January 2011
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Empowering the World of Higher Education

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04. ❑ My department's classrooms or administration
05. ❑ My courses only
06. ❑ My own professional use only

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02. ❑ $1,000,000 to $4,999,999
03. ❑ $500,000 to $999,999
04. ❑ $100,000 to $499,999
05. ❑ Less than $100,000

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02. ❑ 15,000 to 24,999
03. ❑ 10,000 to 14,999
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04. ❑ Presentation Products/Projection Systems/Printers/AV Equipment
12. ❑ Learning Management Systems
13. ❑ Digital Content/Textbooks
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06. ❑ Networking (Wired & Wireless) Products & Technologies
07. ❑ Security & Privacy Solutions
08. ❑ Storage Solutions
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Empowering the World of Higher Education

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AVP Anne Moore and three other IT leaders share what's in store for the coming year.

4 predictions for higher education technology in 2011

Trends to Watch

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Features

A Change Is Gonna Come

A look around any college campus is all the evidence you need to predict the future of learning.

This being the January issue, prognostications for the new year are typically in order.

I don't do predictions very well. Especially at this time in human history, when so much seems in flux, it feels pretty much like a crapshoot to me to place a bet on the future.

But I am willing to make one prediction—maybe not for 2011 per se, but surely for the coming decade: Mobile technology is going to be an unstoppable change agent in education.

Now, you may be thinking: Some prediction! *Everybody* knows that we are headed rapidly toward full mobility.

Please understand: I've been in educational technology since the late 1980s. I've seen hundreds of technological tools be ordained as the innovation that would change education.

And not one ever did.

All you have to do is poke your head into any college classroom and know that things are pretty much where they were a couple of centuries ago.

On the other hand, all you have to do is walk around any college campus and see, to quote William Butler Yeats, how all is "changed, changed utterly."

Pratically every one of our students—rich and poor, wise and less wise—is walking around with a powerful computing device in his or her hand. These students are changing the nature of their education using those devices, whether they realize it or not—and whether we help them or not.

Mobile technology is about to do something that government and universities and K-12 school systems have not managed to do in the past three decades: close the digital divide. And as it closes…well, watch out. This revolution *will* be televised—or, er, rather, digitized.

The question arises, then, for higher education leaders: Are you going to be part of the revolution, or just watch it?

You may be the first generation of educators in human history whose students understand more about their learning tools than their teachers. But as **USC**'s Susan Metros so brilliantly put it in her keynote for the CT Virtual Conference in November: Students "know how to upload a movie in YouTube, to upload pictures…they know how to text, and they are constantly connected to something digital. But my argument is they are *not* literate; they are just basically stimulated." (For more on Metros' speech, see this month's Trendspotter, page 42.)

The point I'm making here is that students are going in the directions they are going without much guidance. And as the proliferation of mobile computing fuels that diaspora, I'm not sure what bodes for the future of institutions of higher learning, or indeed, the future of the planet itself.

I excerpted earlier from Yeats' poem "Easter, 1916," which was its own prognostication on the coming era. It's worth my noting here the entire refrain I quoted from: "All changed, changed utterly: A terrible beauty is born." **CT**

—Therese Mageau, Editorial Director
Continue the conversation. E-mail me at tmageau@1105media.com

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January

JAN 20 - 27
The SANS Institute
SANS Security East 2011
sans.org/security-east-2011
New Orleans, LA

JAN 26 - 29
Association of American Colleges and Universities
2011 AAC&U Annual Meeting
aacu.org/meetings/annualmeeting/index.cfm
San Francisco, CA

JAN 26 - 29
Macworld 2011
macworldexpo.com
San Francisco, CA

February

FEB 13 - 18
The Data Warehousing Institute
TDWI Las Vegas World Conference
tdwi.org
Las Vegas, NV

FEB 14 - 16
Educause Learning Initiative
2011 ELI Annual Meeting
educause.edu/eli11
Washington, DC

FEB 14 - 18
RSA Conference 2011
rsaconference.com/2011/usa/index.htm
San Francisco, CA

FEB 19 - 22
Instructional Technology Council
eLearning 2011
itcnetwork.org
St. Pete Beach, FL

FEB 22 - 24
Digital Signage Expo 2011
digitalsignageexpo.net
Las Vegas, NV

FEB 23 - 25
Society for Applied Learning Technology
New Learning Technologies 2011
salt.org/fl/orlandop.asp
Orlando, FL

FEB 25 - MAR 1
National Association of College Stores
CAMEX 2011
camex.org
Houston, TX

FEB 27 - MAR 2
League for Innovation in the Community College
Innovations 2011
league.org/innovations
San Diego, CA

March

MAR 7 - 11
Society for Information Technology and Teacher Education
SITE 2011
site.aace.org/conf
Nashville, TN

MAR 13 - 16
Association of College and University Auditors
2011 ACUA Midyear Conference
acua.org/cpe_events/midyear_conference.asp
Orlando, FL

MAR 13 - 16
American Association of Collegiate Registrars and Admissions Officers
AACRAO 2011 Annual Meeting
aacrao.org/seattle
Seattle, WA

MAR 27 - APR 4
The SANS Institute
SANS 2011
sans.org/info/65598
Lake Buena Vista, FL

MAR 30 - APR 3
American Society for Information Science and Technology
IA Summit 2011
iasummit.org
Denver, CO

April

APR 3 - 6
Association for Information Communications Technology Professionals in Higher Education
2011 ACUTA Annual Conference & Exhibition
acuta.org
Orlando, FL

APR 4 - 6
California Community Colleges Chief Information Systems Officers Association and SecureIT
CISOA/SecureIT 2011
secureitconf.com
Santa Clara, CA

APR 9 - 12
American Association of Community Colleges
91st AACC Annual Convention
aacc.nche.edu/convention
New Orleans, LA

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Viewpoint

Voodoo Education: Why Are We Still in Its Spell?
Why does higher ed still rely on a teaching and learning model that harkens back to 19th century classoom practices?

Web 2.0's Foundation of Sand
Our entire society is moving rapidly to the all-too-quick sand of web 2.0.

campustechnology.com/viewpoint

Features

IT Beyond the Campus
Since the late 1990s, **Drexel University** (PA) has been serving as an outsourced IT department for a group of colleges that lack the infrastructure necessary to run their own enterprisewide systems. The university focuses mainly on student admissions, financial services, back office systems, and other options that fall under the SunGard Higher Education umbrella.

Finessing Bandwidth for a Campus Laptop Program
Becoming Michigan's first totally "wireless laptop campus" was a boon for **Lawrence Technological University** (MI), but it also brought a new set of challenges for the school's IT team.

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Making the Switch: Migrating to Moodle and Establishing a Sustainable Solution for the Future
Migration strategies and tips from two institutions that successfully transitioned from a legacy LMS to a more open, affordable, sustainable model.

How to Boost Student Services With an Integrated Cloud-based System
How **Yukon College** (Canada) deployed a portal, learning management system, and emergency notification that aligned with its strategic plan—all delivered in the cloud, at a considerable savings.

Student Engagement: Providing Mobility to the Non-Traditional Student
With a "Mobile Imperative," institutions can serve the needs of the "new normal" student—the non-traditional student who balances professional and family responsibilities while still advancing his or her education.

NEED TO KNOW

2011 Security Trends: Bad Times With Refined Phishing and Mobile Apps

Cybersecurity will be no easier in the new year than it is now, as malware proprietors get more sophisticated in their phishing attempts, malware-as-a-service becomes the norm, and smartphones and tablets draw increased attention from cybercriminals. That's the prediction of security software vendor M86 Security, which has released a report summarizing its threat predictions for 2011.

Security experts at the company say they expect spam campaigns to increasingly mimic legitimate mail from popular websites. Gone will be the obvious misspellings, double exclamation points, textual spacing gaffes, and other tiny clues signaling that a message has come from a spammer instead of a legitimate mailer. Read more at *campustechnology.com/articles/2010/12/01/2011-security-trends-bad-times-with-refined-phishing-and-mobile-apps.aspx.*

In Box

"Institutions that fail to change and accept online education will become obsolete."
—Mark Albin, ***University of Nevada, Reno***

Read this and other reader comments at *campustechnology.com/articles/2010/12/01/explosive-online-education-growth-could-slow.aspx*.

Top Stories

- **Eastern Illinois U** Cuts User Complaints with NAC Overhaul
- Sanyo Launches LCD Classroom Projectors
- Working Group Takes on Challenges of WiFi Growth on Campus
- LogMeIn Launches Free Meeting App
- **U Hawaii** Data Breach Hits 40,000 Students
- **Oxford** (UK), **Rice** (TX), **Open U** (UK) Add to iTunes U Electronic Book Collection

campustechnology.com/topstories

Research

Explosive Online Education Growth Could Slow
Nearly a million more students were taking at least one online course in the United States during the Fall 2009 term than the previous year. But, according to researchers, "…the time of unbridled growth may be ending." Read more at *campustechnology.com/articles/2010/12/01/explosive-online-education-growth-could-slow.aspx.*

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TECHNOLOGY HAPPENINGS IN HIGHER EDUCATION

NEWS

E-BOOKS VS. PRINT. E-books and e-readers have been slow to catch on with college students, according to a new study by OnCampus Research, a division of the National Association of College Stores. Out of 627 students surveyed last October, only 13 percent had purchased an electronic book of any kind during the previous three months. In addition, a whopping 92 percent of respondents indicated they did not own an e-reader device (most use their laptop computers to read electronic textbook content).

CALL FOR INNOVATORS. Nominations are now open for our 7th annual Campus Technology Innovators awards: We seek colleges and universities that have deployed extraordinary technology solutions to campus challenges. Is your innovative technology project a model for others to follow? Enter by Feb. 15 at *campustechnology.com/innovators*.

CAMPUS TECHNOLOGY innovators AWARDS 2011

GROWING ARCHIVES. The HathiTrust Digital Library has added multiple new members to its list of partnering institutions, including libraries from **Johns Hopkins University** (MD), **Emory University** (GA), and **Baylor University** (TX), as well as the Library of Congress and the **University of Madrid**, HathiTrust's first international partner. Launched in 2008, the digital repository now has more than tripled the number of volumes held and doubled its initial partnership. Integrating the digital archives of its member institutions, HathiTrust hopes to "contribute to the common good by collecting, organizing, preserving, communicating, and sharing the record of human knowledge."

TWITTER BOOSTS GRADES. Using a social networking platform such as Twitter in university courses can increase student engagement and boost grades, according to researchers at **Lock Haven University** (PA), **South Dakota State University**, and **Penn State**. The fieldwork studied a group of 125 students—70 in the experimental group that used Twitter, and 55 in a control group—taking a first-year seminar course for pre-health professional majors. In the experimental group, instructors and students used Twitter for various academic discussions. Researchers measured students' engagement using a 19-item scale based on the National Survey of Student Engagement (*nsse.iub.edu*); results showed that the experimental group had a significantly greater increase in engagement than the control group, as well as higher grade point averages for the entire semester.

SOUTH DAKOTA STATE UNIVERSITY researcher Greg Heiberger and his colleagues found that Twitter can help improve grades and student engagement.

NEW KUALI PROJECT. Kuali People Management for the Enterprise (KPME) has been launched as a new project under the Kuali Foundation with founding partners **Indiana University**, **Iowa State University**, and open source software developer VivanTech. KPME will be an open source HR/payroll system including modules for benefits administration, position management, time attendance, leave management, and other components.

GREEN EFFORTS. Three-quarters of surveyed IT professionals are working to reduce energy use in IT operations, according to a report from CDW-G. Many organizations are focusing those efforts on the data center: The survey of 756 IT workers in the public and private sectors found that 79 percent of respondents have or are developing a strategy to consolidate servers, storage devices, power management tools, and other data center equipment.

SMART MICROGRID. **Santa Clara University** (CA) is collaborating with Sustainable Silicon Valley, Cisco, and SeriousEnergy to install a smart microgrid, which will tie its power source, transmission, distribution, and consumption data to weather reports, and maximize energy savings. In the first phase of the project, SCU installed sub-meters into 14 buildings and integrated the microgrid's on-site alternative energy sources, such as solar, fuel cells, and micro-turbines. The next phase will connect the entire campus to the microgrid. Once the project is complete in December 2011, it's expected to reduce energy consumption by 50 percent and save the university about 20 percent in energy costs.

SPORTS SCHEDULING. **The University of Washington** has selected Intand's Tandem for Schools online calendar solution to manage and publicize the athletic department's events and games. The tool will help the school ensure that facilities or teams are not double-booked, and will allow organizers to distribute event information via e-mail, text message, RSS feed, iCal, or online. CT

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Project Rescue!

Helping a lost but determined CIO navigate the tough new world of higher education IT.

IN 2009, AS A TIDAL WAVE crashed over the economy, higher education CIOs awoke to a new reality and faced some very real questions:

- Why is technology spending across the campus increasing, in many cases, faster than tuition?
- What value is the campus receiving from its technology investment?
- Why are so many stakeholders so unsatisfied with the campus technology offering?
- Why can I do far more interesting things with my home technology than I can with my university-supplied technology?
- And how do I hold on to and motivate a great technology team to meet the increased demands of the campus?

