CT looks at three ways schools are training the next generation of tech employees.
IF NOT US, then who? That’s certainly the way I look at our decision to move to an all-digital publication. We are, after all, a tech magazine with a tech readership. It’s time for all of us to walk the walk.

It’s a decision that makes even more sense when you consider why we got into this field in the first place—to improve education. For years, CT has championed efforts to use technology to pull higher ed into the 21st century, whether it’s innovative e-texts or mobile learning opportunities. Yet, each month, we felled a few trees and smeared them with ink to tell you about these trends. That’s like the dentist telling you to lay off the candy while he inhales gummy bears.

Many of you face a similar situation. How many of you are still struggling to convince faculty of the benefits of educational technology? How many of you still struggle to secure buy-in from campus leaders? If you expect students and faculty to embrace these technologies, you too need to lead by example. Reading a digital CT may seem like a small step, but small steps can take you a long, long way.

As an editor, I’m particularly excited about the flexibility that an all-digital format gives us. If you’ve ever tried to write about certain aspects of technology—configurable classrooms, say—you know that if a picture is worth a thousand words, a short video is worth a book. Our ability to incorporate multimedia means that we can now do a better job of helping you make the decisions that will move your institution forward.

And if we can’t provide you with all the information you need, we can seamlessly link you to a resource that can. As Editorial Director Therese Mageau says in her videtorial, our magazine will no longer be a walled garden. With collaboration the hottest topic in education today, we needed to give our readers ways to continue the discussions started in our articles via Twitter, Facebook, and more.

From my perspective at least, our move to digital meshes perfectly with how my own reading habits have changed over the last couple of years. Unless I am languishing in a doctor’s office, I have almost completely given up print magazines. And it’s been years since I read an ink newspaper. And that’s just for my personal information needs. For work, I can’t remember the last time I read something in print.

Judging by the proliferation of tablets at CT 2012, I would wager that most of you obtain information for your job in the same way that I do. By going digital, CT is moving the conversation to where you work—and making it richer. Ultimately, I hope our new digital publication can help you blaze the trail toward a brighter future for higher education. CT
Higher Ed’s Future

In the July editorial “The Forces Are Not With You,” CT Editorial Director Therese Mageau pondered forces that are fundamentally challenging the assumptions and future of higher education.

Your piece “The Forces Are Not With You” was truly an eye opener! Here in central Florida, I watch as tuition goes up as much as 15 percent each and every year, and the never-ending administrative sprawl continues. State spending per student goes down yearly and costs get put on students. Most end up unemployed with huge debt loads and a lifetime of payments, and for what? The current situation cannot and will not continue for much longer, as students and the economics will eventually dictate something more realistic.

Anthony Recascino

Colleges must wake up and provide something credible and valuable at a reasonable cost. The elitism that pervades much of academia will give way to reality at some point. If students can get training for free, then get certified somewhere by taking appropriate, credible, industry standard tests, they are way ahead—without a pile of debt that they have no way to pay off. The idea that an online education is inferior must go. Some studies are beginning to show that the reverse is true: that you get more interaction in online course discussions than you would ever get in the classroom. The shy kid in the back will actually contribute in an online setting.

After spending almost 33 years in the IT industry, and now teaching at a private liberal arts university, I can say that we have to teach students not only how to think, but how to do real, practical things. Things that employers need done. Things that clients will pay for. The traditional liberal arts college isn’t about to disappear. But the forces at play will require it to adapt and join the online-class revolution, or face decreasing enrollment and eventual demise.

Alan Hughes

Both of my sons, now in their 30s, are IT people who are gainfully employed, married with children, own their own homes, and are doing well. My oldest balked at pursuing a traditional college education. One of his early employers insisted that he needed a college degree and paid for him to obtain a computer science degree from the University of Phoenix (mostly online). He still contends this was a waste of time and says that technical certifications are more useful.

My younger son, although a smart kid, tried a quarter of college and then quit. Since then, he has been regularly employed at various technology companies. I keep waiting for the other shoe to drop because of his lack of college, but he is still going strong.

Both of them are surviving comfortably during this “Great Recession” without traditional college degrees, so I often wonder about the models—particularly at my institution, where the model is very traditional. I constantly worry...
It Comes Down to Assessment

In a June column, “6 Keys to Engaging Students Online,” West Texas A&M University’s Richard Rose offered tips for becoming a successful online teacher.

I was all over this article…until I got to the end of the first paragraph of key number three: “[Teachers who have a ‘command mentality’] make sure every student is crystal clear on what is expected of them and the consequences of failing to meet those expectations. These are the instructors who adore grading rubrics.”

As an instructor who teaches online (as well as hybrid) courses, I work especially hard—harder than I might in on-ground teaching—to make sure that every student is clear about expectations. In an online environment, you cannot see the head nods or the looks of confusion, so I make sure to provide course expectations—as well as how students will be graded (rubrics)—in clear, concise language. I convey the information in the clearest of terms so that students do not have to second-guess my intentions or try to translate meaning. I’m sorry, I just don’t see this as a control issue.

Vicki Murrell
Assistant Dean, Online Education
The University of Memphis

The author responds: There is nothing wrong with clear expectations. I try to do the same. My point is simply that, at the end of the day, you are not going to know whether those expectations have been met by the student who paid for the pizza, or their brilliant roommate who ate it.

I find it amazing that instructors shun online education because they fear that [someone other than the student might be doing the work]. If instructors could create authentic assessment instead of 50 multiple-choice questions—rote learning at its best—they would not have to worry about someone else doing the assignments. I am an online course designer. At each workshop, faculty arrive with a bad attitude and nothing but multiple-choice assessments. Some professors are simply not cut out to be online instructors.

Marti M

Scoring High

The May story “Grading Online Evaluations” examined the benefits of moving course evaluations online.

We moved to online course evaluations four years ago. The ability to assess individual professors over time, calculate term-averaged ratings, etc., has been an enormous benefit. We learned that the most reliable predictor of course rating is class size: Bigger classes nearly always score lower. This has enabled us to review the results of a particular course’s evaluations relative to comparably sized courses. Another huge benefit: Because we have several questions with narrative answers, students are more likely to compose longer, more thoughtful replies. Finally, it’s fantastic for quick generation of reports for faculty and administration once evaluations are over. And the reports are now available in perpetuity for downloading.

Rich
University of New Hampshire School of Law

Letters are edited for length and clarity.
UPGRADED WEBCASTING TOOL. At InfoComm 2012 in Las Vegas, Sonic Foundry showcased the latest features of its Mediasite platform, including a web-based desktop recorder designed to make it easier for users to create their own content. Additional upgrades include: collaboration workflows that enable users to review, edit, and approve content before it’s published; catalog creation based on search terms, enhanced mobile catalog navigation, and analytics for individual catalog owners; Mediasite Player customization, including the ability to change video, slide, and thumbnail sizes; personalization of the Mediasite Management Portal; and content import and management for MP4s, H.264, and Windows Media Video.

SHIFT TO CLOUD STORAGE. By 2016, about a third of consumer digital content will be stored on cloud-based services, according to a new Gartner research report. The report estimates that just 7 percent of consumer content was stored in the cloud last year, but this figure is expected to grow to 36 percent over the next four years. “As we enter the post-PC era, consumers are using multiple connected devices, the majority of which are equipped with cameras. This is leading to a massive increase in new user-generated content that requires storage,” says Shalini Verma, principal research analyst at Gartner. “With the emergence of the personal cloud, this fast-growing consumer digital content will quickly get disaggregated from connected devices.” Read the full story online.

TABLETS OUTPACING NOTEBOOKS. Tablet PCs will dominate the mobile PC market in four years, says the latest Quarterly Mobile PC Shipment and Forecast Report from NPD DisplaySearch. According to the new report, shipments of Apple’s iPad and its tablet cousins will outpace those of notebooks by 2016, with even greater growth expected the following year. By 2017, tablet shipments will hit 416 million, up from 121 million in 2012. Notebook shipments will increase to 393 million, up from 208 million this year. Read the full story online.

SUPER WIFI. A consortium of higher education groups, technology companies, and nonprofits is aiming to upgrade wireless broadband infrastructure in underserved colleges and their surrounding communities. Known collectively as AIR.U (for Advanced Internet Regions), the group will develop a plan for building next-generation wireless networks at a number of pilot sites, with the aim of deploying “Super WiFi” networks as equipment becomes more widely available. Super WiFi uses low-frequency “white spaces”
that fall between the frequencies used for television broadcasts. These lower-frequency signals penetrate thick walls better than the 2.4 GHz and 5 GHz frequencies used now in 802.11g/n wireless data communications, and can carry information over longer distances. Read the full story online.

