IT shops are turning to students to staff help desks, troubleshoot, and more.

Stanford University's Julie Sweetkind-Singer discusses the importance and impact of long-term geospatial data storage.

Researchers who need to process vast amounts of data can buy an HPC cluster, rent a cloud-based solution, or opt for a hybrid approach.

The right technology can help admissions offices better communicate with prospective students—and ultimately lead to higher enrollments.

IT shops are turning to students to staff help desks, troubleshoot, and more.
Will MOOC- hers Overwhelm the System?
In the wake of a dramatic power struggle at the University of Virginia, the potential for online learning to rescue higher education is receiving even greater scrutiny.

IF ANYONE DOUBTS that MOOCs and online learning will change the face of higher education, he should read the story in The New York Times Magazine about the ouster—and reinstatement—of Teresa Sullivan, president of the University of Virginia. At the heart of the fracas lies a philosophical dispute. On one side, the governing board believes the university needs to make revolutionary changes to position itself for a technologically driven century of education. On the other, Sullivan is inclined to pursue a more conservative approach of incremental change.

The incrementalists edged this particular battle, but the pressure is evidently still on: In July, Sullivan announced a partnership with Coursera to provide a limited number of MOOCs.

But here’s what struck me about the UVA ruckus: While the governing board recognizes that higher education is ripe for “creative destruction,” it has no real idea what that change might look like.

The fact that such a prestigious university as UVA feels it has reached an existential crossroads should give many midtier schools pause. As George Siemens, the founder of the first MOOC, predicted during a speech about transformational change at Campus Technology 2012, “The top tier and elite universities will likely continue to have physical campuses; the midtier levels, on the other hand, are the ones that are going to suffer to the greatest degree.”

But with so much uncertainty facing higher education, charting a course through the fog will be tough. I am the first to admit that I have doubts about online learning and its capacity to provide an equivalent—or better—educational experience to young adults. For me, there are still as many questions as answers:

- Are undergraduate students mature enough to see an online degree through to completion?
- How much of the value of a four-year college experience is social, not academic?
- How do universities maintain their brand identity and value in a disaggregated education model?
- Is there a role for midtier schools in a world of online course offerings from elite institutions?

Maybe online learning is the answer, maybe not. Perhaps it’s just part of the answer. Over the next year, Campus Technology will run a series of articles that seek to shed some light on this complex issue. I invite you to help us sift through the angles and arguments. CT
E-Portfolios: Looking Back to Chart the Future

Can a look at our thinking about e-portfolios from a decade ago tell us where this technology is going today? By Mary Grush

E-portfolio technology has often been labeled as “ready before its time.” In truth, e-portfolios have not fulfilled—yet—the potential that their most fervent supporters see in the technology. A group of e-portfolio experts and campus IT leaders now has plans to hit the “reflect button” by coming together to review e-portfolio discussions in which they took part a decade ago. By doing so, they hope to get a clearer perspective on e-portfolio trends over time, to better map changing market needs to technology, and ultimately help shape the future of e-portfolios. Campus Technology asked John Ittelson, professor emeritus at California State University, Monterey Bay, about plans to reconvene members of a 2002 Ready2Net event that explored key e-portfolio directions.

That Was Then

In October 2002, a Ready2Net program titled “Teaching, Learning, and Assessment With e-Portfolios” brought together the leaders in the e-portfolio field. Here’s a brief clip from Campus Computing Project founder Kenneth C. Green.

Why are you bringing together members of the e-portfolio community to review their thinking from a decade ago?

“Reflection is a key part of folio thinking, so it seems only appropriate that, 10 years after the Ready2Net broadcast on teaching, learning, and assessment with e-portfolios, we take time to reflect on e-portfolio practices.”

Do you think e-portfolio leaders will be ready to join this retrospective, reflective effort?

