



# Technology Transforming Education: 4 Real-World Models of Success

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## INTRODUCTION

**T**he late 1970s marked the beginning of the educational technology revolution. Apple Computer released the highly successful Apple II computer; MIT's Seymour Paper introduced the programming language LOGO for young children; and educators everywhere talked about the power of technology to expand and enhance teaching and learning.

Yet, over the past three decades, though the technology has gotten more powerful and sophisticated, very little has changed, particularly in higher education. In fact, the structure and methodologies at most of today's universities still follow a model established nearly a thousand years ago in Bologna, Italy, with the founding of the University of Bologna, the world's oldest university. As one observer notes, "Other than adding books, electricity, and women, [higher education] is still primarily an older person 'lecturing' to a set of younger ones..."<sup>(1)</sup>

According to many education experts, however, this historic model of education is finally about to change. "Never before has there been such an eruption of education innovation from institutions and companies of all sizes," says Stephen Gilfus, president and CEO of a research and advisory group focused on global education innovation. "I sincerely believe that we have now entered the 'dot edu' era which will stimulate and transform students, instructors, institutions and the global economy to reach new horizons."<sup>(2)</sup>

In a 2012 US Senate briefing on education and technology, a group of education experts concurred, noting that "...we are finally at a time where many factors are converging to overcome historic barriers: increasingly ubiquitous broadband, cheaper devices, digital content, cloud computing, big data, and generally higher levels of comfort with technology among the general population."<sup>(3)</sup>

This prediction is supported by a March 2012 study by the Pew Research Center's Internet & American Life Project. The study found that 60 percent of the 1,021 respondents – experts and stakeholders in higher education, including research scientists, higher education leaders, and technology developers, futurists and consultants – felt that by 2020, a mere eight years from now, higher education will witness substantial change, including mass adoption of teleconferencing and distance learning, more individualized, just-in-time learning approaches, and a transition to blended learning environments that combine online learning with less-frequent in-class meetings.<sup>(4)</sup>

Already, online learning is having a significant impact on higher education. In fact, more than 31 percent of all higher education students now take at least one online course during their college career, according to *Going the Distance: Online Education in the United States, 2011*, an annual study designed to examine fundamental questions about the nature and extent of online education.

At the same time, more than 65 percent of the 2,500 universities and colleges that took part in the 2011 study said that online learning was a critical part of their long-term strategy.

The skyrocketing cost of a four-year education is just one catalyst stimulating the movement toward online learning. As noted in the 2012 Pew report on higher education, "Students and parents, stretched by rising tuition costs, are increasingly challenging the

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Researchers have identified several reasons why blended learning offers enhanced learning opportunities, including increased access, convenience, and flexibility for students.

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affordability of a college degree as well as the diploma's ultimate value.”<sup>(5)</sup>

As a result, many colleges and universities are experimenting with hybrid learning environments that include both online and offline instruction, realizing that “the transmission of knowledge need no longer be tethered to a college campus.”<sup>(6)</sup>

## **TECHNOLOGY IN THE CLASSROOM: AN OVERVIEW OF FOUR MODELS**

The proliferation of these emerging technologies has led to new education paradigms, including blended learning, flipped classrooms, distance learning, and the growing use of technology to deliver supplemental material.

### **THE BLENDED ENVIRONMENT**

The idea of blended learning is not new. Also called “hybrid” or “mixed-mode” learning, blended learning is a pedagogical approach that combines face-to-face (F2F) teaching and learning with technology-based activities.

