Transforming the Classroom for Collaborative Learning in the 21st Century

BY AMY CHRISTEN

Today's hyper-connected students live in a world of instant interpersonal communications and virtually infinite access to information and educational resources. But this networked world, and the powerful learning tools it offers, has yet to penetrate the typical classroom. In many ways educational institutions are spinning their curricular wheels, falling behind the evolving needs of students, communities and future employers. In general, schools are not taking full advantage of the 21st century learning technologies, and they are failing to reach out to the public- and private-sector organizations that can provide them with support and fresh approaches.

What we need now is an educational transformation that aligns the "how" and "what" of learning with the learners themselves and the world of work that awaits them after they leave school. That means:

- Instruction must be synchronized more closely with the ways students live and interact outside the classroom.
- Curricula must address the soft skills required in today's global, information-driven workforce.
- Technology and pedagogy must be better integrated.
- Educational institutions must look for partners that can add to their pedagogical strengths and help shore up their weaknesses.

Networking in all its forms is key to bringing about this necessary transformation in learning.

Closer Rapport with Today's Students

Today's students live in a highly connected, interactive environment that they typically leave behind when they enter the classroom. Sitting quietly and passively while taking lecture notes does not come naturally to a student population accustomed to a virtual world of instant messaging, pervasive Internet access and online social networking. If these connected students are to excel in education, their learning environment should mirror the ways in which they engage the world.

The connected-student phenomenon is not restricted to the developed world. According to a report by the environmental research group World Resources Institute published in 2007, as family income grows in developing countries, spending on information and communications technology (ICT) increases faster than spending on anything else—including health and housing. Wireless Intelligence estimates that 80 percent of the world's population lives within range of a cellular network, and the International Telecommunications Union has determined that most of the world's cellular users in fact live in developing countries.

Greater Emphasis on Relevant Skills

We need to broaden the scope and reach for our curricula to adequately prepare our youth for work in the global economy. On the one hand, students complain that their studies do not give them the pragmatic, job-specific skills they need to succeed outside the classroom. On the other hand, vocational and professional schools are often criticized for focusing too much on procedures and too little on the concepts and strategic thinking that will enable students to grow in their professions and adapt to future organizational and technical change.

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Furthermore, much of today's career and technical education (CTE) training is still aimed at equipping students for work in a traditional industrial/manufacturing economy, rather than the new information/knowledge-worker economy. And soft skills such as collaboration, customer satisfaction, and cross-functional leadership that are important attributes of many 21st century jobs often do not find a place in the fact-based pedagogical approaches that still dominate many classrooms.

Traditional education is divided into segments such as K–12, college, university, adult education and trade school. Such segmentation has increasingly less relevance for modern students who are not well served by age-bracketed classes, instructional tracks, or subject majors. A 15 year old may be entirely capable of college- or CTE-level work in a field for which she has an aptitude, while an older person may want to study an unfamiliar subject as part of a career change or just for pure enjoyment. Curricula must be adaptable enough to present theoretical material for those who can handle it, whatever their age, and also deliver basic instruction in the same subjects for those who are at that level of comprehension. But adoption of new curricula has generally been slow and spotty, in part due to institutional inertia and chiefly because so much has changed so quickly.

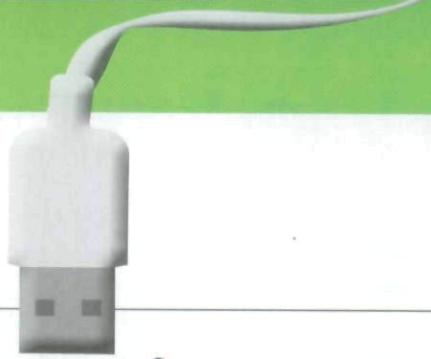
Better Use of New Technology

Technology can act as a catalyst that transforms the classroom into an interactive learning environment, but many educational institutions are not making full use of the latest advances in networking and communications technologies. Technology has the power to make the instructor a better facilitator or coach, bringing greater resources to bear in the classroom and adjusting the instruction to fit the individual. Instructors can also take advantage of the networked classroom to collaborate more closely with their peers, enhance their own expertise, and tap the many resources available online.

Computer networking in general, and second-generation (Web 2.0) capabilities in particular, give educators the means to implement interactivity, creativity and information-sharing activities to an unprecedented degree. By utilizing these tools, instructors can extend the classroom far beyond its four walls and reinforce the soft skills and critical thinking that students require to master complex tasks and compete for higher-paying jobs. E-learning software and hands-on activities also provide effective pedagogical support, but they have to be implemented in an integrated, consistent manner that reinforces objective-based instructional criteria and builds on proven techniques.

Stronger Ties with Partners

Educational institutions have to do a better job of building supportive infrastructures that include diverse partners. One way to overcome the skill/knowledge gap—the gulf between what is taught and what needs to be learned—is for educators to enlist other stakeholders from the government, community, nonprofit and business sectors. Many effective education initiatives involve multi-stakeholder partnerships that combine the expertise and resources of a number of contributors, and that includes commercial enterprises. Companies have a vested



interest in developing a skilled workforce that can strengthen the business and help contribute to healthy, stable economies worldwide.

Cutting-edge communications technologies have the power to bolster these partnerships by facilitating collaboration and delivering instructional tools where they are needed. With Web 2.0 capabilities, educational entities are no longer limited to the resources that are available from the local community or from a regional or national government that may be out of touch with their needs or strapped for funds. Potential partners abound in the connected world, and they can be accessed from anywhere at any time over the Internet.