ONLINE LEARNING EQUAL TO FACE-TO-FACE. Interactive learning online produces essentially the same outcomes as traditional face-to-face education at the university level, according to a recent report from Ithaka S+R. The study, “Interactive Learning Online at Public Universities: Evidence From Randomized Trials,” involved 605 students at six public universities in the northeastern US, all of whom completed the same introductory-level statistics course during the fall term of 2011. A control group took the course in a traditional classroom format, while a treatment group completed the course through a hybrid method. The study results revealed no statistical difference in educational outcomes between the two groups of students. Read the full story online.

SMART SECURITY. Quincy University is providing students at its Illinois campus an option to subscribe to a security service that will listen in on their interactions and track their location in case help is needed. MyForce, offered by a company of the same name, is a personal security service delivered through a smartphone app. Once the app is installed, if users become worried or expect trouble in a situation, they can push a button on the screen requesting MyForce staff to listen to and record audio. Users don’t have to speak at all, and their locations are fixed through the smartphone GPS. Should help be needed, MyForce contacts local police and also relays incident information to the university’s public safety officers. Read the full story online.

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Webinars on Demand

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Going From Roadmap to Deployment With ImageNow

Experts from DeVry University (multiple locations) deliver a blueprint for successfully deploying an enterprise-wide content management system.

Getting the Most out of Moodle With Joule From Moodlerooms

Calvin College (MI) and Roanoke-Chowan Community College (NC) share how they use Moodlerooms’ Joule to enhance teaching and learning on their campuses.

Leveraging a Cloud-Based LMS and Portal Suite to Achieve Operational and Financial Efficiency

How Quad College Group (multiple locations) improved operational and financial efficiencies and boosted communication among students, faculty, and staff at multiple campuses with a cloud-based learning management system.

Upcoming Events

Sept. 16-21
The Data Warehousing Institute
TDWI World Conference: Agile BI
Boston

Sept. 16-23
The SANS Institute
Network Security 2012
Las Vegas

Oct. 21-25
Gartner
Symposium ITxpo
Orlando, FL

Oct. 28-31
League for Innovation in the Community College
2012 STE/Mech Conference
Kansas City, MO

Nov. 6-9
Educause 2012
Denver

Nov. 11-16
The Data Warehousing Institute
TDWI World Conference: Emerging Technologies 2013
Orlando, FL

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Masters of All They Survey
A web-based survey tool is helping IT shops monitor their performance on campus—and gauge the expectations and desires of their constituents.

IMAGINE PLAYING Family Feud where all the survey questions are about what campus constituents think about IT: “How important is it that faculty use technology to enhance the learning experience?” or “How important is it that the campus internet service be accessible via tablets or mobiles?”

Like the contestants on the show, many IT shops would be left guessing at the answers their constituents would give. And that doesn’t bode well for their ability to develop long-term strategies or improve their effectiveness. A survey tool, known as TechQual+, aims to fix that, giving IT leaders a quick and easy way to gauge their departments’ performance on campus and learn what matters to their constituents, including faculty, students, and staff.

The idea of an IT survey tool that can be used across higher education has its skeptics, who feel that colleges and universities are too varied to be able to benefit from a single survey tool. But Timothy Chester, CIO at the University of Georgia, believed it could be done and he had evidence: The creators of LibQUAL+, a library services survey tool, faced similar arguments when they initiated their project, yet that project was succeeding. In 2006, Chester, who was then at Pepperdine University (CA), set out to create a counterpart that would measure the effectiveness of IT departments, no matter the type or size of the institution.

The resulting survey instrument is a deceptively elegant solution to the IT survey problem. And schools that use it are reporting an increased ability to monitor the success of their IT programs, plan strategically, and make funding requests more persuasive.

TechQual+ consists of 13 core questions. Schools can customize the survey and add multiple-choice, multiple-answer, and open-ended questions. Web-based tools make it easy for schools to create, administer, and brand the surveys, as well as to analyze the response data. Importantly, schools can then compare their results with peer organizations. The surveys themselves are hosted on TechQual+’s enterprise-grade infrastructure.

When Chester began work on the survey, he discovered that faculty, students, and staff all want pretty much the same IT services, regardless of whether they’re at a large institution, a small liberal arts college, or a regional teaching
college. “The stories we heard were along three themes,” he recalls. “They wanted consistent internet access and wide availability of wireless access. They wanted access to web-based services and tools that improve collaboration among faculty, students, and staff. And they wanted good support, as well as training for the schools’ tools and services.”

The survey is divided into three sections that reflect these themes. For each question, respondents rate their minimum level of acceptable service, their desired level of service, and their perception of the current performance of that service. Respondents can also choose to elaborate on each question in an open-ended comment section.

To help administrators analyze the results, the data includes information about the survey population and zones of tolerance—the ranges between respondents’ minimum expectations and desired service levels. Data is also presented in the form of a radar chart, which looks like a dartboard with yellow, red, green, and blue paint splotches (see graphic, page 8). The radar chart provides a visual demonstration of how well the perception of services measures up to the desired levels.

“The radar map can be a little confusing at first, because it’s a little more complicated,” says Thomas Hoover, associate vice chancellor and CIO at the University of Tennessee at Chattanooga (UTC), who first encountered TechQual+ when he worked with Chester at Pepperdine. “But it shows a scale of expectations, which gives you a more realistic answer. Otherwise, it’s not clear if you’re comparing your access to the access in your home, the airport, Starbucks—what have you. We need to know this.”

Acting on the Data
At Pepperdine, the IT department uses the TechQual+ survey data extensively to analyze its IT program and make recommendations to the school’s Leadership Council. “That way, we can set priorities and budget for the next fiscal year,” says Jonathan See, Pepperdine’s CIO.

A few recent projects at Pepperdine, including one to create more smart classrooms on campus, originated from TechQual+ survey results. The goal of the smart classroom project, says See, was to enable the School of Public Policy to connect with the Washington, DC, campus, so students could engage with speakers, including members of Congress, using A/V projection and conferencing software.

Pepperdine’s IT group has also been working with various deans to set up technology-training workshops for faculty. “Faculty development is a key initiative,” See says. “This need is something that TechQual+ showed us, and our experience working with faculty confirmed it.”

Monty Wilson, assistant vice chancellor and CTO at UTC, also attributes several recent IT gains to results garnered from TechQual+ surveys, including the extension of wireless coverage to student housing. “Students wanted it, IT wanted it,” explains Wilson. “Collecting data from students helped to give some very specific, focused data to the administration, so they could understand its importance and provide the funding for it.” By this fall, UTC student housing will have 100 percent wireless coverage.

UTC also used TechQual+ data to direct stimulus funding toward the replacement of old computers. “At the same time, it also highlighted the need for us to have a sustainable funded program to refresh computers,” adds Wilson. The vice chancellor for finance and operations has now made this program a priority.

One of the aspects that Hoover likes most about the surveys is the ability for respondents to add their own comments, noting that they are invaluable during funding requests.

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**More Video About TechQual+**
- **Why Are IT Service Outcomes Important?**
- **How Is the University of Georgia Using TechQual+?**

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**Tim Chester, CIO at the University of Georgia and principal investigator of TechQual+, explains the rationale behind the TechQual+ survey and conducts a brief demonstration of the product.**
“If you have a direct quote from a student that you can give to an executive, that’s golden,” he says.

Indeed, during these days of diminished resources, Hoover thinks TechQual+ data gives IT a leg up on other departments: “The data allows us to sit down with an executive and say, ‘Here are the needs, here are the direct quotes, and here’s how that’s trended over the last couple of years.’ Other departments don’t have that.

The ability to use the survey data to zero in on specific problems has certainly paid off at Pepperdine. When some survey participants reported that the wireless service in the dorms was bad, for example, See’s department was able to pinpoint the exact building with the problem, based on data provided voluntarily by the students.

Tracy Schroeder, VP for information services and technology at Boston University (MA), turned to TechQual+ in July 2009 when she first joined the school and “needed to get a relatively quick indication of how IT was doing.” One of the benefits of TechQual+, says Schroeder, is that “it’s a best practice for higher education. It was created by higher education for higher education.”

After three years, Schroeder recognizes that TechQual+ does have some limitations—it’s not a crystal ball by any means—but she believes the tool will only get stronger as more institutions implement it and begin to compare their performance. “My hope is that more institutions will adopt TechQual+ so that it will enable us to measure the impact of investments, and do more complete benchmarking,” she says.

In the last year, the number of people taking the survey across institutions has increased 64 percent, from around 70,000 respondents to 115,000. Survey says…Schroeder might get her wish.

Michelle Fredette is a freelance writer who splits her time between Portland, OR, and Seattle.
OPEN SOURCE  
david raths

7 Questions to Ask Open Source Vendors
Open source vendors can save institutions money and resources, but it’s important to ask the right questions up front to avoid surprises.