What do these questions mean for today's CIO? This column will explore the world of Gene, a composite CIO who may look very much like you or your colleagues. Our goal is to help him navigate the tough times ahead. We will peek into Gene's daily goings-on, investigate his problems, and help him to not only survive, but prosper.

Gene is a well-established CIO leading a sizable IT organization for a top 100 university somewhere in America. He is a member of the president's cabinet and operates a full-service technology shop. He is ultimately responsible for infrastructure, administrative technology, educational technology, and research computing. Gene has been in the job for seven years and has delivered on projects large and small. He has had many successes and, like all of us, a few failures. Gene serves many constituents: students, faculty, staff, alumni, parents, and future employers of his students. In essence, his job is to oversee technology for a small village of people who teach, research, learn, live, and work together.

To begin, let's find out what happened to Gene at the start of his school year.

Part 1: Gene's Back-to-School

The summer had been busy. Gene and his team completed their network and data center upgrade, which resulted in a faster internet connection, greater fault tolerance, and increased storage. As a result of the storage build-out, they were able to increase the mailbox quota size for their students. They had thought about outsourcing mail altogether, but first wanted to make sure that cloud mail providers could really implement FERPA and the privacy settings the university required. Gene also wanted to see the market mature before they bet on a provider.

As students streamed back in to campus, Gene couldn't help but be pleased. All systems were up and running and the new network was easily handling the increased load.

Dan Page

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Wandering through campus on his way to the president's first staff meeting, Gene noticed that everyone seemed to have a mobile device—even the grounds crew. He made a mental note that his team had some work to do to leverage the devices as part of the campus infrastructure, but he figured he had time. Right now, Gene was looking forward to reporting to his peers that this had been the smoothest back-to-school in five years.

The Meeting and Its Aftermath

Gene entered the cabinet meeting and immediately felt the tension in the room. On the table were advance copies of the latest college rankings—the university had dropped in rank. The normal meeting protocol—where each vice president reports out his or her key achievements and issues—was abandoned, and the president and dean of the college of undergraduate studies led the conversation on the negative ranking results. Central to the results were students' comments on the "lack of real technology on campus."

"This campus does not do half of what my high school offered."

"Yes, we have wireless, but it is slow."

"They expect us to carry around notebooks; that's what my father uses."

"They just don't get how we want to collaborate."

The president asked Gene three questions:

- Why did IT spend the summer on projects no one is interested in?
- What are we getting out of our IT investment?
- How is IT going to fix this mess?

To Gene's credit, he didn't become defensive but rather promised to come back with real answers to these questions. Going home that evening, Gene was despondent—and a bit scared. How could it be that after a summer of hard-fought successes, the rest of the campus viewed his organization as a failure? He knew he was an able and experienced manager of people and systems. He wondered how he could have fallen so short in people's expectations and not seen it coming. Needless to say, Gene did not have a good night's sleep.

When he woke up the morning, though, he knew what he had to do. He had to go back to the basics. Rummaging around his files, Gene found his old, beloved manager's handbook, a personal notebook where he had written down the advice he collected over the years. He began to review the secrets of success he had learned from mentors, bosses (good and bad), books, colleagues, and many other valuable professional and personal relationships. As he flipped through the book, Gene realized how—in just trying to keep up with the daily demands of the job—he had lost sight of these important lessons learned.

Lesson No. 1: Hire and Mentor a Great Team

Gene learned from his first mentor that, at its core, the practice of IT is all about people and teams. The world of technology is complex and no one person can do it all. The culture of a team needs to be nurtured and supported. This means hiring collaborative, smart, adaptable, skilled people who will work together, embrace change, learn new ways of working, and quickly gain missing skills—all while operating at a high level of proficiency.

Mentoring a great team, Gene was reminded, means managing each person as a whole person. It means working with individuals to understand what is important to them and charting for each a course of professional development within the means and vision of the organization. It involves creating and embracing feedback systems, and of course, recognizing and rewarding success. Mentoring also includes consistently holding people and teams accountable to measurable levels of service and using service failures as an open opportunity to learn and move forward.

Gene thought about his people and how he managed them. He was pretty sure he had a good team, but was it great? Were his staff members really operating at top capacity—and did he even know what that top capacity could be? He had to admit to himself that lately he had spent little time mentoring; his approach to his team had turned a bit laissez-faire.

Lesson No. 2: Run Your Shop as a Business

Gene didn't always work in academia. For the first few years of his career, he worked in a Fortune 500 company and there Gene learned the value of IT operating as if it were its own business—meaning that the people responsible for its operations constantly asked themselves the following questions:

- What do our customers want?
- What are our core competencies?
- Where can we add unique value?
- What are we doing today that someone else could do better or more efficiently?

To be fair, Gene did ask these questions when he first started as CIO of the university. But the initial set of answers got stuck on some archived PowerPoint slides, and he hadn't bothered to revisit the questions as times and situations changed.

Right now, Gene said to himself, is surely one of those times to question ourselves all over again: Are we really thinking about our customers and what they need?

Gene headed to his staff meeting, ready to start a new conversation around these critical elements of success. He was hopeful that, if his team could adapt, it would not only survive this crisis, but emerge stronger and abler. ▸

PROJECT RESCUE will run every other month through July and culminate with a special event on CIO leadership at the Campus Technology 2011 conference in Boston, July 25-28. For more on the conference, see *campustechnology.com/summer11*.

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The Staff Meeting

Gene knew he needed to simultaneously rally his team members and help them to understand the gravity of the situation. After all, his goal was to be CIO for a long time! Recalling his days as a high school basketball player, he began to channel his coach, who knew how to inspire a team even in the face of adversity.

"Our team put in long hours this summer to achieve some great accomplishments. We had the smoothest fall startup in five years and our students now benefit from more storage for their e-mail. But we missed the boat—we didn't deliver on what our customers value. Because, the truth is, we've lost sight of what it is they want."

He went on to explain the general frustration at the president's cabinet meeting. "Think of us as a small startup with only one customer who has lost confidence in our product. We can no longer just be great at support, just provide a reliable network, or just develop software—our achievements of years past have turned into a commodity. To keep our customers, we need to pull together as a team and provide services that the campus truly values."

Gene then asked three questions:

- Are you, as an individual and as a member of this team, committed to excellence?
- Are you, as an individual and as a member of this team, committed to open and honest dialogue? Can you commit to active listening and problem solving from the perspective of the team and not just your unit?
- Can you commit to asking the same out of your direct reports and to taking time to engage all levels of our organization?

After some conversation, hesitant nods turned into raised hands of commitment, and the team members began to talk in terms of ownership of the problem: how they were responsible for IT's turnaround. They were a team of equals committed to building success.

The group agreed to meet the following day and to include everyone's direct reports. The goal of the meeting would be to identify immediate changes Gene and his team could make to address campus unrest as well as the work they could stop doing to free up their time. Without any new resources, and a time to completion of less than 30 days, it was a tall order—dubbed "Project Rescue" by the team—but one Gene had faith that he and they could accomplish. **CT**

Stephen Laster *is the CIO of* ***Harvard Business School*** *(MA).*

What should Gene's next step be? Join the dialogue at campustechnology.com/projectrescue.

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jennifer demski

Can an iPad Do That?

Yes, those tablets are adorable, but have we forgotten the stalwart laptop? For the same price as an iPad, you can get a whole lot of computing power and a real keyboard to boot!

NOW THAT THE HOLIDAY FRENZY over iPads, tablet PCs, and netbooks is over, let's settle down into a calmer frame of mind and consider the laptop. You remember the laptop, don't you? That breakthrough technology that allowed computing to become portable?

Guess what? It hasn't gone away!

Compaq Presario CQ62Z

Campus Technology recently surveyed the market to see what features one could expect from a laptop priced similarly to today's tablet and netbook wunderkinds. What we discovered is that these days it's easy to get a solid machine with cutting-edge features for under $500.

The 33 Windows-based models included in our survey are all currently priced at $499.99 and under, and all are categorized as full-size laptops—no typing on tiny netbook keyboards or touchscreens here. And, as we compiled the specs for these models, we noticed that there are a few features that almost all of the laptops at this price point share:

Dell Inspiron M101z

- All models feature a widescreen HD display.
- All but one come with the 64-bit edition of Windows 7 Home Premium pre-installed. (Only the 15.6-inch Toshiba Satellite L455D-S5976, priced at $426.99, features the 34-bit edition of Windows 7 Home Premium.)
- All offer either a 250-GB or a 320-GB SATA hard drive, with the exception of two outliers—the 15.6-inch eMachines eME527-2537, priced at $399.99, features a 160-GB SATA hard drive, while, at the other end of the spectrum, the 15.6-inch Toshiba Satellite C655D-S5088, priced at $479.99, includes a 500-GB SATA hard drive.
- All models feature a dual layer CD/DVD(+/-R) optical drive, with the exception of the six lightest machines: the 11.6-inch Toshiba Satellite T215-S1150, the 11.6-inch Toshiba Satellite Pro T110-EZ1110, the 11.6-inch HP Pavilion dm1z, the 11.6-inch Toshiba Satellite T215D-S1160, the 11.6-inch Toshiba Satellite T215D-S1140, and the 11.6-inch Dell Inspiron M101z.

There were a number of categories, though, where certain models clearly stood out from their peers. In the next few pages, we've compiled the top contenders for battery life and weight; processor speed and memory; peripheral support; and connectivity. (Note: All laptops are consumer models released in 2010 and prices are the suggested retail price. These lists are based on manufacturers' specifications; *CT* has not done any product testing to verify manufacturers' claims.)

For complete listing of all the $499.99 and under laptops included in our survey, check out *campustechnology.com/laptoproundup*. ▸

Photos courtesy of Dell, Compaq, Toshiba, HP, eMachines

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Portability and Battery Life

The true portability of a laptop is contingent on both its weight and the battery's ability to hold a charge. These six models aren't just the lightest—their specifications indicate a battery life of five hours or more, perfect for those times when you want to log on without plugging in.

MODEL	WEIGHT	BATTERY	PRICE
14" Dell Inspiron 14	4.96 lbs	9-cell lithium-ion battery—up to 8 hrs 10 mins	$499.99
11.6" Toshiba Satellite Pro T110-EZ1110 	3.49 lbs	6-cell lithium-ion battery—up to 8 hrs	$479
11.6" Dell Inspiron M101z	3.44 lbs	6-cell lithium-ion battery—up to 6.5 hrs	$429.99
11.6" Toshiba Satellite T215D-S1150	3.3 lbs	6-cell lithium-ion battery—up to 5 hrs	$499
11.6" Toshiba Satellite T215D-S1140	3.3 lbs	6-cell lithium-ion battery—up to 5 hrs	$469.99
11.6" Toshiba Satellite T215D-S1160	3.3 lbs	6-cell lithium-ion battery—up to 5 hrs	$469.99

Peripheral Support

A laptop's value increases exponentially based on its ability to interact with peripherals, including: connecting to external hard drives, MP3 players and other USB 2.0 peripherals; reading a variety of memory cards; and outputting digital video and audio to an external display. The five models below feature an HDMI port; a memory card reader that's compatible with up to seven different memory card formats; up to three standard USB 2.0 ports; and an eSATA/USB 2.0 combo port. Four of these models also feature a USB 2.0 port that allows you to charge a USB-powered device while the computer is asleep.

MODEL	PORTS	CARD READER	PRICE
17.3" Dell Inspiron 17R	3 USB 2.0 ports 1 eSATA/USB 2.0 combo port HDMI	7-in-1 Media Card Reader (Secure Digital/SD High-Density/SD High-Capacity/MultiMediaCard/xD Picture Card/Memory Stick/Memory Stick PRO)	$499.99
11.6" Dell Inspiron M101z 	2 USB 2.0 ports 1 eSATA/USB 2.0 combo port with sleep & charge HDMI/VGA	7-in-1 Media Card Reader (Secure Digital/SD High-Density/SD High-Capacity/MultiMediaCard/xD Picture Card/Memory Stick/Memory Stick PRO)	$429.99
11.6" Toshiba Satellite T215D-S1150	2 USB 2.0 ports 1 eSATA/USB 2.0 combo port with sleep & charge HDMI/VGA	5-in-1 Shared Memory Card Reader (Secure Digital/Secure Digital High Capacity/Memory Stick/Memory Stick PRO/MultiMediaCard) (adapter may be required)	$499
11.6" Toshiba Satellite T215D-S1160 	2 USB 2.0 ports 1 eSATA/USB 2.0 combo port with sleep & charge; HDMI	5-in-1 Shared Memory Card Reader (Secure Digital/Secure Digital High Capacity/Memory Stick/Memory Stick PRO/MultiMediaCard) (adapter may be required)	$469.99
11.6" Toshiba Satellite T215D-S1140	2 USB 2.0 ports 1 eSATA/USB 2.0 combo port with sleep & charge HDMI	5-in-1 Shared Memory Card Reader (Secure Digital/Secure Digital High Capacity/Memory Stick/Memory Stick PRO/MultiMediaCard) (adapter may be required)	$469.99

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NEC

Processor and Memory

For top-of-the-line speed and performance, each of these models offers a 2.3 GHz processor and up to 4 GB of RAM for under $500.