Studies show a growing trend toward the use of this education model. Researchers estimate that by 2014, there will be 5.1 million higher education students solely in brick and mortar classrooms; 3.5 million students solely in online classrooms; and 18.6 million students in blended courses.<sup>(7)</sup> Furthermore, findings show that many educators not only expect to increase their use of this approach in the coming years but also, several believe that blended learning is more effective than classroom-based teaching alone.<sup>(8)</sup>

So the question is no longer whether to blend, but how to blend most effectively. As Garrison and Vaughan conclude in *Blended Learning in Higher Education: Framework, Principles, and Guidelines*, “...the time has come to reject the dualistic thinking that seems to demand choosing between conventional face-to-face and online learning, a dualism that is no longer tenable, theoretically or practically.”<sup>(9)</sup>

During the past several years, researchers have identified several reasons why blended learning offers enhanced learning opportunities, including increased access, convenience, and flexibility for students. In addition, a 2010 Department of Education report suggests that a blended instructional approach can yield better learning outcomes than a face-to-face only approach.<sup>(10)</sup>

As we move toward the next decade, it seems certain that blended learning will continue to grow in higher education. As one respondent in the Pew study predicted, “Universities will continue their transition to hybrid classes using online learning components and occasional in-person meetings, while smaller colleges will both adopt online capabilities and technologies to promote access to remote resources while maintaining a focus on in-person, on-campus attendance of seminars and (some) lectures.”<sup>(11)</sup>

### **THE FLIPPED CLASSROOM**

In 2000, Wesley Baker, professor of Communication Arts at Cedarville University, Cedarville, OH, introduced the concept of the flipped classroom in a paper presented at the 11th International Conference on College Teaching and Learning in Jacksonville, FL.

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**“The ongoing development of powerful mobile devices will put a wider range of rich, educational resources into the hands of students at times and places that are most convenient for them.”**

—Educause Researchers

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Since then, the flipped classroom has gained enormous popularity among both students and teachers across the country.

In its essence, the flipped classroom is a pedagogical model that switches classwork with homework and vice versa. In a flipped classroom, teachers record their lecture material for students to view or listen to outside of class, as homework. Class time is then used for discussion, working through problems, developing team projects, or other collaborative activities.

“It is called the flipped class,” explains Jerry Overmyer, mathematics and science outreach coordinator at the College of Natural and Health Sciences in Greeley, CO, “because the whole classroom/homework paradigm is ‘flipped’. What used to be classwork (the ‘lecture’) is done at home... and what used to be homework (assigned problems) is now done in class.”<sup>(12)</sup>

The flipped classroom offers a number of benefits for students and teachers. Students no longer have to try to capture what the teacher is saying in their handwritten lecture notes. Instead, they can review lecture material at their convenience, stopping and rewinding to fully understand new ideas or skipping forward past information they’ve already learned.

At the same time, instructors spend more time interacting directly with students, instead of lecturing. Educause, a nonprofit association that promotes the use of technology in higher education, says the value of the flipped classroom model is in the “...repurposing of class time into a workshop where students can inquire about lecture content, test their skills in applying knowledge, and interact with one another in hands-on activities.”<sup>(13)</sup>

The introduction of new technology tools, such as the tablet and other mobile devices, is helping to make the flipped classroom more viable. These new mobile devices make it possible for students to access content anywhere, anytime. “The ongoing development of powerful mobile devices,” say researchers at Educause, “will put a wider range of rich, educational resources into the hands of students at times and places that are most convenient for them.”<sup>(14)</sup>

### **ONLINE/DISTANCE LEARNING COURSES**

Over the past decade, the number of students enrolled in online learning in colleges and universities throughout the United States has increased dramatically—from 1.6 million in 2002 (representing only 9.6 percent of all higher education students) to 6.1 million (or 31 percent of all students) during the fall of 2010.<sup>(15)</sup>

Even more dramatic is the growth rate of online enrollment in comparison to the growth rate for enrollment in higher education in general. According to *Going the Distance*, the total enrollment in degree-granting post-secondary institutions in the fall of 2010 had grown only 0.6 percent over the previous year, while the growth rate for online enrollment grew 10.1 percent. As the report concluded, “There is no compelling evidence that the continued robust growth in online enrollments is at its end.”<sup>(16)</sup>

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—Peter Pinch,  
Director of Technology, WGBH

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The growth patterns suggest that colleges and universities are making online learning an integral part of their strategic plan for the future. Since 2009, all types of institutions, including public, private for-profit, and private nonprofit, have shown an increase each year in the percentage reporting that online is critical to their long-term strategy. Yet, between 2010 and 2011, the percent of for-profit institutions who reported that online is critical to their long term strategy grew by an impressive eight percent, from 61 percent in 2010 to 69 percent in 2011.