WITH THEIR BUDGETS under increasing pressure, many campus IT directors are considering open source projects for the first time. On the face of it, the savings can be significant. Commercial emergency-planning software can cost upward of six figures, for example, whereas the open source Kuali Ready might run as little as $15,000 per year when hosted by a consortium.

But it’s important not to be seduced by the numbers alone. Especially for smaller institutions such as Hartnell College in Salinas, CA, tackling an open source project on their own can be dicey, says Matthew Coombs, vice president of information and technology resources. “We have very few IT resources,” he explains. “We have two people to manage 2,000 desktops, one network administrator, one telecom person, one web person, and a few lab techs—that’s it.”

For Hartnell to consider open source solutions such as Kuali Financial System or the Sakai LMS, Coombs knows he would have to rely on one of the growing number of vendors, such as VivanTech, rSmart, or Unicon, that offer support and services around open source software.

For smaller schools, it’s almost always less expensive to work with a vendor that can spread costs over many institutions than to hire personnel to run the software in-house. “But even larger schools with a lot of resources could benefit from an affiliate partner,” adds Coombs, “because the companies have already done these implementations two or three times and have been through the learning curve themselves.”

While these vendors can save institutions time, money, and resources, it’s important for IT leaders to clarify exactly how the relationship will work and what’s included in the service contract. Many of the issues that IT departments routinely hash out with proprietary software vendors apply in the open source market, too.

Total cost of ownership and return on investment are probably the two biggest, but there are some questions unique to the open source arena that need to be answered as well. Before taking the plunge, make sure you have answers to the following seven questions.

1) Is there a rich ecosystem around the software?

UMassOnline, the online arm of the University of
Massachusetts, uses vendor Unicon to host and support its Drupal open source content-management system. Patrick Masson, chief technology officer, says he always looks at the size and vitality of the community around a project before considering open source. “If I became displeased with Unicon, I could just go somewhere else,” he says of the Drupal community, which consists of a host of active user groups as well as vendors. “If there are several different vendors in the space, I can change pretty easily.”

For some open source solutions, the online community is so vibrant that resource-starved schools can often find the help they need for free. The WordPress blogging tool, used by Macaulay Honors College at the City University of New York as an LMS, is a good example. “We’ve found that if a question or an issue comes up, somebody within the larger user community has already found an answer,” says Joseph Ugoretz, associate dean of teaching, learning, and technology. Universities can also use an open source service provider to stand something up, and then migrate it in-house later without worrying about vendor lock-in. “It is a risk-mitigation approach,” notes Masson.

2) What type of governance structure does the open source project utilize?
Implementing an enterprise system, be it open source or proprietary, is a major commitment. Given that, it’s important to verify that any open source project has a stable governance structure built for the long haul. “There are many different types of governance, from complex committee structures to one despotic leader,” says Gunnar Hellekson, chief technology strategist for the public sector for Red Hat, an open source vendor. Like universities, Red Hat has to decide whether it will support a certain piece of open source software—often for as long as 10 years or more. “We
look at the governance and activity level," adds Hellekson. “We are wary if there is only one leader rather than a diffuse leadership. That tends to increase the risk level.”

3) How active is the vendor in the open source community?
Open source projects are living, changing products. Institutions should look for vendors that are plugged into the broader community and are active participants. Some vendors just pay the membership fee for access to the software and use the logo, but they don’t contribute much back, notes Maggie McVay Lynch, chief academic officer at consulting firm Thanos Partners and chairman of the board of the Sakai Foundation. “Others are very active in the community, always contributing back code to improve the core product and participating on boards.”

She cites rSmart as an example of a vendor that is very active in the Sakai community. “To me, that means they are plugged into the community, are part of the culture of that common core, and will have the latest information on bug fixes or latest releases.”

McVay Lynch also notes that open source software changes more rapidly than vendor-driven software. In a relatively brief period, for example, there may be 25 new enhancements. Institutions should clarify with their vendor how they are going to deal with these enhancements. How much involvement will customers have in deciding which ones the vendor will offer, and how quickly will they be made available? Will the vendor share its timeline of development?

4) What are the licensing options, and what are the exit costs?
With any software, it’s important to understand not just the entry costs, but the exit costs as well. How simple would it be to switch support vendors? The answer may be related to licensing issues, says Red Hat’s Hellekson. “Some open source software has a core kernel that is open source, but everything else about it is rather closed or proprietary,” he explains. “This is called open core.” The heart of the software is free, but the tools the vendor has built on top are all closed. This may diminish its value as open source. The key is to ascertain what is valuable to your organization. Some schools may want a particular set of functions and features, and don’t care about having the...
f灵活性 to switch vendors.

The whole contract process is a little different, too. Open source separates the software license from the vendor contract, which is usually a subscription for services. This approach is often new to university legal and procurement teams, which may need some time to become acclimated. It becomes easier over time, however, because licenses are the same for different types of products.

5) How flexible is the vendor?
While exploring mobile-technology solutions last year, IT leaders at Villanova University (PA) looked at eight or nine solutions. One of their key criteria was flexibility, leading them eventually to choose the open source Kurogo platform from Modo Labs, which offers a modular approach.

“We originally signed up for their Mobile Campus offering, which has 10 to 12 modules,” explains Joan Lesovitz, director of instructional technologies. “If we want more development or customization, we pay for it. For instance, we paid for the Courses module that integrates with learning management systems.”

A key benefit of Kurogo being open source is that other groups on campus can use it to develop mobile modules of their own. “With proprietary software, the vendor would do that type of development itself and charge for it,” notes Jennifer Pohlhaus, assistant director for multimedia technologies. “Some commercial vendors will even charge you for things like formatting changes. This felt more like Modo Labs was a partner in helping us get set up.”

6) How engaged will the vendor be with IT staff?
If your staff members are going to be working on improvements to the open source software, you may want a vendor that will support them and serve as an advocate for when they contribute patches to the community. Andrew McAllister, manager of academic computing for OCAD University, an art and design university in Toronto, says contributing to open source projects is an important element of staff development.

“It’s an exciting learning opportunity that will provide staff members with a challenge,” he notes. “This will be one of their opportunities to do interesting work. We like to get under the hood and do some development work. Of course, with that additional control comes additional responsibility.”

Last year, OCAD switched from a homegrown LMS to Instructure’s Canvas, and it has had a great experience so far, McAllister says. OCAD’s developers can engage in a vibrant community on an IRC chat channel and get almost instantaneous responses from Instructure.

7) Which charges are additional?
Most open source vendors will give you a slick demo of how the software operates. When it’s time to sign the annual subscription, however, study the contract closely to understand what actually comes with the vanilla product, advises Thanos’ McVay Lynch.

If, for example, you expected that integration with your student information system would be included—only to find out it isn’t—your institution might be on the hook for an additional $25,000. “It isn’t that these vendors are being secretive,” stresses McVay Lynch. “We come with certain conceptions of what is included when we purchase software, but this is a different realm.”

It’s advice echoed by Hartnell’s Coombs, who urges IT leaders to figure out what they are not getting with the software and service agreement, and what kind of staff skills they will need. “You have to ask yourself: ‘Is it important that we have a support number to call?’” he explains. “If the answer is yes, that might be an additional $30,000 to $50,000 per year in support charges. Even so, it’s likely much cheaper than what you would be paying a commercial vendor.”

David Raths is a freelance writer based in Philadelphia.
TUNING THE WIRELESS

CT examines the 6 biggest challenges to improving wireless service on campus—and learns how three schools are forging solutions.

COLLEGES AND UNIVERSITIES have got a big problem: how to bake a wireless network as good as Mom’s. “That’s the root of all the challenges,” declares Eric Hawley, CIO of Utah State University. “I want a $2 million wireless network that’s just as good as the cheap $40 one you run at home.”

As Hawley sees it, the problem is that enterprise wireless networks “tend to be a little more finicky” than the home ones. “They tend to drop clients a little bit more than a home wireless network does,” he explains. While the home devices are plug-and-play, enterprise networks force IT departments to manage client issues such as drivers
and settings. It’s a problem, furthermore, that vendors have not fully solved—no matter what some may say.

So, with students showing up with expectations of ubiquitous wireless, schools are scrambling to implement a variety of strategies to give them what they want. CT looked at the six biggest challenges to providing a reliable wireless network on campus—and how schools are addressing them.

1) Access Point Placement

As people move across campus, they expect their mobile devices to stay connected. The challenge facing schools is to eliminate any gaps in coverage that might result in dropped calls or choppy internet connections, and to provide enough coverage in high-traffic areas without causing signal interference.

Achieving this goal requires some form of site survey that examines the campus’s layout and other physical aspects, such as the kind of building materials used in construction. Once the survey is complete, the IT department should know how many access points (APs) are needed; the kinds of antennas that should be used; where all this gear should be sited and in what density; and on which channel and power setting each AP should operate.