MODEL	PROCESSOR	MEMORY	PRICE
15.6" Toshiba Satellite C655D-S5079	2.3 GHz AMD V Series V140 (2.30 GHz/ 1,066 MHz/512 K cache)	4 GB DDR3	$489.99
15.6" Toshiba Satellite C655D-S5087	2.3 GHz AMD V Series V140 (2.30 GHz/ 1,066 MHz/512 K cache)	3 GB DDR3	$474.99
15.6" Compaq Presario CQ62Z 	2.3 GHz AMD V Series V140 (2.30 GHz/ 1,066 MHz/512 K cache)	2 GB DDR3	$379.99
15.6" Toshiba Satellite C655D-S50851	2.3 GHz AMD V Series V140 (2.30 GHz/ 1,066 MHz/512 K cache)	2 GB DDR3	$459.99
15.6" Toshiba Satellite C655D-S5086 	2.3 GHz AMD V Series V140 (2.30 GHz/ 1,066 MHz/512 K cache)	2 GB DDR3	$469.99
15.6" Toshiba Satellite C655D-S5085	2.3 GHz AMD V Series V140 (2.30 GHz/ 1,066 MHz/512 K cache)	2 GB DDR3	$459.99
15.6" Toshiba Satellite C655D-S5080	2.3 GHz AMD V Series V140 (2.30 GHz/ 1,066 MHz/512 K cache)	2 GB DDR3	$426.99
 15.6" eMachines eME442-V133	2.3 GHz AMD V Series V140 (2.30 GHz/ 1,066 MHz/512 K cache)	2 GB DDR3	$379.99
14" Dell Inspiron 14	2.3 GHz DC Intel Pentium Dual Core T4500 (2.3 GHz/800 MHz FSB/2 MB cache)	2 GB DDR2	$499.99
15.6" Dell Inspiron 15 Standard	2.3 GHz DC Intel Pentium Dual Core T4500 (2.3 GHz/800 MHz FSB/2 MB cache)	2 GB DDR2	$449.99

Ready for Collaboration

Featuring an integrated webcam and an integrated digital microphone, these 11 laptops are optimized for Skype, video chats, and virtual meetings. WiFi comes standard on each, so you can conduct your video chats over your coffee shop's wireless network—and at under $500, you'll have some money left over for a latte.

MODEL	PRICE	MODEL	PRICE
11.6" Toshiba Satellite Pro T110-EZ1110	$479	15.6" Toshiba Satellite C655D-S5080	$426.99
11.6" Toshiba Satellite T215D-S1150	$499	15.6" Toshiba Satellite C655D-S5086	$469.99
 11.6" Toshiba Satellite T215D-S1160	$469.99	11.6" Dell Inspiron M101z	$429.99
11.6" Toshiba Satellite T215D-S1140	$469.99	15.6" Toshiba Satellite C655-S5090	$479.99
15.6" Toshiba Satellite L655D-S5055	$489.99	11.6" HP Pavilion dm1z 	$449.99
15.6" Toshiba Satellite C655D-S5046	$459.99		

Jennifer Demski *is a freelance writer based in Brooklyn, NY.*

1105 MEDIA

JANUARY 2011

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Ingersoll Rand
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A.

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COMMENTARY

DELVING DEEPER

By Ralph C. Jensen

WE'RE TAKING A LITTLE BIT OF A DIFFERENT TACT THIS YEAR WHEN IT COMES TO SCHOOL OR CAMPUS SECURITY: IN 2011, WE'RE LOOKING AT EDUCATION SECURITY AS THE THEME OF EACH OF OUR SUPPLEMENTS. THESE SUPPLEMENTS WILL APPEAR IN THIS ISSUE, THEN AGAIN IN JULY AND NOVEMBER.

Our goal is to delve a little deeper into themes that affect all students, whether K-12 or in the campus setting. We want to expose all our readers, and those from our sister publications, to this information so they can fully grasp security as a vital part of the curriculum.

In our cover story, Bill Taylor of Panasonic writes about a teaching tool that actually found a security application. He informed me about it during our annual visit at ASIS. It is a tool that thankfully made its way into video surveillance.

Imagine, if you will, sitting in your eighth-grade science class, and some kind of disruption breaks out. Back in the day, that probably meant someone in the back row was chewing gum or a couple of kids were not-so-quietly talking over the teacher. Today, disruption could mean a fist fight or someone with a gun. Commotion hits a fever pitch.

Taylor's article points out that most schools today have an IT backbone in place; classrooms are integrated with networked audio and visual systems. Security plays a key role in that the classroom instructor is wearing a pendant microphone that cues up the day's lesson, with a network document camera focusing on the instructional material. When mayhem breaks out, the instructor is neither the referee nor the judge. The teacher touches a button on the pendant, which instantly alerts school security or anyone else chosen to receive the alert. The network document camera moves away from the lesson plans and focuses on the activity in the classroom.

The camera, which enhances the learning experience by displaying documents, maps and whatever else the instructor needs, would be used as video surveillance only in case of an emergency. In this case, a crisis plan would clearly outline the role of teachers and administrations as well as that of law enforcement.

I know what you're thinking: This would never happen in my school. But it does happen, without regard to school or location. In 2006, Charles Carl Roberts entered a one-room Amish schoolhouse in rural Pennsylvania, took five hostages, and killed five girls and himself.

Tragedy can happen anytime, anywhere.

We have, posted online, several case studies that fit in well in the *Education Security* venue.

Crisis can come in the form of a lightning bolt. Just ask officials at Florida State University, which faces more lightning strikes than any other university in the nation.

In order to go head-to-head with Mother Nature, FSU initiated the Blue Light Trail, which is actually 400 strategically placed blue light towers with emergency phones and blue lights from Talk-A-Phone. Passersby get a sense of security as more towers are erected when safety needs on the campus grow. Having a reliable emergency communications link is significant from both a legal and public relations perspective. Tallahassee is in the dead center of a thunderstorm region, and university officials want to provide safety for faculty, students and visitors, so that's why they developed an emergency phone program.

Managing or tracking students is another vital role of schools. Beverly Vigue of Ingersoll Rand Security Technologies writes that ID cards are one tool for tracking students, and the cards can be used for everything from buying lunch to checking out books at the library.

Students and staff are required to wear badges, which makes people without badges more recognizable. Vigue also mentions that a visitor management center at each school should be clearly marked, and that older doors and locks should be retrofitted with newer door hardware and locking systems.

What makes the IT backbone work in the education security requirement is software. James Whitcomb of Video Insight tells of a curriculum in Houston in which the director of facilities and the director of finance have access to live and recorded video using the school network. The focus of interest is camera placement at the entrances of the school, as well as in classroom and administrative buildings. The software keeps cameras in line and access control points in focus.

As schools grow, or are renovated, security plays a key role. Plano Independent School District in Texas is still growing. I live across the street from PISD, and its newest high school is springing up near my backyard.

Matt Barrett of JVC points out that his company has gotten the lion's share of security installation money, and at Plano's McMillan High School, the district is deploying up to 150 cameras monitoring the interior and exterior of common areas on its campus.

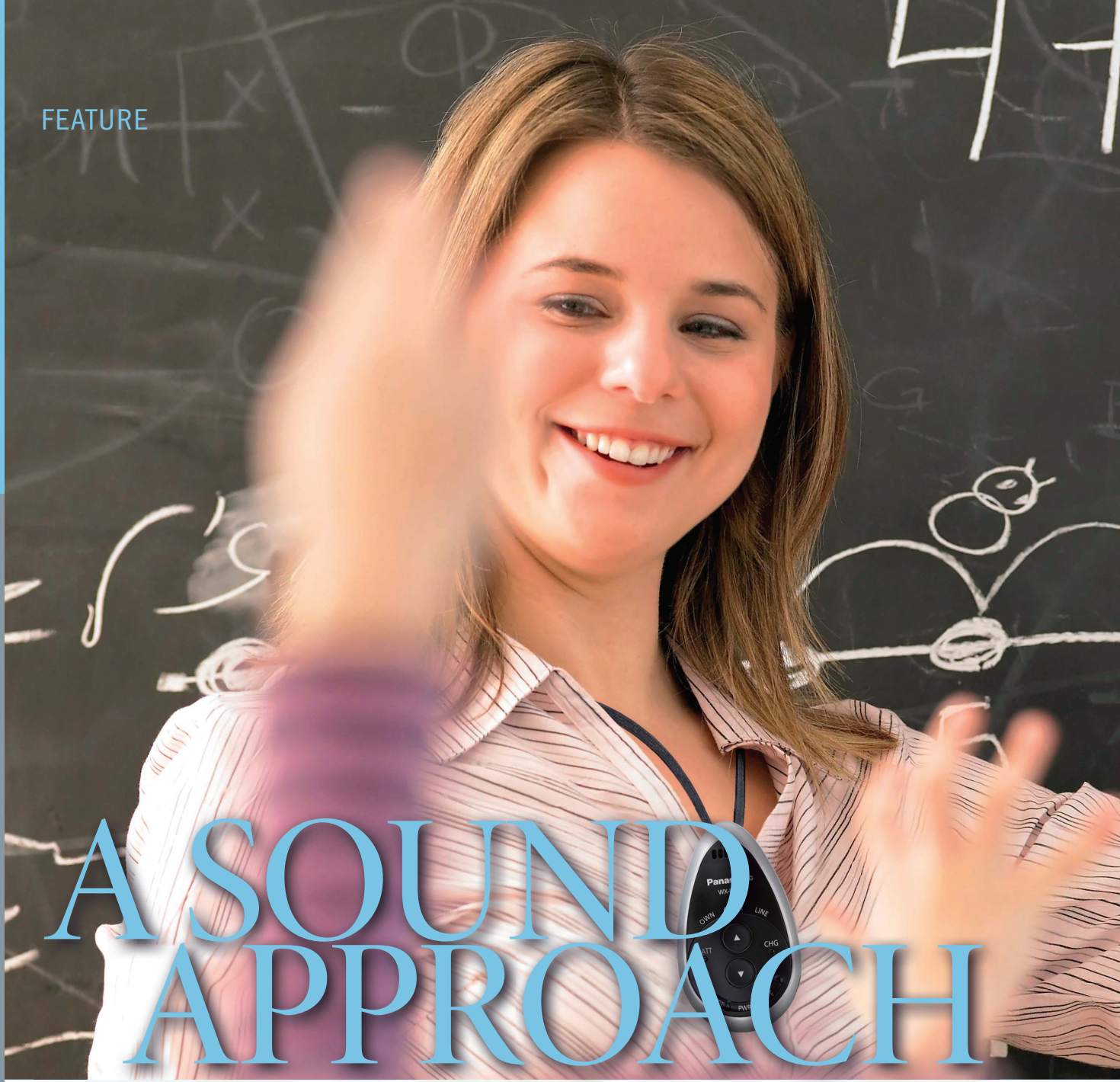
Plano residents are so convinced that campus security is important that they have passed a public bond initiative in favor of funding for security. Security is an important selling point for parents and PISD.

Across our northern border, Vancouver Community College also recognized the value proposition of security by creating a safe environment. Alexander Fernandes of Avigilon said the college underwent an extensive third-party risk assessment, realizing that its analog-based system would have to go by the way.

VCC went digital, using the Avigilon HD surveillance system, which enables the college to capture more useable evidence, should the need arise. The primary concern was to protect vulnerable college students and enhance the learning experience by increasing safety.

Ralph C. Jensen *is the editor-in-chief of* Security Products *magazine.*

FEATURE



A SOUND APPROACH

Systems that boost classroom learning now also provide security benefits

By Bill Taylor

KEEPING STUDENTS AND TEACHERS SAFE IN THE CLASSROOM IS A TOP PRIORITY AND A BASELINE REQUIREMENT FOR EFFECTIVE EDUCATION. IN RECENT YEARS, SOME HIGH-PROFILE SCHOOL TRAGEDIES HAVE REMINDED TEACHERS, ADMINISTRATORS, PARENTS, LAW ENFORCEMENT AND THE PUBLIC OF THE POSSIBLE SCALE AND TRAGIC IMPACT OF SCHOOL VIOLENCE.

When Charles Carl Roberts walked into a one-room Amish schoolhouse in Pennsylvania in 2006, took five hostages and eventually killed five girls and himself, we were reminded that tragedy could happen at any school and in any classroom.

Such high-profile incidents of school violence can overshadow the potential for less dramatic, but still troubling, incidents that can happen every day at schools across the country. Classrooms can be disrupted by fights or other disciplinary problems, by an irate or intoxicated student, by an unexpected visitor or even by an illness or medical emergency.