Still, many question the quality of online education. According to *Going the Distance*, while 67 percent of academic leaders believe learning outcomes in online education are the same or superior to those in face-to-face courses, one-third believe that the learning outcomes for online education are inferior. As noted by the authors of the survey, “While there has been a slow increase in the proportion of academic leaders that have a positive view of the relative quality of the learning outcomes for online courses as compared to comparable face-to-face courses, there remains a consistent and sizable minority that see online as inferior.”<sup>(17)</sup>

Still, others predict this attitude will soon change. “As communications technologies improve and we learn how to use them better,” says Peter Pinch, director of technology for WGBH, a public media company, “the requirement for people to meet face-to-face for effective teaching and learning will diminish.”<sup>(18)</sup>

#### **TECHNOLOGY AS A DELIVERY SYSTEM FOR SUPPLEMENTAL MATERIAL**

The average 13- to 17-year-old today spends three and a half hours per day on digital media (Internet, games, listening to digital music), according to Educause.<sup>(19)</sup> It should be no surprise, then, that when members of this younger generation arrive at their college or university, they expect technology to be an integral part of their courses, including the delivery of supplemental material and instruction.

One familiar technology for the delivery of supplemental material is podcasting — the creation of digital media files for use on iPods and other mp3 players. Podcasting allows students to listen to teacher-created instructional files wherever and whenever desired. (Similarly, vodcasting allows students to view teacher-created videos outside of class time on a computer, tablet, or other handheld device.)

There are many benefits in the use of digital media files for the delivery of supplemental instruction. First, and the most obvious, students are already accustomed to using the technology. Second, people learn better when they experience information with multiple senses, according to University of California researchers Ladan Shams and Aaron R. Seitz, in their study titled *Benefits of Multisensory Learning*. Finally, the technology allows for flexibility for both teachers and instructors in the creation and use of the supplemental material.

While the main use of podcasting in higher education currently is the recording of class lectures, its use in providing supplementary materials has enormous potential. For example, podcasts and vodcasts can provide an opportunity for students to explore or review a topic in greater depth; they can provide conversations with guest speakers who are experts on a topic; and they can deliver weekly reviews of course material, to name a few.

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**“ICESI’s students are graduating with better English proficiency levels every year.”**

—Francisco Piedrahít  
President, ICESI University

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There are, of course, other successful technology solutions that help supplement classroom instruction. (See: *Supplementing ESL Instruction for Adult Learners at the College of Western Idaho* below.) Yet, it seems certain that as educational tools for the delivery of supplemental instruction, these two technologies will play an important role in helping students master the content.

## **TECHNOLOGY IN THE CLASSROOM: BEST PRACTICES**

Each of these four instructional scenarios is having a direct impact on institutions of higher learning around the world. They are enhancing student engagement and retention, allowing more direct interaction between student and teacher, and improving student outcomes, as explained in these four examples.

### **THE BLENDED ENVIRONMENT AT ICESI UNIVERSITY, COLUMBIA**

ICESI University, a private institution in Cali, Columbia serving more than 4,800 students, believes that bilingualism gives its students an important competitive advantage. The university employs a blended learning approach in its foreign language courses, a strategy that has produced exceptional results. ICESI is recognized as one of the top six universities in Colombia in terms of English proficiency.

ICESI uses an interactive language-learning solution from Rosetta Stone in its foreign language courses. The software enables learners to practice their English skills on their own time, at their own pace.

Students have embraced the program, according to Diana Díaz, chief language officer of ICESI University. “Students come Saturday mornings or before classes on their own to practice,” she says. “They have said that the software is very friendly and easy to use. People are very happy.”

The institution is pleased with the results of the blended environment, said ICESI University president Francisco Piedrahít. “ICESI’s students are graduating with better English proficiency levels every year,” reported Piedrahita, pointing to evidence from an official state exam all college students must take. “Students get very high results, on average almost two standard deviations above the national average.”