A physical site survey is the usual approach. At John Carroll University (OH), for example, a consultant used Fluke Networks’ AirMagnet Survey to figure out where to place 800 Cisco 802.11n APs. The consultant “literally walked all of the different rooms in the distant corners,” says Jim Burke, associate CIO.

Not everyone is a fan of the walk-through survey, though. In the view of Ryan Laus, network manager for Central Michigan University, such an approach is expensive and time-consuming. More important, he says, it isn’t reliable.

“You’re looking at a clean RF environment, without tons of people bringing in devices and polluting the air with signals,” he explains. “When you throw some human bodies in there, your whole RF could be different.”

Instead, when CMU places new Cisco APs—the school deployed 1,000 during an 18-month period starting in summer 2009—Laus employs utilities within Cisco’s Wireless Control System and Network Control System. His team imports CAD drawings of buildings and then places APs on the map to show the strength of the signal.

“We have found that the maps are pretty accurate and we have been pretty happy with the results,” he says. “We rarely have to go out and do a physical site survey.”

But geographic surveys—whether virtual or physical—address only one aspect of the challenge. The biggest problem, says Mike Bestul, CIO of JCU, is keeping reliable coverage in areas where students congregate and use multiple devices.

“The congregation places change depending on weather,” he notes. “If we have a mild winter, we see more students outside. Therefore, we might need more coverage outside than we originally thought.” To accommodate these vagaries, the university has purchased its own license to AirMagnet, allowing it to continually tweak its AP placements.

Utah State has taken a completely different tack. The school deployed a wireless system from Meru Networks that utilizes a proprietary virtual cell technology that provides coverage on a single channel without interference. Because of this, site surveys can be easy to conduct—and sometimes not required at all. Like every vendor solution on the market today, however, it’s not a panacea.

“[The technology] is exceptional and amazing for scaling and performance,” says Hawley, but he acknowledges that it can have problems with legacy devices, such as Wii game consoles.

2) Identity Management

Before the advent of mobile devices, it was a simple matter for IT to know who was doing what inside the firewall. When a problem surfaced, the computer could be booted off the net-
Hosted Software Shifts Focus to Business of Learning

Quad College Group improved operational and financial efficiencies and boosted communication among student, faculty, and staff at multiple campuses, thanks to CampusCruiser's cloud-based portal and learning management system.

For the director of distance education at Quad College Group, which owns a number of private higher education institutions, receiving regular emails from CampusCruiser is a reassuring reminder of the constant vigilance the hosted system offers.

“We don’t even think of the technology on the back end—I have no idea which version we’re on,” according to Quad College Group’s Malcolm Younghren. “It just continues to work. That lets us focus on our goals.” Those goals include enhancing students’ online learning experience by rolling out CampusCruiser’s learning management system and portal product at a number of Quad schools.

Quad College Group is part of Quad Partners, a private equity and investment firm focused on education. As director of distance education, Younghren oversees online learning efforts at 84 Quad colleges.

CampusCruiser, the suite of products that Quad uses at a number of its schools, offers its products as software-as-a-service, or SaaS, meaning the vendor maintains the software offsite. The arrangement—also referred to as a cloud-based or hosted service—means colleges have no software or hardware installation, and no ongoing maintenance or updates. The CampusCruiser suite includes an LMS, portal, emergency alert system, and a new offering called Academic Alert that can help clients identify students at academic risk and promptly intervene.

For Quad, CampusCruiser’s suite offers both operational and financial efficiencies, and is helping to enhance communication among students, faculty, and staff. As is common with smaller institutions, none of the Quad schools using CampusCruiser has sufficient technical resources internally to support large software implementations in-house, Younghren said.

Since Quad-owned schools often have very different personalities and focuses, schools can create a variety of portals, or entry points to the web site, to offer different sorts of web experiences and styles to their users. A school might build separate portals for instructors, alumni, the public, and students, for example. “Students just want and expect to go to one site for all of the information they need,” Younghren said. “CampusCruiser lets us do that efficiently.”

The ability to largely ignore the technology and instead focus on the business of learning allows Quad schools running CampusCruiser to zero in on what Younghren calls much more important issues with a new LMS or portal: managing the change itself.

Younghren’s advice for shifting small colleges to an LMS: let an individual institution’s pain points drive the process. For example, one feature in the LMS is the ability to record
grades and take attendance—tools that can save faculty lots of time. Focusing on those benefits in CampusCruiser LMS have helped foster acceptance of the new system among faculty.

One of Quad College Group’s schools is Pacific College of Oriental Medicine. PCOM, with campuses in San Diego, Chicago, and New York, provides Oriental medicine and body therapy education to students worldwide. Its initial rollout of CampusCruiser, at the San Diego campus, began in 2010 and is a gradual, continuing process, according to Walter Muryasz, director of online services at PCOM. The college is also using CampusCruiser Portal, and was a beta-tester earlier this year for another CampusCruiser product, Academic Alert, that it will be implementing once training is complete.

Because he is part of a small technical staff, Muryasz liked the hosted aspect of CampusCruiser immediately. The college moves carefully in rolling out any new technology, he explained, so off-site support for the LMS allowed IT staff to focus on the content and users, not the product: “It was an easy way to get us started in an LMS.”

Despite the cautious start, there are already 2,700 students from all three campuses in the LMS database and Muryasz has created a “shell,” or content-ready template, for each course the college offers. The shell makes it easy for instructors to begin using the LMS with little or no setup. As a result, more and more faculty have begun using LMS for attendance, Muryasz said, and are moving on to using the grade book feature.

CampusCruiser Portal was also important—for example, a model student services portal is underway for the New York campus to offer a central area for students, and a faculty governance committee portal. Each is being created at the measured pace that Muryasz finds works well at PCOM. Some aspects of the services portal will be general for all three campuses, and some will be specific to each campus. “The college is growing in different areas on different campuses,” he said. “This approach allows us to tie all three campuses together while preserving the identity of each.”

In all, the easy path to entry, round-the-clock monitoring, and interoperable suite the hosted software offers have made it a solid partner for PCOM and for Quad College Group as they move further into virtual campuses and online learning.

CampusCruiser
9 Law Drive
Fairfield, NJ 07004

www.campuscruiser.com
work until the user played by the rules.

In a wireless environment, knowing who’s who becomes a lot tougher, especially with students using multiple devices simultaneously. Some schools publish a self-service guide to registration, while others hold “connectivity days,” where students bring their devices to IT for help in hooking into the network. Neither of these approaches is scalable or particularly user-friendly, though. A better approach is to automate the whole process using an identity-management mechanism. In this scenario, when users log in with their normal campus credentials, an identity management program assesses the security of their devices and brings them into compliance without IT intervention.

When users at CMU go onto the school network for the first time, for example, the institution’s Bradford Networks network access control (NAC) system confines their access to a registration page where they must agree to terms. After they register their devices using their global IDs and passwords, the NAC system moves the devices into the production network, where users can access all the role-specific resources granted to them as students, staff members, or faculty.

The Bradford appliance uses a “dissolvable agent” that can run on Windows, Mac, and mobile devices. The agent enables the university to enforce security policies for viruses, service pack updates, and elevated privileges on individual clients, both wired and wireless. It’s described as dissolvable because the agent runs once and then disappears from the device.

“We saw a huge decrease in the number of infected machines, better network performance, and happier users,” reports Laus about the system. It also keeps IT abreast of which operating systems are gaining in popularity, what antivirus solutions are being run, and which kinds of users take up the most bandwidth.

Utah State has even managed to turn registration—often seen as a hassle—into a selling point. According to Hawley, registration is a “one-second process” that takes place for each device every 12 months. Users log in, click “Register My Device,” and the system already knows their MAC address. More technical students are able to pick their own host names to run their personal servers and register and manage their own devices. “It’s really cool because you can’t do that with Comcast,” insists Hawley. “You can’t do that at home.” This feature, together with the university’s gigabit connectivity, is a persuasive marketing tool for on-campus housing.

3) Network Security

At this point, home-based WiFi is essentially a utility—it’s assumed that a user can turn on a device, plug in an SSID key (not a particularly secure approach), and thereafter access the internet through that network. Students come to school expecting something similar, but such an approach doesn’t work in an enterprise setting where network resources need to be protected.

At home, a data breach would affect only the people who live at

“Congregation places change depending on weather. If we have a mild winter, we see more students outside. Therefore, we might need more coverage outside than we originally thought.”

—Mike Bestul, John Carroll University
that address. At the college level, a data breach could affect hundreds of thousands of users and cost the institution a fortune—and its reputation.

For that reason, schools often run two levels of access: one for users to surf the internet and read e-mail, and a second to give users entry to network resources that require greater security. The challenge is to educate users about the differences between the two and to persuade them to go the more secure route.

At JCU, the secure portion of the network requires authentication via an Active Directory login. As an incentive to use it, users receive bandwidth that, according to Bestul, is a “little better” than the open network. Users also gain access to resources that aren’t available on the open network, although in truth most students don’t care about these.