When it comes to responding in an emergency situation, technology can be a helpful tool. For example, school video surveillance systems can provide important information in the midst of a crisis. Use of communication equipment keeps everyone in touch and promotes a timely and effective response.

In fact, technology is transforming schools on a variety of fronts. Today, most schools have an IT backbone in place, and many classrooms are integrated with networked audio and visual systems. The connectivity and functionality of these systems also provides an opportunity for them to play a role in security and emergency response

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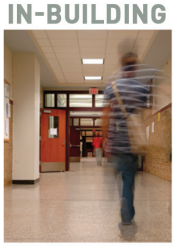

in addition to their everyday function of enriching the learning experience. It is an opportunity that top technology providers are finding innovative ways to leverage.

CLASSROOM AUDIO SYSTEMS

One area in which technology has made great gains in improving the education experience is with classroom audio systems. These infrared technology-based systems can help teachers and students communicate better and achieve better results on both sides of the desk. The teacher wears a wireless pendant microphone that sends a signal to infrared receivers, which connect to speakers and amplify the sound of a teacher's voice. Full control of power, mute and volume can be located on the microphone, enabling the teacher to have both hands free, as the microphone hangs on his or her neck. A separate, wireless hand-held microphone that also uses infrared signals can be passed around the room to help students participate in class.

Day-to-day advantages of a classroom audio system include the ability for students to hear the teacher's voice clearly in every part of the classroom, above ambient sounds such as heaters and air conditioners, noise in the hallway, or other audible interference resulting from insufficient insulation. Studies show that sound systems boost teachers' classroom management skills and reduce stress. Students gain confidence and participate more because their answers can be heard more easily by the teacher and fellow students. The result is higher academic performance.

Audio systems are just one electronic component of today's classrooms, which differ from yesterday's schoolrooms dominated by chalk-and-eraser systems and teachers who sometimes had to shout to be heard. An integrated audio and visual system is part of the new networked, technology-driven classroom environment. In addition to sound systems, teachers can now plug in a variety of multimedia devices, such as iPods, laptop computers and LCD projectors. Intelligent solutions today allow for integration of videos, computers, projectors, whiteboards and hand-held tablets along with a wireless audio system.

Another component of the integrated classroom is the document camera, which captures images of books, maps or other teaching materials and projects on a screen in the classroom. A network document camera, similar to the video cameras used for surveillance, provides exceptional images in virtually any lighting condition.

The ability of such systems to improve student learning is well known. There are additional benefits of integrated classroom systems that can be used in case of an emergency situation or an outbreak of violence.

SECURITY AND THE TEACHING ENVIRONMENT

While protecting students should always be foremost for K-12 schools, ideally the elements of that protection should not interfere with the teaching environment. It is possible to protect any school from almost any possible threat, but what would be the consequences of doing so for the school environment? As we need our schools to feel like schools—and not like prisons—the best security systems are those that do not interfere with the school experience for students and teachers.

In fact, elements of security should ideally be incorporated into the day-to-day function of the school and become a part of the school environment. It's true that video cameras are invaluable in helping administrators and teachers monitor what is happening in the hallways, stairwells and even remote parts of the campus. But many, if not most, schools would not accept the placement of a video camera inside the classroom. Not only would it change the classroom dynamic and potentially intimidate the teacher, it could cause district-level problems if parents object to having their children recorded on video. These possible negative effects certainly overshadow the benefit of having the camera in an emergency situation once or twice a year.

But what if we could use the same technology that enhances learning in the day-to-day classroom environment to aid response in an emergency situation? The network connectivity, communication ability and even video imaging capability are all already there in today's high-tech classroom. With outside-the-box thinking, we have found a way to leverage that technology in case of an emergency—instantly and powerfully—to call for help and to provide sound and video to boost the emergency response. Let's look at an example of how this is being done.

FROM CLASSROOM SYSTEM TO SECURITY SYSTEM

Panasonic System Networks Co. of America developed the A+ classroom audio systems for use in K-12 classroom settings. These infrared systems include wireless microphones and amplifiers and receivers that provide all the learning benefits of enhanced audio in the classroom. This year, we took a broader look at the needs of the classroom and added the SAFE system as an option on the A+ product. This option transforms the classroom audio system to a security solution with a panic button that allows the teacher to initiate a first response immediately in the case of an incident.

The panic button is located on the pendant microphone, so the teacher can easily and discreetly push the button whenever any emergency happens, whether an intruder comes into the room or a child has a medical emergency. In addition to alerting administration of the emergency via the network, pressing the button opens an immediate audio line of communication between the classroom and the outside world, thus leveraging the classroom sound system to capture clear audio of any unfolding emergency.

The system also can document and record the classroom activity using surveillance video from a document camera. Pressing the panic button can send a signal to the document camera already being used in the classroom, which will automatically reposition the camera to focus not on a book or map but on the classroom as a whole. In effect, the document camera instantly becomes a video surveillance camera, incorporating it into the school's surveillance system and making it available anywhere on the network to provide instant visual information about the unfolding event.

Such a system can instantly provide "eyes and ears" into the classroom for anyone in emergency response. Network connectivity makes the information available to administrators as well as police and emergency response as needed. In addition, audio and video information is recorded and can be used as evidence if needed at a later date.

WHEN TRAGEDY STRIKES

Statistics suggest that the possibility of an extreme, violent incident happening in a classroom is very low, but obviously a single death or injury resulting from a violent episode is one too many. Violent out-

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breaks are totally random, and unfortunately, they are almost certain to continue. Day-to-day emergencies are also a reality. Schools and classrooms must therefore be prepared for any emergency and have systems and processes in place to respond.

Every school and classroom needs a thoughtful crisis plan that is updated annually and includes training for school staff. The plan needs to be specific and to outline the roles of teachers, administrators and law enforcement in case of an emergency. Who's in charge in various emergency situations? Who calls whom? How are students relocated or sheltered-in-place? Where do I go, and what do I do?

A key element in responding to any emergency is the need for information. A system that provides video and audio as an emergency unfolds can help to guide every aspect of emergency response. Video and audio help administrators to cater their response specifically to the needs of the emergency, avoid overreacting, and rethink and redeploy resources as appropriate, even as an ongoing situation changes. What is the right approach, and what if it fails? It helps to have additional eyes and ears watching and hearing what is going on, ready to escalate the response if the situation changes.

COST CONSIDERATIONS IN SCHOOLS

A benefit of leveraging classroom technology to aid emergency response is the extreme cost-efficiency of using solution elements already in place and serving important educational functions. The panic button is a feature on the wireless teacher microphone, and the video surveillance camera is a document camera; all the other elements of functionality are additional benefits of existing networking capabilities. Developing a solution like this is a result of thinking more broadly about what a system can do, rather than restricting its use to what it was initially created to do.

It also is an approach that highlights the benefits of incorporating security into every aspect of school operation. School security professionals should be looking at ways the new networked infrastructure can help to keep students and teachers safe, in addition to investing in security-specific technologies that also have proven value.

Tight education budgets are a given, and K-12 schools understandably seek to maximize the portion of those budgets that goes toward improving student achievement and teacher satisfaction. Technologies such as classroom audio systems can improve both of these, and now they can even help make students safer, too. Particularly for schools with limited budgets, the ability to boost education and security with a single expenditure is an attractive opportunity. Technological advances have made these products affordable, and they integrate easily with other classroom systems, which also can save costs.

One of the key criteria for buying anything in any economy is whether it adds value, and classroom audio systems can improve the learning environment for students and make teachers' jobs easier. This can make them highly cost-effective, even when times are tough. The added elements of security and emergency response boost the value even higher.

THE POWER OF INTEGRATION

Integration is a buzzword in the security market, but it also reflects a new level of functionality and benefit for customers. Too often in the security market, we think of security systems as integrated but don't consider fully the benefits of integrating security systems with other systems. Networking drives all kinds of systems for various uses among today's customers—the same networking technologies that make IP-based security systems possible.

It is time for the security industry to look at the broader impact of integrating security and other systems. It's a mindset that enables leveraging of other technologies, such as classroom audio systems, for security functions. It also enables leveraging security systems for non-security functions such as process control and traffic management. Only by taking a broad view can users maximize the benefits of modern technology.

Using classroom audio systems to help boost security is just one example. There are others, emerging now and yet to come, that provide both an opportunity for the security industry and new benefits and functions that make our industry's systems more valuable than ever.

Bill Taylor *is the president of Panasonic System Networks Co. of America.*

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FEATURE

A HANDS-ON LESSON

By Beverly Vigue

SECURING EDUCATIONAL FACILITIES IS A COMPLICATED SUBJECT WITH MUCH DEPENDING ON THE INDIVIDUAL INSTITUTION, NOT TO MENTION THE DIFFERENCES BETWEEN SECURING K-12 SCHOOLS AND HIGHER EDUCATION CAMPUSES.

In K-12 schools, administrators must be able to track students from pickup to drop-off, effectively control visitors at the school and be prepared to lock down the school in a time of emergency. The overriding issue on higher education campuses, on the other hand, is the ability to lock down quickly.

K-12 — WHERE IS JOHNNY RIGHT NOW?

Whether tracking students with simple roll calls, requiring that students show identification cards to gain access to designated vehicles, or using GPS tracking of buses, student tracking is now possible for all school districts, even when children are no longer at the school. More schools are taking advantage of these systems, even with children who aren't bused.

Additionally, schools using ID cards can use them for other applications, from buying lunch to checking out books at the school library.

Today, nearly all schools require visitors to sign or check in when entering the school building. Some states, including Florida and California, require criminal background checks for anyone working in or regularly visiting a school. Communicating a visitor policy to all parents and guardians helps ensure that everyone supports and complies with the access plan.

Most schools use some form of badge to identify visitors to the building. The badges, when displayed properly, help staff, faculty and students easily identify whether someone they do not recognize is authorized to be in the school. Visitor badge programs also make people without badges more noticeable.

Schools should designate a single entrance/exit door in the facility. The main entrance should be clearly marked by signs with directions to a visitor management center. Older doors and locks can be retrofitted with newer door hardware and locking systems. Electronic release of door locking mechanisms coupled with video and intercom systems enable interior monitors to screen visitors before allowing them into the school.

Digital video camera systems offer state-of-the-art resolution, tracking and Internet access to internal space monitoring and control. School safety surveys show that most K-12 school districts use security cameras to monitor parts of their facilities or campuses. The most common uses for security cameras are at entrances, exits, gathering areas and parking lots.

School districts should enable their local agencies — police, fire or emergency responders — to view security camera footage in real time.

CRITICAL ELEMENTS OF A K-12 EMERGENCY LOCKDOWN PLAN

Terrorist attacks and hostile intruder situations have emerged as serious threats to school safety. These threats may require an emergency lockdown or shelter-in-place procedures, which are the opposite of a facility evacuation.

National standards for school lockdown procedures are beginning to emerge. However, the responsibility of developing a lockdown policy continues to lie with individual facility administrators. By design, an emergency lockdown procedure ensures that all internal and external doors and windows are locked or secured. Building occupants remain inside their secured rooms, awaiting an "all clear" from emergency personnel.

The most effective lockdown procedures include regular training for not only students but also faculty and staff, who are often the initial responders to an emergency but are seldom properly trained to respond. Training may include lockdown drills conducted annually, school maps distributed to responders and inventories of classroom emergency equipment.

Effective emergency management plans rely on communication methods that will distribute emergency instructions quickly and widely during a crisis. Public address systems, messaging via networked computers, electronic signage and other devices can alert everyone to a dangerous condition and the need for an emergency lockdown. Notification systems should alert all areas of the building, campus or district, including remote buildings and outside areas.

There are a host of everyday actions school can take immediately to get procedures and systems where they need to be. Some actions include equipping classroom and common-area doors with locking devices that allow the doors to be secured from inside the room, installing a reliable security and emergency warning system, establishing district-wide communication capabilities and creating a central monitoring station to receive lockdown signals and to notify authorities.

For a relatively low-cost security enhancement, doors with mechanical locks can be enhanced by upgrading the locks to a patented or patented restricted keyway in which keys cannot be duplicated without authorization.

Electronic locks or card readers take security to a higher level by requiring a unique credential for access. Electronic security makes it easy to manage adding and deleting users and allows administrators to know who went where and when.

New construction or remodeling lets schools hardwire electronic locking to the computer network for centralized management. When managed from a central location, lockdowns are fast and effective.

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As an alternative to hardwired locks, a wireless electronic locking system provides flexibility and simplicity of installation with the same enhanced security of a hardwired system. They connect easily to the school's network for fast, effective lockdown. Wireless access control system installation is fast and easy with minimal disruption and can easily be integrated with other electronic hardware for an integrated life safety and security door solution.

COLLEGES BRING ON A WHOLE NEW SET OF LOCKDOWN CHALLENGES

Open campus environments pose significant challenges, particularly during emergency conditions that call for a lockdown of some or all buildings. With traditional security controls and procedures, campus officials may struggle to lock down buildings quickly. Mass notification systems may rely on landline phone systems to call each department with instructions to lock facility access doors manually, one building at a time. After resolution of a security issue, the reverse process may prove equally inefficient when manual procedures are used to return facilities to their normal state.