“Yes, because that’s a folio practice! It’s interesting how many of the leaders then are still active in the e-portfolio movement…. Looking at these experts talking about where they were and what they were doing…should give us a way of predicting the future of what we see happening in the e-portfolio space.”
WEB TOOLS FOR RESEARCH. Purdue University (IN) has announced the latest version of HUBzero, an open source platform for web tools that enable scientific research and collaboration. New features include the capability to create collaborative project areas within a hub, federated identity management, e-mail integration, and design improvements. Winner of a 2011 Campus Technology Innovators award, HUBzero is used by 40 virtual communities for research, education, and training in fields ranging from nanotechnology to earthquake engineering. Read the full story online.

GRANTS RESOURCE. A new website from CDW-G showcases the latest grants and awards available to educators in pre-kindergarten through higher education. GetEdFunding is a free, searchable resource of more than 600 funding opportunities, created by a team of current and former educators and grant specialists. Registered users can create custom searches based on any combination of six criteria, including 45 educational focus areas, nine subject areas, and 21st century themes and skills that support curriculum. In addition, the site will soon offer advice from grant writers and tips on applying for grants and awards. Read the full story online.

SAFETY APP. OCAD University, an art and design college in Toronto, is offering a free smartphone safety tool to its campus community that allows users to communicate with public safety personnel in the event of an emergency. The mobile application, Guardly Safe Campus, was created as part of a two-year joint project between the university and Guardly, developer of a web-based incident-management system. The company itself grew out of OCAD’s Mobile Experience Innovation Centre incubator program. Read the full story online.

TEXT FOR THE NEXT BUS. Riders of the University of Minnesota, Twin Cities bus system can now learn when their bus is expected to arrive, thanks to new route-predicting technology. Hardware on each of the 24 buses in the fleet tracks its location and relays the coordinates to the fleet-tracking system. Students, faculty, staff, and visitors can call or send a text message to receive the next three predicted arrival times at a particular stop. Alternatively, they can visit the university’s Parking and Transportation Services website to view a map of
the campus, along with the real-time locations of the buses and predicted arrival times. Selected bus stops also have new electronic signs that inform riders of predicted bus arrival times. Read the full story online.

**E-TEXT PILOT SCALES UP.**

After a test phase at Indiana University and follow-up pilots at five institutions, an e-textbook project will be expanding further this fall. In a series of pilot efforts conducted by Educause and Internet2, 21 additional colleges and universities will be introducing digital content in classes. Eventually, up to 50 schools may participate. Preliminary results of the tests will be shared at the Educause 2012 Annual Conference next month. So far, at least one of the universities involved in the original pilot, the University of Minnesota, has chosen to step away from the scaled-up version of the test owing to accessibility concerns with the e-textbook platform. Read the full story online.

**MODELING BIG DATA.** The Predictive Analytics Reporting Framework project, which explores the use of big data and predictive analytics to improve learning outcomes, has added 10 new participating educational institutions. Launched by the Western Interstate Commission for Higher Education’s Cooperative for Educational Technologies, the project collects anonymized data from partner institutions “to create models predicting student success and momentum while in pursuit of a higher education credential,” according to information released by the organization. The project currently has data from more than 1 million students and 6 million courses. The new participants include Lone Star College System (TX), the University of Central Florida, and Western Governors University (online). Read the full story online.

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Nov 11-16
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TDWI World Conference: Emerging Technologies 2013
Orlando, FL

Nov. 26-27
The Software & Information Industry Association
SIIA Ed Tech Business Forum
New York

Dec. 7-16
The SANS Institute
SANS Cyber Defense Initiative 2012
Washington, DC

Jan. 4-7
The Council of Independent Colleges
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Preserving History in a Digital World

Stanford University’s Julie Sweetkind-Singer discusses the importance and impact of long-term geospatial data storage.

STANFORD UNIVERSITY’S (CA) Julie Sweetkind-Singer is a recognized authority on digital preservation, and has been honored by the Library of Congress for her work in the field. She currently serves as both the assistant director of Stanford’s Geospatial, Cartographic and Scientific Data and Services and as head of the Branner Earth Sciences Library and Map Collections. In a recent interview with CT, Sweetkind-Singer discussed the challenges facing the field of digital preservation.

Campus Technology: What are the primary considerations for archiving and preserving digital information over the long term?