JCU’s two-level access is an evolution from an earlier policy that required students to register their computers and log in to gain any kind of WiFi access. The school opted to switch to a two-level system after students complained that the network was too tightly controlled. Even then, school administrators debated ways of pushing students to the secure side of the network.

“We did have some discussions among our consulting team and our staff about how to put this in place,” Bestul recalls. “Should we force students to join the secured network by ratcheting down the open side of it to the point where it’s virtually unusable? I personally think I made a wise decision by saying, ‘No, let’s not do that.’”

**Schools often run two levels of access: one for users to surf the internet and read e-mail, and a second to give users entry to network resources that require greater security.**

When your campus relies on cutting-edge technology, you can rely on us. Helping higher education go even higher is how we’re engineering a better world.

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It was a conscious decision to forgo some security protections in favor of a more user-friendly system. As a result, most students do opt to stay on the open network. While IT can still shut students down via the Cisco firewall, says Bestul, “we don’t have a really good way of telling who they are.”

It’s a balancing act with which IT managers on campuses nationwide are all too familiar. Utah State and CMU also have a second tier of security, which requires authentication each time a user gets online, but neither IT organization is delighted with the results. The benefit is more privacy for the user, such as encryption of data passing over the network—and more security for the institution. But it’s tougher to work with, too. For starters, users have to configure their devices for advanced encryption.

“This is where enterprise networks are just more complicated than the $40 stuff users have at home,” notes Hawley. “You’ve got the whole certificate-management thing on enterprise networks, which is a nightmare from a usability standpoint.”

4) Rogue Networks

It’s a vicious cycle. Students and faculty, unhappy with their wireless connectivity, set up their own rogue wireless networks. In turn, these networks pollute the wireless signal on the existing network, further degrading system performance and leading even more students and faculty to go rogue. The challenge for schools is to stamp out these pirate networks, while simultaneously improving their own network so students won’t feel the need to go outside the system.

Even if the university network is reliable, however, some students will inevitably want to set up their own networks in resident housing. “There’s nothing inherently wrong with that,” says Bestul. “But if it conflicts with your regular university-provided network, it can cause problems with all the other students down the hallway.”

For a while, JCU’s only solution was to send IT staff out to knock on doors, trying to ferret out the location of the rogue network. Then the university implemented Cisco’s CleanAir, which provides visibility into the radio frequency spectrum to expose sources of interference. Now, IT can identify where bandwidth issues are taking place and where the network is being saturated with conflicting signals. IT still knocks on doors, but this time it can pinpoint the source of the problem. “Either we get students to shut their network down, or come up with some different channel or something of that nature, so that we get our own network back to the performance level where it needs to be,” explains Bestul.

5) Privacy Protection

Mixing mobile devices and sensitive data is a disaster waiting to happen. All it takes is for a staff member to copy a file onto a flash drive, and then lose the device or leave it where somebody might find it. Suddenly, IT is in the hot seat performing mitigation work.
To address the problem, CMU uses a two-pronged approach. First, university policy forbids the copying of data onto mobile devices in departments that must be in compliance with the Health Insurance Portability and Accountability Act (HIPAA) or Payment Card Industry (PCI) data-security standards.

Second, the school requires that all WiFi devices used to access HIPAA data run WPA2, a protocol specifically designed to require the use of stronger wireless encryption than the previous iteration of wireless security. And since a thumb drive can’t run WPA2, it is unable to access the systems that carry HIPAA data. Active Directory is used to configure the wireless profile to enforce policy.

To further protect the data, CMU also requires that each machine go through a HIPAA-certification checklist. “Once the machine passes, we use our NAC system to put it on a protected [virtual network] that has access to the HIPAA data,” explains Laus.

6) Lost Connections

Every campus seems to have at least one spot where no one can get wireless coverage—or the coverage is spotty at best. It might be a basement space converted into a student union; or a LEED structure with an advanced window coating that blocks RF signals; or a stadium where thousands of users simultaneously pull out their smartphones to share their feelings about the coach. A distributed antenna system (DAS) is one approach that can help address the problem (see “Connecting the Dots in DAS,” page 23).

Theoretically, DAS supports WiFi and that other kind of wireless connection—cellular. The technology uses small antennas connected by fiber and working in arrays to carry voice and data traffic in a specific area. So why not put it everywhere? For a variety of reasons related to channel usage, antenna degradation, and signal collision, DAS is a better choice for gaps in cellular coverage than for picking up the slack in WiFi. Plus, as Utah State’s Hawley declares, “It’s crazy expensive!”

Some schools in populous areas have been able to cut deals with neutral brokers to fund construction of a DAS infrastructure. These brokers make their money back by turning around and selling wireless access to carriers such as AT&T and Verizon. For its part, the institution may be able to negotiate some kind of revenue-sharing deal, even as it achieves targeted improvements in WiFi coverage.

As an alternative, JCU is testing Wi-Ex zBoost Pro YXC-3500, a low-cost multicarrier amplifier. Bestul expects the zBoost to “work well in a few of our below-grade locations on campus,” such as the dining hall and data center. These areas have non-exterior walls and lots of concrete, so cell coverage “has been spotty at best.” The solution will cost a few thousand dollars: about $300 to $500 for the amplifier kit, and about $2,000 to run wiring for a roof-mounted antenna. “We’ve been told that it will work with most US cellular standards except for iDEN from Nextel and 4G,” says Bestul.

Dian Schaffhauser is a senior contributing editor of Campus Technology.
Connecting the Dots in DAS

With the use of smartphones soaring, distributed antenna systems (DAS) offer schools a way to improve cellular service, even in the most problematic corners of campus.

**THE BAD NEWS** from campus is that students are not sleeping alone. The good news? It’s their phones they’re cozying up to. Indeed, a recent survey from HackCollege indicated that 75 percent of college students sleep next to their phones. The finding is a stark reminder of just how reliant today’s students are on their mobile devices, be they smartphones, tablets, or regular cellphones. In fact, many students consider reliable cell coverage as something akin to an inalienable right.

Surprisingly, even as schools push to deploy reliable WiFi networks, not all college campuses offer adequate cellular coverage. As students consume more content with their wireless devices, commercial wireless operators like Sprint, Verizon, and AT&T are under great pressure to handle the new data traffic. Uploading photos to Facebook and watching YouTube videos take up much more bandwidth than making a phone call. To help address the issue, many institutions implement a distributed antenna system (DAS) as part of a holistic approach to providing better wireless coverage and capacity on campus.

A DAS provides wireless service within a particular area or structure via a network of separate antenna nodes that are connected to a common source through fiber or coaxial cable. Because DAS antenna node installations are compact, they can be deployed either inside or outdoors. They are more expensive to deploy than macrocellular towers, however, so DAS networks are often used to augment coverage and address capacity constraints in a targeted area.

“Our goal is to find the most economical solution, which could include towers, rooftops, DAS, and WiFi,” says Mike Kavanagh, president of DAS sales for Crown Castle, the nation’s largest neutral-host DAS provider.

Major phone companies do deploy DAS networks, but a university population usually carries plans from a wide variety of carriers. As a result, it may make sense to contract with a neutral-host DAS provider, which can then contract with multiple carriers to carry their signals.

WiFi technology remains the mainstay of the campus computing experience, and DAS is not intended as a replacement. While DAS can accommodate WiFi—and some companies sell solutions bundling the two—the
results can be disappointing and costly. In addition, schools risk vendor lock-in that can be difficult and expensive to resolve.

WiFi does have some drawbacks, however. While WiFi networks are a good way to offer broadband connectivity and some mobility to students, they use unlicensed spectrum that can become overloaded from too many users, degrading the quality of the service.

One of the biggest differences between WiFi and cellular service involves emergency calls. WiFi was not designed to provide location information required when an emergency call is made to 911. For DAS vendors, this is a key selling point, especially since the Federal Communications Commission estimates that about 70 percent of 911 calls are made from cellphones.

“Parents want assurances that, in the event of an emergency, students can contact 911,” says Seth Buechley, president of SOLiD, a provider of DAS and optical network solutions. “Similarly, they want to know that communications from first responders and school administrators—as well as their own—will get through.”

Deploying a DAS Solution

For many institutions, the most economical way to obtain both coverage and capacity on campus is probably a hybrid approach that utilizes a variety of technologies, including DAS, other small cells, and even macrocellular towers. “Using a hybrid solution allows service providers to allocate capital to areas of the campus where a DAS is the only viable solution,” says Gerard Ainsztein, senior VP of managed networks at American Tower, a nationwide neutral-host DAS provider.

Collaborative efforts among the university, wireless carriers, and neutral-host providers are needed to manage expectations among the parties involved. While a university may want the best possible service in every building and around campus, such a goal may be unrealistic, says Tormod Larsen, CTO of ExteNet Systems, a neutral-host provider.