### **THE FLIPPED CLASSROOM**

Three years ago, Jerry Overmyer, Mathematics and Science outreach coordinator for the Mathematics and Science Teaching Institute at the University of Northern Colorado, was thinking about the topic of trends in education and technology. And so he did what most people would do—he Googled it.

What he found was a discussion about the ‘flipped classroom’, an emerging pedagogy designed to increase the amount of time teachers can interact personally with their students.

Today, Overmyer is an outspoken advocate for the flipped classroom concept. He is also the creator and facilitator of the Flipped Learning Network ([www.flippedclassroom.org](http://www.flippedclassroom.org)), an online professional learning community for teachers using vodcasting and the flipped teaching model.



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## “APUS offers an asynchronous platform without a lecture focus.”

—Fred Stielow  
Vice President and  
Dean of Libraries  
& Educational Materials,  
The American Public  
University System

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As Overmyer explains, “In most flipped classrooms, there is an active and intentional transfer of some of the information delivery to outside of the classroom with the goal of freeing up time to make better use of the face-to-face interaction in school.”

While some educators feel that the flipped classroom may make their role irrelevant, in Overmyer’s experience the exact opposite is true. “The flipped model is allowing teachers to be more engaged and personally understand the learning process of all their students,” he says.

As one Advanced Physics and AP Chemistry instructor concluded, as a result of the flipped model, “I’ve moved out of the role of ‘Chemistry Know-it-all’ to ‘Consultant’ and ‘Coach.’ It actually feels like a huge promotion.”

### **DISTANCE LEARNING COURSES AT APUS**

Creating a successful and affordable online learning environment has been the goal of The American Public University System (APUS) since its transition from a correspondence-based university to a 100 percent online learning institution in 1998.

Today, APUS serves more than 100,000 distance learners studying in 50 states and more than 100 countries. A for-profit institution, APUS consists of two online universities: American Public University (APU) and American Military University (AMU) and provides students with more than 130 degree and certificate programs in seven schools.

Although APUS is an online university, the school does not believe that online learning is or should be isolated to the student and his or her computer. “Learning must occur in a community,” APUS believes.

To achieve that goal, students can chat with fellow students in the student lounge, participate in online discussion boards where professors and students gather, and participate in live webcasts with fellow students, instructors, or industry leaders.

“By way of setting,” says Fred Stielow, vice president and dean of libraries & educational materials at APUS, “APUS offers an asynchronous platform without a lecture focus. We are already pretty well advanced in using cloud-based voice recognition for language education and simple video production in public speaking courses.”

As far as new technology tools that will be impacting online learning in the near future, Stielow mentions the onset of touch screens and voice recognition for navigation, as well as authenticating student participation. “The idea of 3D projections for geometry and engineering is another intriguing prospect,” he says.

Despite the advances in technology-based education, Stielow believes that there is still one challenge that faces online education. “Our biggest challenges remain re-inventing pedagogies away from 1950’s/GI-Bill Era dependency on textbooks,” he says.

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**“We chose Rosetta Stone TOTALe solution for a number of reasons, including the fact that it is interactive and extremely user friendly.”**

*—Becky Sherman  
CWI Technology and Business  
Solutions Manager*

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#### **SUPPLEMENTING ESL INSTRUCTION FOR ADULT LEARNERS AT THE COLLEGE OF WESTERN IDAHO**

When a local beef producing plant closed its operations, more than 500 workers—most with limited English proficiency, job skills, and formal education—suddenly found themselves out of work. To address the problem, the College of Western Idaho (CWI), a public community college with seven campuses throughout southwestern Idaho, created a six-week workforce program aimed at giving these individuals the skills they need to obtain new employment. Developing English language skills was critical to this endeavor.

After evaluating various programs, CWI chose an online language-learning solution from Rosetta Stone. With its interactive technologies that replicate the immersion environment, the Rosetta Stone solution provides core language-skill development.

“We chose the Rosetta Stone TOTALe solution for a number of reasons,” says Becky Sherman, manager for technology and business solutions at CWI, “including the fact that it is interactive and extremely user friendly. Many of our students had never used a computer, which made the user friendliness very important.”