An Example from the Private Sector

Cisco Networking Academy is one example of an educational program that has partnered with a broad range of organizations worldwide to create an e-learning environment aimed specifically at 21st century students and their instructional needs. Established 10 years ago, the academy offers a curriculum designed to augment traditional technical education with hands-on learning using the latest networking technologies. Today the program reaches 700,000 students a year (19 percent of them women) in more than 160 countries, helping to alleviate the global shortage of ICT professionals in a broad range of industries, and providing opportunities for career advancement, continuing education and economic growth.

The academy curriculum has been devised to give students the understanding of networking theory and principles, and the practical experience they need to build and maintain networks regardless of the specific vendor products used. The curriculum also prepares students looking to obtain Cisco certification exams that are universally valued in the networking industry and provide a good entrée into jobs that involve network installation, design, administration, support and sales.

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Recently the academy rejuvenated its curriculum as part of a continuing effort to stay current with technological advances, industry trends and pedagogical resources. The overall aim of the rejuvenation process was to improve student outcomes, while keeping instruction globally consistent and yet flexible enough to accommodate a variety of educational approaches. To this end, instructional designers built on already successful instructor-led classes that are supported by hands-on labs.

A Dual-curriculum Approach

In response to input from the Networking Academy community, the Cisco CCNA curriculum, which introduces students to basic network design and operation, was replaced by two new curricula: CCNA Discovery and CCNA Exploration. Both new curricula give students a firm grounding in networking technology, but each is tailored to a particular student segment based on the students' past academic accomplishments and future goals. CCNA Discovery features interactive tools, easy-to-follow labs, and quick-application exercises intended for general students with only basic PC skills who want to acquire the everyday expertise that enables them to set up a network at home, at school, or in a small business. CCNA Discovery may be delivered as independent curriculum or as part of the course of study in a secondary school or other educational institution.

CCNA Exploration takes a more top-down approach designed to engage students with advanced analytical skills who can handle more technical depth, especially students in postsecondary schools, technical colleges and universities, as well as working professionals looking to advance their careers. For example, students enrolling in CCNA Exploration are expected to know binary math and understand concepts such as algorithms and logic trees.

E-learning Leads To E-doing

Academy pedagogy employs multimodality instruction that includes Flash-based interactivity, computer visualization, sophisticated simulations, and in-class discussions centering on culturally specific scenarios. The curricula place a strong emphasis on "e-doing," the idea that the learning experience should replicate real-world tasks. E-doing and other high-

touch methodologies are designed to hold the students' interest by appealing to their interactive instincts and their already well-honed digital acuity. Visual, auditory and tactile reinforcement is combined with many opportunities for instructor feedback and participation in exercises that reflect the students' specific culture and circumstances.

Academy experts have developed network simulation software called Packet Tracer that allows students to perform a variety of tasks just as if they were administering a real network. Packet Tracer improves visualization to help students understand the inner workings of a network and make it easier for instructors to integrate simulations into their lesson plans. In addition to providing a real-time mode that simulates a network without the need to buy and install expensive equipment, the software allows students to create their own what-if scenarios and supports self-evaluation activities that give students immediate feedback about how well they are learning.

To maintain high standards, course content and assessments must be consistent no matter where they are delivered, which can be a problem in areas where schools find it difficult to obtain equipment and the instructors may need additional training themselves to be effective teachers. Training is made available to instructors in person or remotely through Webinars, videos on demand, and podcasts, along with supporting online course materials such as interactive course guides, instructor reference guides and case studies.

Metrics for Continuous Improvement

The academy takes a pragmatic, business-oriented approach to measuring success by collecting data and applying metrics to outcomes. An important means for improving curricula and instructor performance are the comprehensive Course Feedback Survey that every student must fill out at the close of a class, and the Student Outcome Survey that students are asked to complete several months after their last class. By comparing the initial course-satisfaction survey with the follow-up survey, the academy has been able to link the students' evaluation of the instruction, materials and instructor in each class with the students' subsequent success in pursuing their education, using their expertise, and finding employment.

Not surprisingly, the key predictors for later success have turned out to be high course feedback ratings for the instructor and the course materials. The Student Outcome Survey gathers information about students' employment and education accomplishments after their classes, and the academy's impact on these accomplishments. Relying on these and other metrics, the academy is moving to improve educational performance. Some of these metrics are fed back to the instructors and institutions to help monitor their success. Others are being used to improve the initial teach-the-teacher courses for new instructors and resources for existing instructors.

Leveraging Partner Contributions

Public-private partnerships are critical to 21st century educational advancement. The academy conducts its courses in close association with a variety of established institutions: secondary and postsecondary schools, universities, CTE schools—even prisons and homeless shelters. It also helps build linkages between secondary and postsecondary schools and encourages students to further their education at a college or other institution.

For instance, the curriculum has been improved as the result of relationships with the Cisco Learning Institute (CLI) and Indiana University's Kelley School of Business and School of Education. CLI is a nonprofit organization whose mission is to change the way teachers teach and students learn using technology. CLI and the university co-sponsored the Indiana University Cisco Networking Academy Evaluation Project to evaluate the success of the CCNA program, particularly in terms of its impact on the students' education and employment opportunities. The project conducted a series of surveys that collect detailed data on CCNA students, non-CCNA students and instructors, determining that the program led to an increased enrollment in four-year colleges for high school students and increased employment and salaries for community college students.

Networking and Transformation

The Networking Academy program represents a major initiative on Cisco's part, but it is but one example of what can be accomplished when educational institutions join forces with partners inside and outside the educational community to bring 21st century curricula into today's classrooms. The interaction and collaboration made possible by networking technology, together with creative pedagogical approaches and motivated instructors, have the potential to transform learning in ways that we are just beginning to explore. T

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