**Where’s the Cash in DAS?**

**DAS DEPLOYMENTS** can require large upfront capital investments and be financed in a number of ways. There are three basic ownership models, but all require carrier approval:

1) In a carrier-owned DAS, a wireless service provider pays for the equipment and installation costs, as well as any maintenance and upgrades. While often built for exclusive use, the operator may charge other operators to attach to the DAS.

2) Building owners and managers are responsible for all the costs. In this scenario, it is important to get wireless service providers to approve the design and installation.

3) A neutral-host third-party provider bears the costs of the DAS. In this scenario, the DAS company aims to get more than one wireless service provider on the network and split the costs among the providers.

**Join the Conversation**

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provider that owns and operates distributed networks including DAS and other small-cell solutions. Larsen advises universities, wireless carriers, and neutral-host providers to set realistic goals and expectations about what services can be provided where and when.

DAS deployments on campus can be particularly tricky because there is a wide range of venues, as well as many constituencies with different goals. “Everything from historical societies to arborists’ concerns could impact the proposed design, which is a bit outside the realm of engineering,” notes Peter Murray, director of wireless solutions at CCI Systems, based in Michigan.

“Technically, it often requires different DAS systems to solve the issues surrounding indoor deployments, outdoor coverage, and the capacity issues of stadiums and arenas.” Successful deployments are often done in stages that can occur over the course of a few years.

Because a DAS is expensive to install, third-party providers and carriers prefer long contract terms—usually 10 years—to justify their investment (see “Where’s the Cash in DAS?” page 24). “This allows both the neutral-host provider and the wireless-service providers to benefit from the DAS over an extended period and earn a reasonable return on their invested capital,” explains Ainsztein. “The minimum 10-year term will also result in a higher number of carriers that will utilize the DAS, which ultimately benefits the campus and the students.”

Universities can help bring down the cost of a DAS by contributing existing campus assets and resources such as fiber, space to house the DAS base-station hotel, and staff familiar with the existing IT infrastructure. Universities can help bring down the cost of a DAS by contributing existing campus assets and resources such as fiber, space to house the DAS base-station hotel, and staff familiar with the existing IT infrastructure.

Before a school deploys a DAS, administrators should consider what additional services they might want to provide via the network. According to Ray Hild, director of channel sales at Corning MobileAccess, many colleges and universities use their DAS to add applications covering student safety, security, and event and transportation updates. Some schools even push courseware to wireless devices, while others use it to make money from third-party vendors by sharing revenues from apps designed for campus use or from advertising opportunities. CT

Tracy Ford is director of The DAS Forum, a membership body within PCIA, the Wireless Infrastructure Association.
By Michelle Fredette

REWITING THE JOURNAL

With faculty balking at the high price of traditional academic journals, can other digital publishing options get traction?

THIS SPRING, more than 12,000 science, math, and humanities researchers signed an online petition against the academic publisher Elsevier, pledging not to publish in, referee for, or edit Elsevier journals. The protest, sometimes referred to as the Academic Spring, is the most public manifestation of growing unhappiness with the giant publisher over a number of issues. As the name of the petition website—The Cost of Knowledge—suggests, academics accuse Elsevier of charging exorbitant rates for individual journal subscriptions, forcing libraries to buy journals in bundles that include titles they don’t even want.

On top of that, Elsevier stands accused of trying “to restrict the free exchange of information” through its support of legislation such as SOPA, PIPA, and the Research Works Act. Introduced in December 2011, the RWA would prohibit the digital dissemination of any research funded by the federal government for which a publisher has already entered into a contract to provide editing or peer review.

The petition was launched on the heels of a blog post by Timothy Gowers, a Fields Medal-winning mathematician at the University of Cambridge (UK), who first griped publicly about Elsevier’s practices. “If you publish in Elsevier journals you are making it easier for Elsevier to take action that harms academic institutions, so you shouldn’t,” Gowers wrote.

The protest has definitely had an impact. On Feb. 27, a month after The Cost of Knowledge site launched, Elsevier announced that it was withdrawing support for the RWA, due to concerns that “the Act seemed inconsistent with Elsevier’s long-standing support for expanding options for free and low-cost public access to scholarly literature.” The company also agreed to lower per-article and journal prices and to allow open access to more of its archives.

For many academics, Elsevier’s move represented a real victory. “I see the boycott as a great example of author advocacy resulting in changing publisher practice,” says Michael Boock, head of the Center for Digital Scholarship and Services at Oregon State University Libraries.

But how much has really changed? While the boycott managed to extract some concessions from the publisher, the Elsevier saga also served to focus attention on the broader world of
academic publishing. And, by many accounts, it’s an unbalanced world indeed, with commercial publishers taking research, editing, and peer reviews provided for free by scholars and selling them back to the community at prices many can’t afford.

Unfortunately, scholars are caught in a classic catch-22. As part of the career-advancement structure in higher education, they must place their work in high-profile journals or risk being passed over for hire, tenure, or promotion. It’s fair to ask then, what options remain for those scholars who have turned their backs on Elsevier’s empire of academic journals, or who feel similarly about other major academic publishers such as Springer and Wiley?

The great hope, of course, is—and has been—the internet. But what will it take for web-based alternatives to gain traction, given how entrenched the current system is in academia? Could the Elsevier boycott finally be the spark that lights the fuse?

Open-Access Archives
University libraries are no strangers to one of the most popular online alternatives, the open-access archive. These archives enable scholars to upload work—including drafts of articles that are published later in subscription journals—so they can be accessed for free by the public. Members of the Oregon State University community, for example, can add their work to ScholarsArchive@OSU, which provides full-text search, long-term hosting, and view and download statistics for the work.

Cornell University Library owns arXiv.org, one of the most popular—and populated—open-access archives, with more than 750,000 articles on physics, mathematics, computer science, quantitative biology, quantitative finance, and statistics.

Even so, ArXiv isn’t a publishing mechanism—it’s a means for sharing. Its mission is to open up a tremendous body of scientific research to the public at large, but it employs only a couple of quality checks:
Authors submitting articles for the first time must be endorsed by established contributors, and all articles are moderated to make sure they’re relevant, add value, and are “of refereeable quality.”

Despite the lack of a rigorous vetting process, these kinds of open-access archives are proving to be of enormous value to scholars. “The really interesting papers get disseminated and discussed long before they ever appear in a journal, because they go on the archives and news spreads quickly through blogs,” noted Gowers during a 2012 debate at **Oxford** University (UK) about open science and the future of publishing. “It’s very, very natural for a significant percentage of mathematicians to support open access because it just seems crazy not to... when all the dissemination is taking place before publication. That’s not true for all papers, of course, but it certainly seems to be true for the papers that one cares about.”

It should be noted, however, that Gowers is an award-winning mathematician with an established career. His advocacy for open-access publishing stems from a desire to further academic inquiry and redress what he perceives to be unfair pricing by publishers. In the current higher education environment, though, no up-and-coming scholar can advance his career by placing articles in an open-access archive alone. In academia, there’s no prestige in self-publishing.

**The Prestige Factor**

Fair or not, prestige matters. Publishing in high-profile journals—or failing to do so—can make or break a career in academia, where the American Association of University Professors estimates the ratio of tenure-track openings to new doctorates at around 1:4.

Having an article appear in a big-name publication isn’t just a win for the scholar. Schools use the prestige of their faculty to bargain for bigger budgets, draw new hires, and recruit students. Prospective students look for programs with high-profile faculty whose reputations will give them a boost in the grad school, post-doctorate, and job markets. The stakes are high, particularly in the hard sciences where there’s big money to be won.

Which explains why new journals—or new digital modes of scholarship—are slow to take off. A journal’s prestige comes from its reputation; the renown of its editors, reviewers, and contributors; and from other factors, such as its acceptance rates and how often its articles are referenced by other scholars. A group of high-profile scholars can come together to create a high-stakes journal, but it can still take years to build a reputation.

Until recently, researchers have largely been insulated from the pricing strategies of commercial publishers, since their school libraries have been able to pay the high subscription fees, which range from a few hundred dollars to more than $5,000 per year, depending on the title. The situation is not sustainable, however, with librarians contending that journal prices “continue to rise well beyond the rate of inflation and beyond the Consumer Price Index,” says Michael Boock, head of the Center for Digital Scholarship and Services at **Oregon State University Libraries**.

Publishers initially explained away high book and journal prices as being necessary to help build their digital-publishing platforms, but, Boock points out, “that migration happened a long time ago now.” Due to persistent price boosts, the move to a digital format—supposed to make accessing publications easier—has actually decreased access because libraries can no longer afford to subscribe to as many journals.