Another benefit of the Rosetta Stone solution, Sherman notes, is that it allows students to verbally practice what they've learned. “We knew it would help our students learn the small nuances of pitch and tone that are hard to teach,” she says. “At first, many of the students were afraid to use the Studio component because they felt embarrassed speaking into the microphone and talking to strangers. As it turned out, students loved the Studio time and visited it often.”

The college used the software to support the in-class language instruction. Learners spent an average of 1-3 hours per day, outside the classroom, working with the Rosetta Stone solution during the six-week program. As Sherman explains, “While the classroom component of the blended ESL program concentrated on the language skills needed to interview for a job or complete applications for employment, the Rosetta Stone program supported the students by giving them the experience of continued learning and the basics of English literacy.”

This blended learning approach paid off. An estimated 35 percent of the program's participants obtained new employment upon completion of the course. “We found that the Rosetta Stone program enhanced CWI's goal to help these people become employable,” reports Sherman.

The college plans to continue using Rosetta Stone for its language courses. “We have already started a blended Workplace Spanish class for 60 of CWI employees to help them better communicate with many of our students,” Sherman explains, “but we are also planning to implement several weeks of Introduction to Foreign Languages in which we would invite students to spend a couple hours becoming acquainted with the language of their choice.”



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“...all six of these technologies will have a significant impact on learning-focused organizations within the next five years.”

—NMC Horizon Report:  
2012 Higher Education Edition

## TRANSFORMING EDUCATION: SIX TECHNOLOGIES THAT ARE LEADING THE WAY

In 2012 the New Media Consortium (NMC), an international community of experts in educational technology, in collaboration with the Educause Learning Initiative, an EDUCAUSE Program, released the NMC Horizon Report: 2012 Higher Education Edition. This ninth annual Horizon report identified and ranked six emerging technologies likely to have an impact on learning, teaching, and creative inquiry in higher education in the years ahead.

The six technologies identified in the report are grouped into three “horizon” periods: near-term, mid-term, and far-term. Near-term includes technologies to watch in the next 12 months, such as mobile apps and tablets, Mid-term technologies, including game-based learning and learning analytics, are two to three years away from adoption. Far-term technologies are four to five years away from widespread deployment, including gesture-based learning and the Internet of Things.

Taken together, the report says, “...all six of these technologies will have a significant impact on learning-focused organizations within the next five years.”

- (1) **NEAR-TERM HORIZON:** In the near-term, according to the Horizon Report, mobile devices (defined as typical hand-held devices designed to make calls) and tablets will provide the means for whenever and wherever learning. Already, researchers in higher education are developing apps for mobile devices that are specifically tailored to educational and research needs across the curriculum. At the same time, tablets – with their portability, touchscreens, and high resolution – are ideal for supporting enhanced learning experiences.
- (2) **MID-TERM HORIZON:** Within two or three years, the explosion of interest in game-based learning will have a significant impact on higher education. Educators will see a plethora of games designed to enhance and improve learning across all disciplines, including social games that combine social issues or problems with game play, role-playing and collaborative problem-solving games, games related specifically to course content, and simulation-based games. The mid-term horizon will also see the further development and application of learning analytics, making it possible for educators to synthesize data in real-time and, as a result, “make adjustments to their teaching style that better caters to student needs.”
- (3) **FAR-TERM HORIZON:** The far-term will see gesture-based computing and the Internet of Things come into prominence. Gesture-based computing makes it possible for users to control computers through body movements, facial expressions, and voice recognition. As an assistive technology, it is already being widely used for special needs and disabled individuals. In the future, however, gesture-based computing, combined with voice recognition, will allow “users to engage in virtual activities with motions and movements similar to what they would use in the real world.”

The Internet of Things refers to “smart objects that connect the physical world with the world of information” easily and instantly. While the implications for education are not yet clear, one application is in the area of tracking – from student attendance to marine animals’ behavior, to the location of science lab equipment.

The School District of Palm Beach County in Florida uses Cognos to aggregate disparate data sources and deliver continuous access of key data with on-the-fly report generation to teachers and administrators for decision-making.

