs as knowledge generation and management strategy

The four communities are organized around four topics:

- Electronic Portfolios (E-PAC)
- Learning Objects (LOVCOP)
- New Academy
- Teaching and Learning

The communities are facilitated by facilitator teams of two or three facilitators per VCOP who are supported by two NLII staff members: Darren Cambridge and Vicki Suter. Multiple venues are used, including a community platform (Worktools), chats, videoconferences, audioconferences, Web tours, listservs, and face-to-face meetings. Each community has had at least one face-to-face meeting at a regularly scheduled event such as the NLII annual meeting for all communities, the fall 2002 focus session for the E-PAC, and the summer 2003 focus session for some members of the New Academy. To date, total membership in the four VCOP pilots exceeds 400. A preliminary report has been developed that contains findings to date and initial recommendations concerning resources, community technologies, and success factors (www.educause.edu/vcop). Several of the pilot communities have been involved in the planning and delivery of NLII focus sessions.

In addition to the NLII VCOPs and MERLOT, the NLII 2003 annual meeting featured several other VCOPs such as a set of closely

related communities at the University of Minnesota and a California State University systemwide community of academic technology staff.

Linda Jorn, director of the Digital Media Center, and J. D. Walker, instructional technology consultant—both of them from the Office of Information Technology at the University of Minnesota—have done considerable work on both the theory and the practice of virtual communities in their attempt to identify types of workplace virtual communities, understand their properties, identify management and evaluation issues, and use their expertise as learning technologists to help faculty design such communities. The key question they've tackled is, What are the design, management, and evaluation issues associated with creating a virtual community?

The WebCT Support Community evolved out of two smaller virtual teams, both of which continue to exist in related community space: the Digital Media Center virtual team and the WebCT administrative team. It now includes faculty using WebCT and departmental college support staff, and it supports 1,500 University of Minnesota faculty per term as well as about 30,000 students per term in their use of WebCT. The community uses multiple channels of communication with different levels of formality for each.

One case study—the Online Learning Communities Seminar—used as its guiding principle that a subject is best taught by modeling it in the teaching process and that participants learn by experience. Participant experience varied from those who'd never worked virtually with someone before meeting the person face-to-face to those who prefer virtual communities for some type of activities and face-to-face for others, to those who valued the speed of access to others and to information across a geographically dispersed campus, to those in, say, global teams that are carrying out activities that simply cannot be done with others without the virtual environment. The Online Learning Communities Seminar used different modes of online communication and one face-to-

“COMMUNITIES OF PRACTICE ARE GROUPS OF PEOPLE WHO SHARE A CONCERN, A SET OF PROBLEMS, OR A PASSION FOR A TOPIC AND WHO DEEPEN THEIR KNOWLEDGE AND EXPERTISE IN THIS AREA BY INTERACTING ON AN ONGOING BASIS.”

—ÉTIENNE WENGER, 2002

face meeting. It was designed to model good and bad Netiquette and its effects, how to set tone and atmosphere, and how to project identity, different kinds of structure, and facilitation of online discussion. For more information—including a handout on helpful definitions and community characteristics, another on the characteristics of Internet tools as spaces for workplace virtual communities, and a listing of resources, all developed by the University of Minnesota presenters—see www.educause.edu/asp/doclib/abstract.asp?ID=NLI0326.

Louis Zweier, director of the Center for Distributed Learning at California State University's Office of the Chancellor, described CATS (the Community of Academic Technology Staff) as a solution to a professional development problem: information technology staff work in a fast-changing environment and are charged with meeting diverse needs, yet most professional development opportunities are extended to faculty. CATS offers an opportunity for staff within the California State system to build community, to cultivate relationships and exchange information, and to realize they're not alone and don't have to reinvent the wheel. CATS is a collaborative community with the primary goal of supporting its members—both individually and collectively—in increasing their knowledge, productivity, and professional effectiveness in service of California State University's academic technology goals.

CATS provides programs, communication

and technological infrastructures, resources and tools, and strategic opportunities so that its members can collaborate and contribute to each other's objectives. In addition, it operates in both the virtual and face-to-face realms, with an annual conference that four staff members from each campus attend; statewide, regional, and local events; monthly online seminars that get archived for later viewing; e-mail lists; and an online community environment in MERLOT for sharing resources.

In addition, a grant program called Technology Integration Grants for Educational Resource Sharing (TIGERS) is situated in CATS. The purpose of TIGERS is to improve learning and teaching, support staff productivity, promote resource sharing, and build community among staff. The program provides funding for staff projects that document methods or create tools. Such projects must produce a sharable product, address a significant need among staff, involve collaboration with staff from other campuses, have project oversight coordinated with the Center for

Distributed Learning, and be reported on at the next CATS conference. Example projects include online Americans with Disabilities and instructional management systems workshops and a collaborative interface design evaluation and testing service, whereby staff submit interfaces to be evaluated and the system asks other staff with expertise in the area to evaluate it across 12 dimensions.

For more information about CATS, see www.cdl.edu/cats; for the annual meeting presentation, see www.educause.edu/asp/doclib/abstract.asp?ID=NLI0333.

Activities Planned

The NLII plans to continue the VCOPI pilots through January 2004 and to deliver a final report on them at the NLII 2004 annual meeting. In addition, the NLII maintains a key themes page with information on virtual communities of practice and related resources at www.educause.edu/nlii/keythemes/VirtualCommunities.asp. ^{NLI}

"VIRTUAL COMMUNITIES OF PRACTICE ARE COMMUNITIES OF PRACTICE (AND THE SOCIAL 'PLACES' THAT THEY COLLECTIVELY CREATE) THAT RELY PRIMARILY (THOUGH NOT NECESSARILY EXCLUSIVELY) ON NETWORKED COMMUNICATION MEDIA TO COMMUNICATE, CONNECT, AND CARRY OUT COMMUNITY ACTIVITIES."

—VICKI SUTER, 2003



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