Interestingly, those campuses receiving Title I funding must have such procedures in place. It is one reason why there is such a scramble going on with the country's community colleges, which lag behind their four-year cousins in implementing such solutions.

With recent advances in electronic security management systems, many campuses have systematically upgraded traditional locks on building perimeters with access control devices connected to a centralized system. These systems allow authorized individuals to quickly lock down a building, a series of buildings or even an entire campus. With advanced programming, access control systems can respond to different threat levels to automatically lock down buildings and turn control over to a predetermined system procedure.

Locking devices also can be programmed to automatically secure all or part of the campus at different times. The system can keep doors unlocked, allowing free access, or maintain a locked system that requires proper ID cards for entry. Keyless systems that use electronic locks and proximity or smart cards also can effectively control access.

Wireless access control is quite prevalent on college campuses but it brings with it a lockdown caveat. As University of Virginia's Gary Conley, points out, "Usually, with WiFi, access control decisions are downloaded by the host into the lock five-to-six times per day, versus five-to-six times per hour with 900 MHz solutions, a 10-minute heartbeat. Access control decisions may also be managed within the locks (as is the case with offline locks) to minimize communication from the lock to the host and conserve batteries. However, such limited connectivity with the host limits the locks' ability to receive urgent commands from the host. For instance, even with a 900 MHz platform, a direction to immediately lock down could be ignored for 10-plus minutes.

"(A new) 'wake up on radio' feature works in parallel with the 10-minute heartbeat. Without waking up the entire lock, it listens for complementary commands every 1 to 10 seconds and responds. Thus, 10 seconds is the longest it will take to initiate lockdown."

Emergency notification and broadcast alert systems provide an effective way to notify people of the need to lock down facilities. These systems include sending text messages to students' cell phones, linking campus buildings to a public address system and broadcasting messages to a variety of communication channels. Mass notification systems should fit the local situation and type of campus organization. When possible, redundant systems provide the best solution.

Beverly Vigue *is vice president for education markets for Ingersoll Rand Security Technologies.*

Case Study: Mater Academy High School

GETTING A'S IN ACADEMICS AND ACCESS CONTROL

Mater Academy Charter High School, a Miami-Dade Public Charter School located in Hialeah Gardens, Fla., has been recognized as one of our nation's top 400 high schools out of 21,000 that were rated. The school's 2,800 students, grades 6-12, are predominately Hispanic and many of them will be first-generation college attendees. Mater Academy holds its students to a very high standard, and it is consistently graduating students with AA Degrees right out of high school.

Mater Academy's vision is "to provide an innovative, challenging curriculum in a safe learning environment that promotes a philosophy of respect and high expectations for all students, parents, faculty, and staff."

Challenge: Controlling Access to Classrooms, Offices, and Sensitive Areas

Jorge Macho, Mater Academy's IT security manager, says, "We began experiencing many of the security problems other schools are having. We needed an access control system that would allow us to control who and when someone accesses our classrooms, offices, and other sensitive areas." With the mechanical key system the school had in place, each time someone lost a key, administrators had to re-key the classroom doors. The work was expensive and had to be contracted out to local locksmiths. Also, keys were being duplicated at local hardware stores.

Solution: CyberLock

"After researching many options, we chose CyberLock because of its affordability and the security features it offered," says Macho. "The transition to CyberLock went smoothly because the system required little effort to install," he adds. There are at least 200 CyberLocks installed throughout the school. All they had to do was replace the cores in their existing door locks with CyberLock electronic cylinders.

Mater Academy has issued 150 electronic keys to its staff and teachers. Each key contains that individual's access permissions. Teachers' keys are programmed to be active only during school hours. Each janitor's key contains the access privileges they need to do their job. "CyberLock has minimized the security risks from frequent turnover in this department. The system's audit reporting of lock openings and key activity helps our administrators when security issues arise. The expenses associated with re-keying have been completely eliminated."

Just as Mater Academy has set high academic expectations for its students, teachers, and staff, it is just as committed to making its school a safe place to be. Macho states, "We take security very seriously. Our objective is to provide a safe learning environment for our students, teachers, and staff."

Videx CyberLock Solutions *is an engineering design company that manufactures CyberLock access control products for academic institutions. They can be reached at 541-738-5500, and* sales@videx.com. *For more information go to:* www.videx.com.

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VIRGINIA TECH'S Anne Moore: "We are now opening up a new conversation about how everyone can use information differently."

Jim Stroup/Virginia Tech

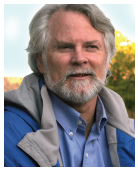
READING THE IT LEAVES

Four predictions for higher education technology in 2011.

By Mary Grush

NO START TO THE NEW YEAR is complete without media prognostications for the 12 months ahead. Leaving the social, political, and economic fad predictions to others, *CT* asked four members of its editorial and conference advisory boards to identify information technology trends in higher education that are beginning to take real hold in 2011—the impact of which will be felt well into the decade ahead. Here's what they shared.

PREDICTION NO. 1:
Learning Analytics & Learner-Generated Content Will Accelerate



Phil Long, director, Centre for Educational Innovation and Technology, **University of Queensland** (Australia), and visiting researcher, Center for Educational Computing Initiatives, **MIT** (MA)

As Phil Long sees it, 2011 will witness the acceleration of two concurrent trends: an uptick in the use of learning analytics, and broader acceptance of learner-generated content.

Early on, learning analytics—the digital footprints students leave as they interact online with various learning materials—were considered to be "a potential source for predictive indicators of student progress (or stagnation) and custom-tailored interventions," says Long.

For-profit institutions have recognized the potential of learning analytics for years as a means to automate the tracking of student performance, he notes, but "learning institutions and corporations have made little use of the data learners 'throw off' in the process of accessing learning materials, interacting with educators and peers, and creating new content."

Only now, he believes, has higher education finally reached a point where learning analytics will take a more prominent place in teaching and learning practice. "In an age when educational institutions are under growing pressure to reduce costs and increase efficiency, analytics promises to be an important lens through which to view and plan for change at course and institutional levels," says Long. "We need to better understand how these traces of learning might help illuminate patterns and perhaps suggest interventions to make the journey more valuable."

Professional interest in learning analytics is certainly growing. The first international conference convened specifically to discuss learning analytics and knowledge, LAK11, will take place early this year: Feb. 27-March 1 in Banff, Alberta, Canada (*tekri.athabascau.ca/analytics*).

Learner-generated content, while nothing new in higher education, is beginning to be more fully accepted in teaching and learning practice. "What's worth watching in 2011," Long says, "is the developing set of tools that allow students who are learning skills that involve physical activities (from dance to surgical techniques) not only to record these learning experiences, but also easily share them to enable social pedagogy—including annotation, response videos, and so forth. This has two effects: It makes otherwise ephemeral learning visible; and it leverages the power of collective inquiry to deepen understanding."

Another benefit derives from how learner-generated content relates back to learning analytics. "More objective standards, or at least records of variation, now can be maintained and archived for comparative measure," he says. "This is a particular and powerful example of the trend toward making learning visible."

In trying to gauge the impact that learner-generated content will have on higher education, Long looks directly at the role of e-portfolios. "Portfolios were hijacked early on in the name of institutional objectives for collecting or at least tracking criteria around various needs for certification," he notes. "After all, the value proposition of the university is increasingly anchored around certification. But as students become more mobile and engage in learning activities in a more diverse ecology of options, the notion that the evidence of that learning will be exclusively kept as a text record in a particular learning institution is of diminishing value."

Long points to a worldwide resurgence of interest in capturing, managing, sharing, and reusing the artifacts of learning: "The sharing of learner-generated content is already happening surreptitiously, via the proliferation of cloud services," he says. "But the real story here is the movement from institutionally locked-up artifacts of learners to places and systems that are learner-centric."

PREDICTION NO. 2:
Knowledge Application Will Supplant Information Access

Anne Moore, associate vice president for learning technologies and director of information technology initiatives, **Virginia Tech**

"Everyone says that this is the age of amateur experts because we all have access to such great amounts of information, but that's a superficial view—the emphasis on how we acquire and use information is what's changing." *—Anne Moore, Virginia Tech*

Anne Moore espouses a belief that would have been considered heretical just a few years ago: Information access is not the Holy Grail. The burning issue, she says, is what you do with all that information.

"As IT leaders and educators, we have just moved beyond talking about information access," she explains, "and we are now opening up a new conversation about how everyone can use information differently than they have in the past, and use it well. We are finally moving beyond information access."

While access to data is vital, the real key is developing technology tools and a conceptual framework to create new ways of solving problems.

Moore notes that business, government, and education all face complex challenges that require new approaches to how institutions apply knowledge and information resources. And while no institution can expect to develop and master these new approaches in a single year, 2011 is defi-

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nitely the time to begin. Indeed, Moore expects to see widespread progress this year in understanding the nature of information and ways to use it more effectively for solving problems.

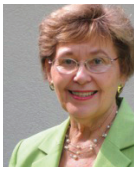
Industry experts have long advocated mining the huge amounts of data that are collected on a regular basis. "But once you do that, how do you approach using the information in beneficial ways?" asks Moore. "Does high-performance computing [HPC], for example, have the potential to allow academic users to think about data and problems differently, and could this open up the possibilities for 'computational thinking across the curriculum?'"

The world that Moore foresees for higher education is light-years away from simple "information access" for students, faculty, and researchers. What that world looks like exactly remains to be seen, but one thing is clear: It will involve a whole new way of putting information technology to work.

As she points out, any number of technologies could factor into this new dynamic: How will computers—even if they are not HPC systems—allow the examination of data in ways that can free users to concentrate on other things? Similarly, could virtualization be leveraged to move organizations beyond just accessing information? And what role could collaboration, social networking, and visualization technologies play?

At the heart of these changes, says Moore, is recognition of the work of amateur experts. "Everyone says that this is the age of amateur experts because we all have access to such great amounts of information," she explains, "but that's a superficial view. Access is about 'giving' people information, and remember, the emphasis on how we acquire and use information is what's changing. The new process for amateur experts will include people not just receiving information, but 'doing the process' forward. It's going to make our technology look different. It's going to make our institutions look different. This is a radical change and we will see it taking hold in 2011."

PREDICTION NO. 3:
Digital Textbooks Will Make Their Move



Judith Boettcher, consultant, Designing for Learning

Why have digital textbooks failed to become bestsellers in higher ed? According to Judith Boettcher, the technology just hasn't been there. With the release of the iPad, though, she believes that picture is about to change—and quickly.

"I think we'll see big changes this year in textbooks and course content—driven by the learners themselves as they embrace the new tools: iPads, smartphones, e-readers, and the 'slate tablet' phenomenon," she explains. In the future, students will expect everything they need for a course to be available digitally, and they will want more options for how they interact with course content. "This trend will ultimately change how students access, use, and choose content," adds Boettcher.

Although it's helped tip the balance, the iPad is only one of several device choices now available to students, including the Entourage Edge and the HP Slate—and the list will blossom with newcomers this year. And, alongside iPad-like tools, the slate tablet category is complemented by a wave of e-readers on the market. "I think we are going to see students move fairly quickly to these devices," predicts Boettcher. "Now that the tools are in place, students will drive this trend, and faculty will adapt their courses to accommodate it."

And what of the textbook publishers? They'll come along, too, says Boettcher, who believes publishers will move quickly in 2011 to make their content digital.

She dismisses those skeptics who feel that the digital textbook wave will founder over pricing concerns. "If you can [afford to] buy your textbooks for one semester, you can probably buy an iPad, though the digital textbooks are still somewhat pricey," she notes. "But in terms of cost benefit and value, I think students are now going to start picking up on these devices."

If digital textbooks are priced properly, Boettcher believes, students may actually buy and read more of the assigned textbooks for their courses. "Very soon, hard-copy textbooks will become secondary; digital textbooks will become the course content vehicle of choice," she says.

Looking to 2011 and beyond, Boettcher issues a heads-up to libraries, which will be particularly affected by the move to digital course materials. Required and highly recommended resource materials will need to be available in digital format, and catalogs and databases will need to be easily accessible from everywhere.

"There is no doubt that data management issues have reached an absolutely critical point for research. We are all coping with the demands on information technology related to data-intensive computing.

—Joel Smith, Carnegie Mellon University

PREDICTION NO. 4:
Data-Intensive Computing Will Challenge IT

Joel Smith, vice provost/CIO and director, Office of Technology for Education, **Carnegie Mellon University** (PA)

When Joel Smith looks at science in higher education, he sees data. Mounds and

mounds of data—more data than has ever existed. "We're all seeing this on our campuses," says Smith, "in terms of gene sequencers that can produce a terabyte of data in 10 hours; or particle physics, which looks at increasingly complex high-energy interactions; or distributed telescopes; or protein folding."

Indeed, in both the natural and social sciences, huge amounts of data are now central to the discovery and confirmation processes. "There is no doubt these issues have reached an absolutely critical point for research," says Smith. "We are all coping with the demands on information technology related to data-intensive computing, ranging from networking, to compute resources, to storage, to the management of that data for research."