A new addition to the Cognos family, Decision Management, provides the ability to optimize decisions that are informed by predictive analytics by scoring and prioritizing the actions to be taken when specific conditions are present.

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**Distance learning, blended classes, and a host of technology tools for collaboration, research, and presentation are enhancing the traditional stand-and-deliver mode of content dissemination**

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## **CONCLUSION**

Colleges and universities are blazing new trails in education by implementing technologies that support new and traditional pedagogical approaches and organizational models. Distance learning, blended classes, and a host of technology tools for collaboration, research, and presentation are enhancing the traditional stand-and-deliver mode of content dissemination. This trend, according to Syracuse University professor Lee McKnight, has only just begun.

“The transition [will continue] en masse to online and hybrid models for collaborative learning,” McKnight says. <sup>(20)</sup>

The benefits of implementing technology are already evident in a number of institutions throughout the country. At Arizona State University, for example, a number of students were not college-ready in mathematics. After using Knewton Math Readiness, a web-based, developmental math course that assesses, remediates, and re-assesses student progress, student withdrawal rates dropped by 56 percent and pass rates went from 64 percent to 75 percent.<sup>(21)</sup> At Texas A&M-Commerce, faculty and staff improved their foreign language skills, thanks to Rosetta Stone’s solution. The institution reports that the learners increased reading skills by 150 percent, pronunciation skills by 100 percent, and speaking skills by 75 percent.

As education continues to evolve, technology will be at the forefront, driving learner outcomes and transforming instructional practices. As Charlie Firestone, executive director of the Communications and Society program at the Aspen Institute, reported in *The Future of Higher Education*, “Technology will allow for more individualized, passion-based learning by the student, greater access to master teaching, and more opportunities for students to connect to others – mentors, peers, sources – for enhanced learning experiences.” <sup>(22)</sup>



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## **ABOUT ROSETTA STONE EDUCATION**

For nearly 20 years Rosetta Stone Education has helped higher education educators deliver innovative solutions to expand the ESL and World language programs essential for students and faculty to live, work, and ultimately thrive in multilingual settings. Our interactive solutions have been used by over 20,000 education institutions worldwide.

Our proprietary, proven method leverages interactive technologies and immerses learners in their new language. Interactive online lessons take place solely in the new language, activating each student's natural aptitude for acquiring a new language regardless of language background. With Rosetta Stone® solutions words and sentences evolve into live online conversations with coaches who are native speakers, plus social games and activities increase student engagement.

Perhaps most importantly our interactive platform offers educators the flexibility to implement our solution in the way that fits their language program needs. We understand that no two language classes are the same and strive to offer faculty a solution that will work in their classroom, whether they are looking for a supplemental material to their classroom instruction or a program they can incorporate into a blended curriculum, there's a Rosetta Stone solution that will work for them.

**For more information, visit [www.RosettaStone.com/highereducation](http://www.RosettaStone.com/highereducation)**

## **ABOUT CAMPUS TECHNOLOGY**

Campus Technology is the only monthly publication focusing exclusively on the use of technology across all areas of higher education. Campus Technology provides in depth coverage of specific technologies and their implementations, including wireless networks and mobile devices; enterprise resource planning; eLearning and course management systems; "smart classroom" technologies; telecom; Web; and security solutions--all the important issues and trends for campus IT decision makers.

Launched in October 2004, Campus Technology replaced the highly respected Syllabus magazine, a recognized leader in the coverage of technology on campus since 1988. Campus Technology continues to uphold Syllabus' mission of serving as a complete resource for academic and administrative IT leaders in higher education, and provides in depth coverage of specific technologies, their uses, and implementations on campus.

Campus Technology consists of the monthly Campus Technology print magazine; the daily CampusTechnology.com Web site; weekly, biweekly, and monthly electronic newsletters (CT News Update, CT Insider, 21st Century Campus, CT IT Trends, Campus Mobile Computing, Campus Cloud Computing, Campus Networks & Security, C-Level View, CT E-Learning Report, Community College Tech Spotlight); conferences; and targeted list rental opportunities.

**For more information, visit [www.campustechnology.com](http://www.campustechnology.com)**

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