In the face of high costs and slashed budgets, libraries are developing some nimble solutions to fulfill their mission. OSU Libraries, among others, are moving from the traditional “just in case” model, where they order books they think their communities will want, to a “just in time” model, where they buy books on request or borrow them from other libraries.
The deck is further stacked against new entrants by the directories that rate journals. Thomson Reuters’ Journal Citation Reports and Cabell’s Directories require journals to publish consistently for years before they’ll rate them. As a result, it’s difficult to know the status of a journal until it’s been up and running for about five years.

In addition to prestige, an institutional bias against collaboration is also slowing innovation in digital publishing. “There has always been more credit toward tenure and promotion for single-authored work,” notes Howard Besser, director of the Moving Image Archiving and Preservation master’s program at the Tisch School of the Arts at New York University. “In most cases, you have to write a detailed explanation of your work and what each of your coauthors did. It can feel punitive.”

But just as collaborative learning is an emerging trend in classrooms, collaborative scholarship is on a similar trajectory. At the Oxford debate, Gowers related the story of how he posted a challenging math problem on his blog and encouraged others to help solve it by posting comments. “This was quite a tough problem, and six weeks later it was solved,” he recalled. “It was quite unprecedented. It was the sort of problem that I would have expected an individual to work on for months or years.”

Besser sees collaboration across disciplines as “absolutely the trend in digital humanities, where scholars put together projects that defy the normal model of journal publishing.” Such projects often require the expertise of computer programmers and user interface designers.

One such project is The Valley of the Shadow, an online archive of material from one Southern and one Northern county before, during, and after the Civil War, all amassed by faculty at the University of Virginia. Letters, diaries, county records, photos, and maps show the changes that took place during this time span.

“The normal model would be to gather materials and write a history for a book or journal,” says Besser. Instead, the site provides different routes through the materials, and invites visitors to find their own paths as well. The site doubles as both “the curatorial vision of the creators” and a resource for other scholars.

Open-Access Journals

For scholars who don’t want to build an entire site, there is the option of publishing in an open-access journal, of which there
are thousands. Many open-access journals have become well established in their fields, but with a catch. Since they don’t charge article or subscription fees to readers, many journals charge author’s fees instead. Big author’s fees. It costs $3,000 to submit to Elsevier’s open-access journals. The Public Library of Science, publisher of such journals as *PLoS Biology*, *PLoS Medicine*, and *PLoS ONE*, charges authors between $1,350 and $2,900.

According to the publishers, these costs cover peer review, journal production, and online hosting and archiving. In some ways, though, the model is every bit as strange as the subscription model: One system charges libraries high fees for scholarly work done for free, while the other charges scholars for the privilege of sharing their work with their peers.

It remains to be seen whether there’s enough pent-up frustration in academia to overturn systems that are stacked in favor of publishers. Certainly, the anger was bubbling long before the Elsevier boycott of 2012. Back in 2006, for example, the entire editorial board of the Elsevier journal *Topology* resigned in protest over the company’s high library-subscription costs and ended up launching its own periodical, the *Journal of Topology*.

There are encouraging signs that new open-access journals—following fair publishing practices—can achieve success online. One example is *Herpetological Conservation and Biology* (*HCB*). Started in 2006 by about 100 herpetologists who saw the need for a journal covering descriptive or natural history subjects, it relies on the sweat of a large stable of editors and production costs of around $100 per year.

Because its founders had no money for the venture, the decision to make the journal digital was pretty easy. But the perks of an online format go beyond cost. Not only is the journal free to the public, but there are no page costs or space limitations, so *HCB* can publish longer articles, selected monographs, and large amounts of accompanying data (for print journals, authors often have to summarize the data in a table or figure).

From the beginning, the journal has operated on the philosophy that “it’s better to have more editorial staff looking at fewer papers very thoroughly, than to have fewer editorial staff and end up with papers with problems,” says Malcolm McCallum, one of *HCB*’s managing editors. Researchers from around the world perform editorial work on the journal as part of the service component of their jobs. As the number of submissions expands, *HCB* increases its editorial staff to keep the workload from becoming burdensome.

*It remains to be seen whether there’s enough pent-up frustration in academia to overturn systems that are stacked in favor of publishers.*

The model has been so successful that *HCB* has received takeover offers from big publishers. “That’s not our goal,” states McCallum. “Our goal is to provide an outlet for this particular kind of research.” Since its inception, *HCB* has steadily gained influence in the field of herpetology, and was scheduled to be included in the Journal Citation Reports in June.

A more recent entrant to the open-access field is *Ada: A Journal of Gender, New Media, and Technology*, which releases its first issue this September. Published by the Fembot Collective, an interdisciplinary, international collaborative, *Ada* was conceived as a vehicle for the open-access dissemination of feminist research.
According to Carol Stabile, Ada’s editor and director of the Center for the Study of Women in Society at the University of Oregon, the collective set out to make feminist research available to anyone with a web browser, both inside and outside the academy. But the collective also intends to stand the traditional peer-review process on its head. For starters, it’s prepared to review materials other than text, including audio and video pieces.

“Around the country, more forward-looking departments and schools are figuring out how to evaluate this kind of work, and how to include it in tenure and promotion cases in ways that we haven’t in the past,” explains Stabile.

Accepted works of scholarship will be posted along with the comments of two reviewers, whose identities will be provided, and will be open for further review by Fembot members. After two weeks of feedback, the author has two months to revise and resubmit the work, which will then be posted on the website, open to review and comments by the world at large. By throwing the doors open on review and feedback, the collective hopes to make the process less daunting and mysterious.

It’s too early to say whether efforts such as these will forge a new path for scholarly publishing, or whether the Elsevier boycott will snowball into a true Academic Spring. The internet tools are certainly in place to support such a revolution, but the cultural fundamentals do not inspire hope.

While much of the anger about journal pricing has been aimed at Elsevier, the truth remains the company is a for-profit business that will charge what the market can bear. The real culprit in all this is the tenure-track culture of higher education that places a market-distorting emphasis on publishing in prestigious journals, often at the expense of academic freedom and efficiency.

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COMMUNITY COLLEGES serve on the front line of workforce development. With their focus on applied science associate degrees and technical certificate programs, they provide students with a high-quality, low-cost education that prepares them for careers in one to two years. And for students who can’t take time away from their family or work to attend a four-year school, they offer much-needed flexibility, too.

“Community colleges serve a broad spectrum of customers,” notes Ellen Gordon, program administrator for the Air Washington and National STEM Consortium grants and the building sciences programs at South Seattle Community College (WA). “Our customers are not only local businesses that hire our students, and people who are trying to get into the workforce, but also the community at large, and the members of the community who are trying to find their American Dream by bettering themselves through education. We want people to get a job, keep a job, and then get a better job. And the way you do that is to train them well in a field where there is job demand, and give them the math, science, and technical skills they need to continue improving their skills throughout their career.”

CREATING TECH PROGRAMS INDUSTRY WANTS

By Jennifer Demski

With the demand for STEM skills growing, community colleges play a key role in preparing students for local industry needs. CT looks at three ways schools are training the next generation of tech employees.

SOUTH SEATTLE COMMUNITY COLLEGE’s aerospace program relies on industry advisers to identify the skills, knowledge, and ability needed for jobs.
But how does a community college ensure that its curriculum is up-to-date and aligned with the skills its students need in the workforce? To answer this question, Campus Technology recently spoke with representatives from SSCC, whose area is home to Boeing and a growing aerospace-manufacturing industry, and Anne Arundel Community College (MD), whose local economy is built around government, military, and defense contractors. Here are their three keys to providing students with the training that local industry wants:

1) Identify the Needs of Your Community

Advisory boards are a key resource for ensuring that students learn the skills they’ll need in the local economy. “We have advisory boards both collegewide and at the program level,” notes Marjorie Rawhouser, assistant professor of engineering at AACC. In assembling these boards, she advises, look to companies in the region that hire a large number of graduates, or companies that hire a large number of professionals in relevant fields.

“In the engineering department, our advisory board meets twice a year and is made up of people who are currently working in the industry, people who’ve recently left the industry for education, or people who have a lot of experience teaching in the industry in various locations,” she explains. “It really helps us stay plugged in to what’s happening out in the field.”

While advisory board members advise the college on curriculum issues, they also share their knowledge about new positions needed in the field, as well as internship and co-op opportunities. The members of any advisory board should encompass all types of local industries that may need the skills taught in a program. For example, the advisory board members for AACC’s CyberCenter (a program focusing on IT security) span healthcare, defense contracting, government, education, retail, and other organizations.

“It’s not just government that’s interested in information assurance,” explains Kip Kunsman, director of the CyberCenter. “Everyone needs to protect their data and their networks. Any organization that you can think of where you might swipe a credit card or share personal information via the internet is very interested in making sure that they maintain a secure environment.”