According to Smith, higher education must immediately look at significant problems that relate to providing compute cycles, pushing large data sets across networks, maintaining large data storage repositories, providing federated identities, and more.

Adding to these complex issues, data management includes providing the appropriate metadata. This alone, notes Smith, "is very likely opening up an entire new range of possibilities for our library systems: The 21st century library may be as much about large data sets as it is about other forms of scholarly materials. You need curation of this data. And you have to hold on to the data, because it is key to an important feature of scientific methodology: the replication of experiments."

The problem is only going to get bigger, as data-driven IT issues—once limited to research—spring up in undergraduate curricula as well: "Undergraduates are going to need the visualization and analytic tools used by scientists in order to learn how to do that kind of science," explains Smith.

The pressure to provide for data-intensive science in the undergraduate curriculum may be two to three years off, but the tip of the iceberg has already been exposed: "I see the bleed into undergraduate curriculum beginning in the need to render images from data," he notes. If IT leaders haven't already begun planning, they need to start right now.

Higher education institutions are not alone in their efforts to resolve the issues related to data-intensive science. Smith points to Internet2, as well as to specific initiatives that bring all of higher education together to work on common problems.

"I believe the leadership of Internet2 is moving aggressively to step into the areas of need," says Smith. "And one piece of evidence to support that is the sudden momentum behind InCommon. The rate of not just colleges and universities, but also federal agencies, signing on to be part of InCommon—to commit to federated identity—is dramatic. It will not be long before the National Science Foundation and the National Institutes of Health will depend upon identities provided by our campuses to manage awards."

In Smith's opinion, R1 institutions won't be the only schools to benefit from InCommon as an enabler. "I think our colleagues throughout higher education need to understand InCommon and what federated identity can do for them as we come together around the challenges of data-intensive computing," he stresses. CT

MORE PREDICTIONS FOR 2011

SEVERAL OTHER HIGHER ED IT LEADERS peered deep into their crystal balls to predict what 2011 will bring. We've briefly summarized some of their visions below, but expect to hear more from them in the coming year—in *CT* magazine features, conference sessions, and web articles.

"Institutions will jump-start faculty development as even more courses move online, particularly given new entries in online courses for the undergraduate curriculum."
—***Alicia Russell**, director, Educational Technology Center, **Northeastern University** (MA)*

"Mobility will leap ahead along with student expectations. This will be one of the very active arenas for technology development in higher education for 2011."
—***Wayne Brown**, vice president for information technology, **Excelsior College** (online)*

"Students will take charge of their own educations. They will become the cautious consumers of educational offerings, and 'swirling' students will document their accomplishments with e-portfolios." —***John Ittelson**, professor emeritus, **CSU Monterey Bay**, and director, communication, collaboration, and outreach, California Virtual Campus*

"New collaborative learning styles will be reflected and supported in learning space designs." —***Ronald Danielson**, vice provost for information services and CIO, **Santa Clara University** (CA)*

"'Open education' will begin to signify not just openly available resources but openly displayed, richly interactive educational experiences in which participants may cross the boundaries of courses, semesters, degrees, and university roles." —***W. Gardner Campbell**, director, Academy for Teaching and Learning, and associate professor, **Baylor University** (TX)*

"The web 2.0 diaspora will create uncertainty but still continue to disrupt the LMS."
—***Gary Brown**, director, Office of Assessment and Innovation, **Washington State University***

"Social media will begin to be established as the new backbone for course content distribution." —***Susanna Wong Herndon**, director, technology enhanced learning, Center for Teaching and Learning, **University of Texas at Austin***

"CIOs will experience an identity crisis: plumbers or strategists?"
—***Brian Voss**, vice chancellor for IT and CIO, **Louisiana State University***

Linda A. Cicero/Stanford News Service

a mobile education

By Dian Schaffhauser

Involving students in the development of mobile apps requires institutions to decide what they want to achieve from the partnership—and to know what to expect.

THE STUDENT TEAM behind Terriblyclever Design created Stanford's first iPhone app.

SINCE 2008, WHEN iSTANFORD stormed onto the college scene as the first campus mobile app, schools from **Amarillo College** (TX) to **Vanderbilt University** (TN) have rushed to create their own offerings. Some have elected to do the work in-house; others have licensed the software from a vendor (see "Alternatives to In-House Mobile Apps," page 30). Still others hope to bottle the same magic that made iStanford such a hit—by turning to their own students for help.

Inviting students to the mobile party definitely poses risks, but it also holds the promise of significant benefits. Students have a chance to participate in a unique educational experience (and possibly to jump-start their careers), while institutions can garner positive PR as well as insight from student developers, who probably know the end user better than university staff.

The key to success lies in forging a relationship that allows students to be students—creative, idealistic, and passionate—while still meeting IT's goals for quality, security, and performance. There's no set formula for what will work: The skills that each side brings to the table will vary from institution to institution.

ALTERNATIVES TO IN-HOUSE MOBILE APPS

JUST ABOUT EVERY known vendor—and some unknown ones—are getting into the mobile business. Here's a smattering of current options:

Blackboard: Blackboard Mobile Central, free for colleges and universities, ties into Blackboard apps. For Android, BlackBerry, and iPhone. *blackboard.com/mobile*

Datatel: Mobile Access (MOX) provides numerous campus apps that tap into data maintained in Colleague. For Android, BlackBerry, and iPhone. *datatel.com/mox*

Jenzabar: Internet Campus Solution Go (JICS Go) delivers the company's portal apps to mobile devices. For iPhone, Android, and other platforms. *jenzabar.com/products.aspx?id=1156*

Logical Dimension: Focused specifically on digital maps; sells a multitude of campus map apps. For iPhone. *logicaldimension.com*

oMbiel: CampusM is customized for each campus in about six weeks. For iPhone and web mobile. *ombiel.com/campusm.html*

SunGard Higher Education: Mobile Connection has a framework and starter components to help schools bootstrap their mobile apps across popular platforms. *sungardhe.com*

App-y Go Lucky

Stanford University (CA) stumbled onto its blockbuster more by happenstance than hard planning—which may in itself explain its success. In early 2008, Tim Flood, a senior technology consultant at Stanford, was brainstorming with his boss, Tom Black, the university's associate vice provost of student affairs and university registrar, about their newly purchased iPhones. "Tom held up his phone and said, 'I wonder if we could do anything that would connect to our enterprise systems,'" recalls Flood. "I said, 'Why not? When I get weather on the iPhone, I'm connecting to some big enterprise system somewhere with all the weather information all over the world.'"

To Black and Flood, the project was essentially an experiment. And by approaching it as such, they managed to shield it from the institutional bureaucracy that might have killed it. "If we'd started out saying we were going to develop a mobile application that was going to do all these powerful things and reflect our brand, imagine the sign-offs and permissions we'd have had to get," marvels Flood. "We were just being playful and trying something new because we thought it would be of value."

Given how much media attention has been focused on the student aspect of iStanford, it's ironic that Black and Flood didn't set out to involve students. In April of 2008, Black asked the campus Apple representative, Silvia Herrero, if she could identify a resource who could assist in an experiment. Herrero introduced the two administrators to Stanford sophomore Kayvon Beykpour and they were "immediately impressed with his maturity and strong interest," says Flood. "We established the overall parameters of our working relationship then and there."

The Stanford administrators outlined what would become the first four "tiles" of iStanford: an app encompassing athletics, courses, a directory, and maps. Beykpour was part of a group of five students who made up the entire staff of Terribly-clever, a development company that created Facebook applications using the Facebook API. Apple had just released its software development kit for the iPhone and iPod Touch. While the team of sophomores hadn't done any mobile development before, they were enthusiastic about taking on this new project.

By taking a quasi-experimental approach to the project, Stanford achieved something else: It ensured that the students had leeway to brainstorm. "We were given the freedom to imagine what would make sense," says Aaron Wasserman, a Terribly-clever partner (and student at the time) in charge of doing conceptual design and business development.

"By no means was this an exercise in following a scope of work as laid out by Stanford," he recalls. "iStanford was a project that broke a lot of rules, giving students access to data that the university owned, and letting them do with it what they wanted."

That approach, unburdened by institutional requirements, allowed the development team to create an app that would appeal to other students. "It should be user-friendly," says Flood. "It should be approached from the standpoint of the end users. What kind of experience would they want? I would have thought like an administrator because I am an administrator. The students said, 'I just want to find courses.' And they approached it from a complete innocence."

Growing Apps From Seed

A similar process has worked well for the **University of Michigan**, which has developed a de facto greenhouse program to foster student-built apps. The university recently ran a "Mobile Apps Challenge," in which students, as well as faculty and staff, were invited to enter their apps and win prizes such as iPads and gift certificates.

In October, the school also hosted its third 48-hour mobile apps "hackathon," where students came together to build mobile apps for the Apple iOS and Google Android platforms. Among the apps created: One helps drivers find campus parking lots that mesh with their parking permits, while another allows Android users to print to any university printer from their mobile device. The university is also developing programming interfaces for use by developers of mobile and non-mobile apps.

From the university's standpoint, the student-built apps have been a great way to jump-start in-house development. In 2010, for example, the Ann Arbor school acquired an iPhone app named iWolverine that was created by two students. According to Cassandra Carson, mobile applications product manager, the school's Information and Technology Services department then began work on an Android version of the app, expected in 2011, as well as additional apps for the campus community.

Now the U-M Mobile Center, U Michigan's website for mobile applications and development, provides a link to the latest version (1.0.2) of what has been renamed

WEB EXTRA

Making Mobile Apps Easy: Amarillo College (TX) CIO Lee Colaw shares just what it actually took for the institution to set up Datatel's MOX platform. *campustechnology.com/acmox*

Michigan, as well as descriptions of other upcoming campus apps, including MFile (which will provide users with secure access to institution-hosted files), MPrint (for printing to campus printers from a mobile device), and Student Academics (which will provide a schedule of classes).

Honoring the Code

Using student-built apps as a foundation for in-house development doesn't always work. That was the case at Southern California's **Cal Poly Pomona**, where Shawn Irvin, a student in the computer information systems program, created Cal Poly Pomona Central, an app with typical mobile campus features that could be downloaded for free in the Apple iTunes Store.

Impressed by Irvin's initiative, Curtis Clark, director of the university's Division of Instructional and Information Technology Web Development, offered him a job as a student assistant in the department. Clark hoped Irvin would start work on a Android version of his program, while the other members of the department worked on web services to replace some of Irwin's somewhat manual processes. Irvin turned the job down, opting instead for a position with another software company.

Part of Irvin's decision was based on his desire to retain the rights to his code. "He was afraid that he'd turn the code over to us, we would have him working with us for a while, and then we'd lay him off," Clark says. "I could assure him that we wouldn't do that, but I won't always be the director of the department. And there was no way we could buy his code—we don't have the money to do that."

The university's decision not to buy the code went beyond money. For starters, Clark was concerned about how Irwin had developed his data sources. "Developing the mobile app itself is a much less difficult part of the process than developing the data sources," he notes. "That was one of the things that Shawn ran into." For the app's directory, for example, Irwin "scraped" the data out of a publicly availably PDF phone book. Clark offered Irvin access to the XML file that's used to generate the campus directory, but the student didn't take him up on the offer.

Second, Clark was concerned about the quality of the code. After examining it, he determined that there was nothing in it that couldn't be duplicated more professionally by the department's own developers. "If we were to develop it from scratch, we'd develop better data sources," he explains. That meant that workarounds created by the student to handle static data wouldn't be necessary.

The school now has opted to create its own app in-house. The campus developers have access to the code used to create interactive maps on the university's website, a major step up from Irvin's static map. They have other ambitions, too, such as adding functionality that lets users point their mobile camera inside a building and have the app guide them to such destinations as the closest restroom.

Keeping It Simple

Still, if an institution's goal is to involve students—for educational reasons, for PR, or as a recruitment tool—then static data sources are okay, says Stanford's Flood, who believes that keeping the specs simple early on helped iStanford get off the ground.

"If you try to do something complex, people get bewildered because it's a new technology to begin with," he says. "If you say we'll use existing data, it makes it easier." To generate a list of courses, for instance, Stanford provided an extract from a PeopleSoft application. To create a contacts list, it provided an extract from the LDAP directory. Like Irwin's Cal Poly Pomona app, there was really nothing dynamic about the first edition of iStanford. It was only later on, Flood says, that "we began to produce more timely extracts so you could get information that was live and up-to-date."

PREDICTION: CROSS-INSTITUTION COLLABORATIVE APP

GREGORY JACKSON, EDUCAUSE VP for policy and analysis, believes the momentum of mobile campus apps could follow the same track as another type of campus software that surfaced nearly 10 years ago. Back then, a lot of campuses were working on their own web portals, and were covering the same ground as one another. Carl Jacobson, now the **University of Delaware**'s VP for IT and CIO, recognized how much redundancy was occurring and persuaded several schools to collaborate to develop an overall portal framework. The result was the open source uPortal project.

"We're already seeing the same thing happen again around mobile devices," says Jackson. "The catch right now is that the mobile device landscape shifts very quickly, unlike uPortal, which was going to be delivered through web browsers that were fairly standardized. With mobile you have to write each app differently depending on whether it's for the Android, Windows 7, iPhone, the straight web, or BlackBerry. It's a harder problem."

While major education vendors such as Blackboard and Datatel are jumping into the fray to deliver mobile apps on multiple platforms, Jackson notes that the companies have a "fundamental interest" in making sure their mobile solutions work first and foremost with their traditional applications that pay the bills.

That warning aside, Jackson also predicts that, at some point, the education sector will see commercial vendors "march into this space independent of underlying software—much the way Unicon helps institutions implement uPortal."

LESSONS LEARNED FROM STUDENT MOBILE APP DEVELOPMENT

Start small; keep it simple. For instance, begin with a single campus app. "Get started in a small, doable way," advises Tim Flood, a senior technology consultant at **Stanford University** (CA). Adds Aaron Wasserman, director of Blackboard Mobile: "A phased approach is really a good way to get your feet wet."

Get out of the project mind-set. Mobile projects don't have to be complex and managed like other campus initiatives. "With those, you have to have a strategy," notes Flood. "You have to very careful before you do anything—to the point of obsessive."

Use the data you can get. Says Wasserman, "You have to take what is readily available, what various departments are willing to share, and start with that." His proof: iStanford used weekly data extracts in its early versions. As time goes on and the app continues to pick up traction, you can revisit some of your initial ideas.

Don't hold off on releases. "The process for updating mobile apps is so easy," says Wasserman. "There's really no reason to hinder the release of any sort of mobile app because you're waiting on one last thing. You're better off getting it out there, into the hands of users—and making updates as you go."

Leave tradition outside. According to Wasserman, the normal institutional approach to development—"invoking committees to decide on every little feature"—is best saved for mature applications. It doesn't work for mobile, because by the time you've got a decision made, "the mobile industry will have changed 180 degrees."

Collaborate. Gregory Jackson, Educause VP for policy and analysis, advises getting together with similarly situated schools. "Pool your resources, and make something happen," he says. "Collaboration is headline number one."

Collaborate with the more experienced. Headline number two: Have reps from your collaborative group meet with reps from another group that has already developed apps. "Create an efficient connection to people who have already done something further down the line," says Jackson.

Push your vendors to do the right thing. If you decide to buy a mobile app, do what you can to let the vendor know that it needs to offer more than ties to its own student information system or learning management system.

Even when the specs are kept simple, it's important for institutions to understand that the tech department will still have work to do. In Stanford's case, Flood knew that the students' lack of knowledge about PeopleSoft would have to be reconciled. The students' initial design didn't really have a way of specifying in which term a course was being offered, which was a requirement for the course listings. "They weren't knowledgeable about the how the real back engine works," says Flood. "But the key elements of their design were very refreshing."

It's also worth remembering that a student will approach a development project with a different mind-set than a professional programmer. A student who codes a mobile app is typically more anxious to get it done than to get it right. At least, that's what Gregory Jackson, Educause VP for policy and analysis, has observed in his 13-plus years as CIO at the **University of Chicago** (IL) and four years as director of academic computing at **MIT**. That makes working with student programs a challenge for professional coders. According to Jackson, the person who has to adapt the student code often says, "Gawd, this is awful code. Let's go back and do it right."

It's frequently that second programmer—the one who isn't in such a hurry—who does the work to make the app worth disseminating. That's the person who will often work with data sources to provide dynamic information—the actual GPS location of the bus rather than a static shuttle schedule—giving the app the "cool" factor.

The Company You Keep

As much as Stanford's Flood stresses the need to give students plenty of room to think and dream, he says he would not have undertaken the project the way he did if the students didn't have a company behind them—or a signed contract. Otherwise, the risk is that the students may lose interest, be unwilling to accommodate institutional needs, or simply make mistakes.

"These are young minds—very bright people—but they don't have experience," Flood notes. "It's different from doing a lab assignment or homework or a project for class, because this is something that's going to exist. You can have a student develop an app as a volunteer, temp, independent contractor, or company. We feel the latter provides a better chance of ensuring better results—results that are sustainable beyond the student's years on campus."

Despite the fact that they were working with a company, Flood and Black never lost sight of the fact that they also had a role to play as mentors. "We introduced Kayvon and [the] team to the Intellectual Property and Information Security offices," recalls Flood. "We made sure the branding of the app conformed to university policies; we worked with the students and our procurement people on a contract with a statement of work. We explained to the students that they would become our vendor. But at the same time, we enjoyed a special relationship with them because they were students."

Regardless of whether iStanford succeeded because it was the product of students, an outside company, or both, the fact remains that it has exceeded all expectations. At last count, 64,000 people—44,000 more than attend or work at Stanford—have downloaded the app. It has also been featured on Stanford's home page multiple times as part of the university's branding. As for the students at Terriblyclever? In July 2009, their company was bought by Blackboard. **CT**

Dian Schaffhauser *covers technology trends in higher education and K-12 for 1105 Media.*

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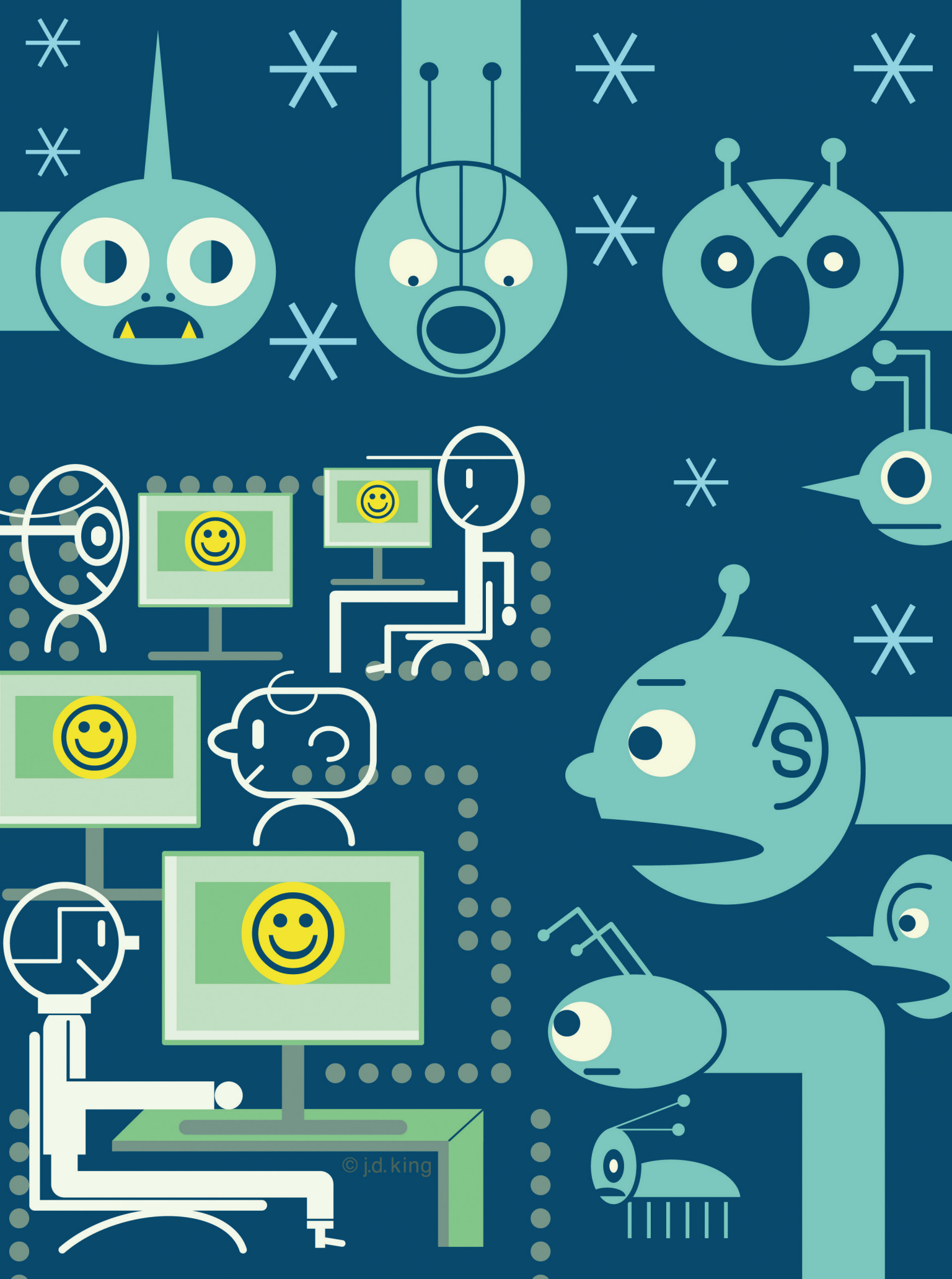
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In the fight against malicious software, it's not enough to treat individual infected machines. Here's how to develop a malware strategy that protects an entire campus.

4 Steps to Combat Malware Enterprisewide

By Lenny Zeltser

TOO OFTEN, ORGANIZATIONS make the mistake of treating malware infections as a series of independent occurrences. Each time a malicious program is discovered, IT simply cleans up or rebuilds the affected host, and then moves on with routine operational tasks. Yet, this approach doesn't allow the institution to keep up with the increasingly aggressive and innovative attack tactics employed by malware authors, who design malware to bypass defenses, evade detection, and resist efforts to remove it.

In fact, combating malware in an enterprise environment means not only locating suspicious programs on servers and workstations, but also detecting and interfering with the use of malware on the network. To win the battle for data security, institutions must discover malware propagation attempts and contain infections before they escalate into all-encompassing pandemics. Ultimately, in an enterprise setting, where thousands of diverse computers are loosely connected to perform diverse tasks, malware incidents must be treated as elements of a holistic security incident cycle. The cycle comprises four major phases: Plan, Resist, Detect, and Respond. (For a definition of each phase, see "The Security Incident Cycle," page 36).

Step 1: Plan

As you design an approach to resist, detect, and respond to malware enterprisewide, begin by understanding the threat landscape relevant to your computing environment. This process involves reviewing what infection vectors you're likely to encounter. For instance, common approaches for malware to find its way onto systems include:

- Vulnerabilities in client-side software on workstations.
- Vulnerabilities in network-accessible software on servers.
- Social engineering techniques, which often are part of malware-propagation tactics.
- Removable media, such as USB keys.
- Weak passwords of network-accessible accounts.

Which of these infection vectors are likely to be most dangerous to your organization? What technologies and procedures can you implement to prevent malware from propagating through these vectors? These are some of the questions you need to answer when designing your anti-malware architecture.

Next, consider the activities malware might undertake once systems in your enterprise have been infected. For example, common capabilities of malicious programs include downloading updates and instructions, collecting and sending out sensitive data, and propagating to other systems. What measures can you take to make it difficult for malware to perform those actions? It is important to hone your plan to detect and interfere with these activities not only at the endpoint level, but also on servers, on internal network devices, and at the network perimeter.

Another key consideration: You probably won't have the budget to protect all information resources with the same rigor. Keeping financial limitations in mind, catalog potential malware targets (such as your data) across the enterprise and prioritize them by sensitivity, privacy, or any other measure relevant to your organization. Then design your malware security architecture accordingly. Focus on IT resources that process, store, or transmit the most critical data. Don't forget to incorporate into your design not only preventative security controls, but also measures for detecting malware and responding to the associated security incidents.

Once the plan phase is complete, the output often is a set of architectural blueprints, product recommendations, configuration procedures, training plans, and security policies that guide the enterprise through the rest of the security incident cycle.

WEB EXTRAS

Head to our **Security & Privacy** solution center for the latest news, case studies, research, features, and more: *campustechnology.com/securityprivacy*

THE SECURITY INCIDENT CYCLE

MALWARE IS THE TIP OF THE SPEAR that attackers often use to compromise an organization's IT defenses. On a strategic level, malware combat should be placed in the context of an institution's overall security incident cycle. The cycle, as was initially defined by security guru Richard Bejtlich, comprises four major phases: Plan, Resist, Detect, and Respond.

In the plan phase, the enterprise prepares for security incidents by understanding the relevant threats, assessing systems' vulnerabilities, and designing a security infrastructure and processes accordingly.

The resist phase encompasses the enterprise's efforts to avoid data breaches by making use of the architecture—the security program and associated tools—designed in the plan phase.

During the detect phase, the enterprise monitors its IT infrastructure, data transfer, and user activities to discover incidents as early as possible, with the expectation that the resist phase will not be able to prevent all malicious activities.

The respond phase mobilizes the enterprise's incident handlers in response to discovered anomalies.

Step 2: Resist

In the fight against malware, one might say that the best offense is a good defense: That is, when implementing the policies developed in the plan phase of the security cycle, institutions must take steps to resist malicious software attacks in the first place.