When AACC started its collegewide STEM initiative in 2007, it also formed a small advisory board made up of government and military partners, local industry partners, and campus workforce-development administrators. “Our county executive supported a three-year-plan to establish an AACC regional STEM center at the Arundel Mills facility, which is close to Fort Meade,” says Richard Cerkovnik, director of the STEM center. “The three goals that we have are: to increase the pathways for students to enter into STEM programs or certificates through outreach at the K-12 level and articulations with four-year schools; to increase the number of highly qualified teachers in STEM; and to prepare the workforce for STEM. Those three goals together cover pretty much everything. There’s nothing in STEM that we don’t get to do.”

When developing a new program for a growing industry, community colleges should realize that they don’t always have to start from scratch. Often, government-launched consortia will research the industry’s needs, from the type of skills needed to the number of trained workers required. While Boeing is a major adviser for SSCC’s aerospace programs, the college’s programs must also serve the needs of the industries in Boeing’s supply chain—a growing area, especially with manufacturing now on the rise in Washington.

“In the aerospace industry right now, there are more than 20 consortia looking at industry needs from a very high level, and they all have industry representation,” remarks Gordon. “As specific types of jobs are identified, we have [consortia] people come in for a structured interview to identify the skills, knowledge, and ability needed for these jobs, so we can train to those specific needs.”

In assembling advisory boards, look to companies in the region that hire a large number of graduates, or companies that hire a large number of professionals in related fields.
2) Don't Let Your Program Exist in a Vacuum
When it comes to actually teaching these specific skills, there also has to be open communication between industry partners and the school, especially in fields related to information technology, where industry standards evolve at breakneck pace.

“We can’t sit in a vacuum relying on our own expertise, because there’s just no way that our faculty and subject-matter experts can be everywhere and experience everything that’s going on externally,” explains Kunsman. “Obviously, there are industry secrets and proprietary information that different companies own, but, where possible, we ask them to keep us abreast of what they’re seeing, whether in government or private industry. That helps us maintain and prepare a pipeline of new workers—and upgrade the skills of their current workforce.”

If faculty members don’t bring a particular skill set from their workplace, AACC sends them out for professional development, upgrading their skills in new certifications.

When AACC’s CyberCenter was established in early 2010, AACC became the first community college to map its cybersecurity curriculum to the Committee on National Security Systems 4011 standards and subsequent 4013 standards. “Our curriculum has to be on the bleeding edge,” explains Kunsman. In fact, AACC has already rewritten the curriculum and requirements for a digital forensics certificate introduced in September 2011, based both on information from advisory board members and information available to the general public. “For academia, that’s really unusual, but technology changes quickly,” says Kunsman. “Once you patch up a hole in a network, hackers find a new way into a system.”

Once an advisory board has identified a new tech skill needed in the workforce, the community college must ensure that its faculty members master the skill in order to be able to teach it to students. In Kunsman’s CyberCenter, professional development usually happens seamlessly because the adjunct professors who teach most of the center’s classes are still working in the industry. “Because this is a relatively new field, most of our faculty are current industry professionals employed in a number of different sectors,” explains Kunsman. “Our students get real-world, hands-on experience based on what these experts see happening in their particular arena, whether it be government, defense contracting, or other industries.” If faculty members don’t bring a particular skill set from their workplace, Kunsman sends them out for professional development, upgrading their skills in new certifications related to the cyber arena.

Just as community colleges can turn to government-funded consortia when it comes to researching industry needs, they also can partner with other groups to help develop student skills. SSCC, for example, manages a number of registered apprenticeship programs in its Building Sciences and Aviation departments. Working out in the field, student apprentices get firsthand experience with new technologies deployed by industry professionals.

Students in the cement masons and plasterers apprenticeship, for instance, learned how to use new technologies for permeable concrete—designed to meet energy efficiency and sustainability requirements—at pace with industry professionals. “If there’s a demand within the marketplace, an apprenticeship program adapts to those industry needs very quickly because of that close association with the workforce,” explains Gordon.

The aerospace apprenticeship at SSCC is linked to Washington state’s Aerospace Joint Apprenticeship Committee, a state-run initiative comprising industry employers and the International Association of Machinists. To support its apprenticeship programs, the committee maintains a mobile training unit that travels to companies and community colleges across the state. “No one school or company could afford all of the specialized training software and equipment that are on that truck,” says Gordon. “It’s a really powerful way to aggregate resources and share them out.”

3) Leverage National Needs for Local Gain
For-profit schools, such as ITT Technical Institute, often seem able to react to industry changes faster than community colleges. AACC’s Rawhouser, who has experience working in the for-profit
education sector, attributes this advantage to the nationwide footprint of these organizations. “They’re drawing information from a lot of different regions, they have the resources of a large, nationwide organization, and, when they make a change to the curriculum, it affects a lot more people at once,” she explains.

By pooling their resources, community colleges can reap many of the same benefits of a nationwide footprint. In September 2011, AACC was tapped by the Labor Department to lead a new National STEM Consortium. The consortium comprises 10 community colleges in regions with both high populations of dislocated workers affected by the recession and up-and-coming industries in need of skilled workers. Funding comes from a $19.6 million Labor Department grant, as part of the Trade Adjustment Assistance Community College and Career Training Grants Program.

The consortium is charged with developing one-year certificate programs in five emerging STEM industries: composite materials technology, cyber-technology, electric vehicle technology, environmental technology, and mechatronics. A school with a strong existing program will lead development of each certificate program, which will then be adopted by those member schools that have a demand for those skills in their region.

“These five areas have been identified as high-need, high-technology, and high-wage employment opportunities by industries across the country,” explains Cerkovnik. “Instead of each school trying to write its own curriculum and reinvent the wheel, it’s able to work with a community college with existing expertise in that area to quickly establish its own program.” The grant includes money for the equipment and technology needed to support these certificates; after three years, the curriculum will be available to community colleges outside the consortium.

SSCC, Clover Park Technical College in Lakewood, WA, and Cuyahoga Community College in Cleveland, OH, were tapped to participate in the program due to their strong curriculum in composite materials. With SSCC acting as the lead, the three schools are developing a program that will be implemented at Roane State Community College in Oneida, TN.

“Roane State is anticipating a need for highly skilled workers in composite materials manufacturing due to its proximity to Oak Ridge National Laboratory,” says Gordon. “It’s looking to start a program from the ground up, and now it’ll be able to use our broad experience to meet its local needs.”

AACC is developing certificates in cyber-technology and mechatronics through the National STEM Consortium. “We believe in a collaborative spirit, because it can only benefit our nation,” explains Kunsman. “Each region throughout the country has specific industries that it supports, but cybersecurity spans all industries. It takes a tremendous investment of capital and time to keep our curriculum up-to-date. Now students across the country will be able to receive what I consider to be state-of-the-art instruction.”

College of Lake County in Grayslake, IL, is the lead developer of the mechatronics certificate, with input from AACC and four other schools. “The mechatronics certificate is a major change for our engineering department, because we’re actually adding this new program to meet the needs of industry in this area,” notes Rawhouser. “Even though this certificate is being developed in conjunction with other community colleges as a national effort, we need to make sure that the curriculum meets the requirements of our local industry partners.”

Cerkovnik sees this approach to curriculum development as a model worth emulating. “We’re leveraging expertise across the nation, and the National STEM Consortium enables us to do it rapidly, with high quality,” he explains. “Mechatronics is a new industry for our region, and we’re developing the pathways to get people back into the workforce within a year’s time.”

Jennifer Demski is a freelance writer based in Brooklyn, NY.
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Editor Picks:
InfoComm 2012
From Digital Literacy to Media Fluency

At Ball State University, students must not only consume new media, they must be able to create it. By Mary Grush

Increasingly, institutions are seeing their students not only as consumers but also as creators of digital media—requiring a greater fluency in the use of new media tools. Ball State University (IN) has been on this track for years, under the leadership of Philip Repp, vice president of IT. In recorded interviews, CT asked Repp and other Ball State leaders how to move students to “media fluency.”

1) How does Ball State prepare students to work with digital media?

“It used to be necessary to learn how to type so that you could write your papers.... Now, we teach [students] the technical foundation of the media-creation tools.”
—Jonathan Huer, director of emerging technologies and media development

2) What new media tools and environments do Ball State students experience?

“We’re really looking at the potential for 3D immersive learning. Three-dimensional digital environments are, in our mind, more conducive to remote learning.”
—John Fillwalk, director, Institute for Digital Intermedia Arts

3) Have your goals for student learning changed?

“I believe increasingly the higher education world needs to focus more on how we equip our students to handle life and work, not process content.”
—Jennifer Bott, assistant provost for learning initiatives

4) What are the important lessons for institutions as they approach digital literacy and media fluency?

“The future is bending toward students having much more technologically mediated experiences while they are in higher education.”
—Rich Edwards, director of iLearn: Integrated Learning Institute