When it comes to protecting a single system from malware infection, the road map is usually clear. Common tasks include:

- Install and maintain a modern antivirus suite.
- Lock down the configuration of the operating system.
- Control what software is installed and allowed to run.
- Restrict outbound and inbound network access.
- Protect web browsing activities.
- Limit user account access and minimize user privileges.
- Keep up with security patches.
- Enforce change management practices.
- Identify, investigate, and respond to anomalies.

While implementing these measures for a single computer is quite achievable, doing so for thousands of systems across the enterprise is a monumental challenge for most organizations. There are a variety of issues that factor in at the enterprise level:

- The diversity of business requirements imposed upon systems: The variety of configuration and usage options across multiple users and departments makes it hard to establish a consistent set of security controls.
- The geographic distribution of systems in large enterprises, especially those that employ laptops: Security administrators have a hard time protecting systems if IT cannot connect to them or if the systems access the

2010 WINNER: Western Carolina University (from left to right): Beth Lofquist, Craig Fowler, and Anna McFadden

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Resisting malware must take place not only at the system level, but also at the network level. In many cases, network security measures that you have already deployed as part of your overall security architecture can help in the fight against malware.

network from various locations.

- The difficulty of taking actions that span multiple systems: It's relatively simple for the security administrator to execute commands and review activities on a single host, but remotely controlling thousands of systems presents logistical and scalability challenges that are difficult to overcome.

The solution to all these challenges: Deploy some form of an Enterprise Management System (EMS). EMS is software designed for collecting inventory data, remotely executing commands, managing applications, and controlling the configuration across many systems in a scalable manner—making it possible to resist malware infection across the enterprise at the system level. Among numerous commercial EMS tools are Symantec Altiris, Novell ZENworks, and Microsoft System Center Configuration Manager. And for Microsoft Active Directory environments, the great news is that many EMS capabilities are already built in to the Group Policy functionality.

Keep in mind that resisting malware must take place not only at the system level, but also at the network level. In many cases, network security measures that enterprises have already deployed as part of their overall security architecture can help in the fight against malware. For example:

- Restricting traffic from less trusted networks (e.g., the internet) to the more trusted network, making it harder for malware to spread to vulnerable systems.
- Restricting internet-bound traffic by controlling allowed network ports and blacklisting connections to risky IP addresses and domains, making it harder for malware to exfiltrate data, update itself, or otherwise communicate with the attacker.
- Restricting what systems are allowed to plug directly into the internal network by using network access control (NAC) technologies, limiting the risks posed by highly vulnerable or infected hosts.
- Restricting how data may be transmitted from systems using removable media and the network, by using data leakage prevention or similar technologies to complicate the ability of malware to transmit sensitive information to the attacker.

Of course, it's not realistic to expect that even the most robust set of controls will prevent all malware infections. Your ability to rapidly discover the presence of malware—and respond to it—often will affect the repercussions of the incident.

Step 3: Detect

The sooner you can discover the presence of malware in your enterprise, the sooner you can react and, hopefully, limit the spread of malicious code before the infection finds its way onto many more systems. Enterprises without mature anti-malware practices tend to rely solely on antivirus tools to spot malware. This may be a good start, but antivirus software is far from being the only security mechanism we need to discover and resist malware infections. Gone are the days when detecting malware by static signatures was effective, and the approaches to identifying malicious programs using behavioral and heuristic techniques are still in need of improvement. As the result, malware authors often are able to design their creations to avoid being detected by antivirus tools.

In order to more effectively protect systems enterprisewide, institutions must employ a variety of other means of identifying and tracking malware:

- Use change detection tools to discover unauthorized modifications to the file system, network device configuration, or application code.

Resources

Argus: qosient.com/argus

F-Response Enterprise: f-response.com

HBGary Responder: hbgary.com/products-services/responder-pro

Mandiant Intelligent Response: mandiant.com/products/core/intelligent_response

Microsoft Active Directory: microsoft.com/windowsserver2008/en/us/ad-main.aspx

Microsoft System Center Configuration Manager: microsoft.com/systemcenter/en/us/configuration-manager.aspx

National Institute of Standards and Technology *Computer Security Incident Handling Guide*: csrc.nist.gov/publications/nistpubs/800-61-rev1/SP800-61rev1.pdf

Novell ZENworks: novell.com/products/zenworks

Sguil: sguil.sourceforge.net

Symantec Altiris: symantec.com/business/deployment-solution

YARA: code.google.com/p/yara-project

- Educate end users on how to observe the signs of malware and how to report potential incidents.
- Train IT personnel to perform an initial survey of a potentially infected system to assess whether it has been compromised (see *tinyurl.com/incident-survey* for a reference).
- Review security event logs to identify suspicious activities such as failed access attempts.
- Employ intrusion detection systems to identify signs of malware in inbound and outbound network traffic.
- Examine NetFlow data to spot anomalies in network traffic or attempts to connect to known malicious hosts (the Sguil and Argus tools can assist with this and related tasks).
- Look at DNS logs to identify internal systems that attempt to resolve known malicious domain names (for a script that can help, see *tinyurl.com/blackhole-dns*).

Malware investigations might begin with the review of a single system, allowing the security administrator to formulate the signs of infection—called indicators of compromise—that can help locate malware elsewhere in the enterprise. Using this information to locate additional infected systems might involve examining network traffic, or looking at the configuration of numerous systems throughout the enterprise. A free tool that can examine a system for custom indicators of compromise is YARA. EMS products also can assist with this task, as can specialized malware discovery and response tools, such as Mandiant Intelligent Response, F-Response Enterprise, and HBGary Responder.

Step 4: Respond

According to the National Institute of Standards and Technology *Computer Security Incident Handling Guide*, responding to a confirmed malware incident involves three key steps: containment, eradication, and recovery. The execution of these steps should be driven by the guidelines the organization defined during the plan phase of the security incident cycle.

Containing malware involves efforts to inhibit its attempts to spread or compromise additional data. Understand the scope of the infection by reviewing the data collected during the detect phase of the cycle, and perform additional investigations where necessary. If malware is spreading with the unwilling assistance of employees—for instance when they click a particular link—provide them with instructions regarding what they should or should not do in this situation. If malware is targeting specific services, temporarily disable them until you can address the relevant vulnerability. You may need to disconnect affected systems from the network or, in some cases, disconnect whole subnets. If you need to reboot or shut down a system, first take a snapshot of its memory for future analysis. Make a trustworthy backup of any file before removing it from the infected system, in case you need to refer to it later in the investigation.

Eradicating the infection involves removing malware artifacts, restoring from backup, or rebuilding the relevant systems. Staying in contact with your antivirus vendor can help you obtain a set of malware signatures for detecting and—at least partially—disabling malware in your environment. Modern malware can embed itself deep in the OS, and may be used by the attacker to install additional tools and take a variety of malicious actions on the compromised host. As a result, incidents where you can reliably remove malware without rebuilding or restoring the host are very rare. However, knowing how to disable malware can buy the enterprise some time during the incident response process. Use this time to lock down systems, patch vulnerabilities, and reconfigure relevant IT infrastructure components.

Recovering from the incident focuses on resuming normal operations of the affected IT infrastructure. Keep an eye on the restored or reconfigured systems to confirm that they no longer exhibit the signs of infection, and assess what temporary containment measures can be removed. Recovery from a malware incident also involves collaborating with non-IT colleagues, such as public relations and legal teams, to take the necessary actions with respect to the organization's constituents. The recovery step often requires a continual examination of aspects of the enterprise's IT infrastructure to see whether additional signs of infection appear in areas that have not previously exhibited indicators of compromise.

After the incident is resolved, the response team needs to review its actions to determine how to improve its ability to handle future infections. It also needs to assess and adjust the relevant security components to see whether the environment can be made more resilient to such incidents. These actions complete the security incident cycle, bringing us back to the plan phase.

In the end, how the enterprise plans and executes its actions during all four phases of the security incident cycle will determine the success of its quest to combat malware. **CT**

Staying in contact with your antivirus vendor can help you obtain a set of malware signatures for detecting and disabling malware in your environment.

Lenny Zeltser *leads the security consulting team at Savvis and teaches classes on combating malware (*combatingmalware.com*) at the SANS Institute. He regularly discusses information security topics on his blog (*blog.zeltser.com*) and on Twitter (*twitter.com/lennyzeltser*).*

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Literacy Redefined

What does it mean to be literate in the digital realm? By Mary Grush

LITERACY IS ALL ABOUT readin' and writin'—right? Not any more, Susan Metros reminds us. "Now, it's much broader. It's about understanding information and technology, being able to communicate digitally and visually, and having the critical thinking skills to make valid, credible, and ethical choices and decisions."

As associate vice provost and deputy CIO for technology-enhanced learning at the **University of Southern California**, Metros guides her IT organization in aligning its strategies with USC's overall institutional goals for teaching, learning, and research. In that process, she puts the question of literacy first: "What does it mean to be a literate human being in today's society?" And as a part of her recent keynote for the 2010 CT Virtual Conference, "New IT Strategies for a Digital Society," Metros offered some answers and shared her insights with attendees.

Metros observes that the definition of literacy has now expanded in the digital realm, encompassing digital, visual, technology, information, media, and multimedia literacy. But she is quick to point out that we mustn't make assumptions about today's students just because they have "grown up digital." She notes, "They know how to upload a movie in YouTube, to upload pictures…they know how to text, and they are constantly connected to something digital. But my argument is they are *not* literate; they are just basically stimulated."

LITERACY CONTINUUM

That puts most college-level students right at the beginning of what Metros calls the literacy continuum. "Literacy sits on a continuum. As we move up the continuum, we become more learned, practiced, original, sophisticated, and critical," she explains. So where would we like our students to be on the literacy continuum? "While we do need to move our students toward digital literacy, I think there is some confusion about this continuum. I don't think we need to make everyone an expert. For example, you could be a student in economics and be literate in technology; but if you are a student in film studies, you are going to need to be truly fluent in certain technologies."

To examine the definition of literacy further, Metros maps attributes of literacy against the levels of the literacy continuum (see chart below). And though discussions of literacy in the digital age might conjure up visions of learning lots and lots of technical skills, she believes that literacy—even what some call "digital literacy"—is not about the tools, and not about technology. In fact, more technology in the future will actually mean more emphasis on skills related to analyzing, visualizing, communicating, and innovating in an increasingly digital environment. "As technology continues to evolve, digital literacy must necessarily be less about tools and more about ways of thinking and seeing, and of crafting narrative," concludes Metros. **CT**

Listen to Susan Metros' keynote address at campustechnology.com/virtual.

LITERACY ATTRIBUTES ON THE CONTINUUM

LITERACY ATTRIBUTES	Stimulated	Novice	Literate	Fluent
Comprehension	Minimal	Basic	Intermediate	Advanced
Production	Observer	Tinkerer	Informed	Expert
Originality	None	Emulator	Innovator	Visionary
Judgment	Minimal	Unsophisticated	Competent	Sophisticated

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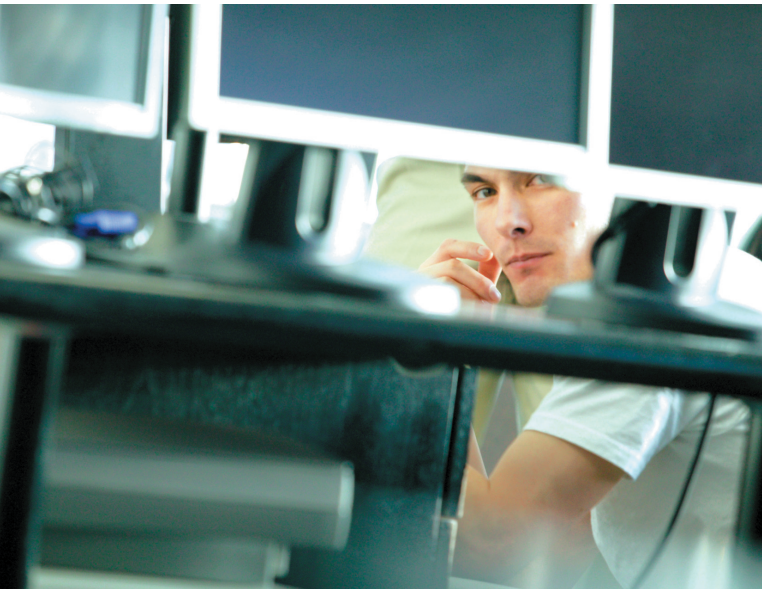

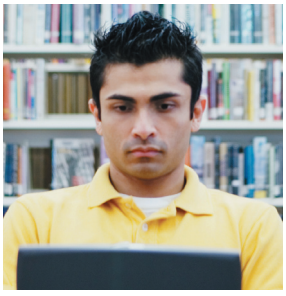

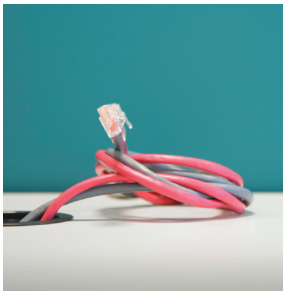

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