Julie Sweetkind-Singer: From a librarian’s point of view, digital data is very different and much more difficult to preserve for extended periods than paper-based data. For example, a book on acid-free paper can be kept on a shelf in a cool, dark place for 100 years. If it is well cared for, you would expect it to remain in pretty good shape.

With digital information, you have to implement a process from the very beginning that will allow you to preserve it well into the future. This includes ensuring that the data is well managed technically; that metadata exists so that someone in the future will understand what the data represents and how it has been stored; and that legal documents are in place indicating how the data may be used.

It’s important for digital archivists to develop long-term preservation plans that include both technical and legal stipulations. Unless digital files are correctly preserved and documented, we run the risk of losing the information, which is then unavailable to future generations.

CT: From an educator’s perspective, what are the key reasons to preserve geospatial data?

Sweetkind-Singer: For both educational and research purposes, it is critical that we preserve data for the long term. For example, the opportunity to trace the development
of a region using historical maps is useful to researchers who are studying population growth or the change from an agriculture- to industry-based economy. A historian may want to know when the railroad first reached the study area, and what effect it had; what crops formerly grew there; in which direction the area began its expansion; when major roadways were built and which cities they connected.

You can analyze all this over time by studying geospatial data, but only if you have the content to do so. Preserving historic data and continually adding to that collection are a critical part of change-detection research.

**Preserving historic data and continually adding to that collection are a critical part of change-detection research.**

CT: How did the National Geospatial Digital Archive (NGDA) come about, and what role does it play in preserving geospatial data?

Sweetkind-Singer: The NGDA is a collaborative research effort between Stanford and the University of California, Santa Barbara, with funding from the Library of Congress, to examine the issues surrounding the long-term preservation of geospatial data. The program is called the National Digital Information Infrastructure and Preservation Program (NDIIPP).

One of the goals of the NGDA is to set up the structure for a preservation network and eventually add more partners, including both libraries and state archives, covering a variety of regions around the US. Maintaining geospatial data in various locations is one important aspect for its long-term preservation.
You have to assume that both the software and hardware components that originally created the data will change in the future.

CT: What procedures does the NGDA recommend for the long-term storage of geospatial data?

Sweetkind-Singer: You have to assume that both the software and hardware components that originally created the data will change in the future. It’s important to remember that many organizations produce geospatial data but aren’t involved in its collection or preservation. However, the mandate for libraries and government archives is to preserve valuable documents for the future.

Regarding the preservation of remotely sensed imagery, you need to know which sensors were used, when they were updated, and what software was used to interpret the data format.

Legal documents are another important part of the long-term data-storage process. We drafted agreements with participating NGDA members about collection-development policies, specifying what each institution is going to collect and curate. Another contract brokers the relationship between the software used to create it and related white papers. We developed a registry to track information about formats because they will certainly change over time. This information was the basis of the Library of Congress’ geospatial content section on its Sustainability of Digital Formats website. Regarding the preservation of remotely sensed imagery, you need to know which sensors were used, when they were updated, and what software was used to interpret the data format.

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AN INTRO TO GEOSPATIAL DATA

ACCORDING TO THE EPA, geospatial data is defined as “information that identifies the geographic location and characteristics of natural or constructed features and boundaries on the earth.” To analyze, interpret, and display geospatial data, researchers and planners use a geographic information system (GIS). Typically, a GIS is used for handling maps of one kind or another. These might be represented as several different layers, where each layer holds data about a particular kind of feature. Each feature is linked to a position on the graphical image on a map and a record in an attribute table. GIS can relate otherwise disparate data on the basis of common geography, revealing hidden patterns, relationships, and trends that are not readily apparent in spreadsheets or statistical packages.

With GIS, researchers and planners can explore the spatial element of data to display soil types, track crime patterns, analyze animal-migration patterns, find the best location for an expanding business, model the path of atmospheric pollution, and make decisions for many types of complicated problems.

Long-term data preservation involves technical solutions as well as recommendations from librarians, archivists, and lawyers.

The long-term preservation of data is something that is just emerging as an issue for libraries. While many libraries and state archives are aware of the problem, they don’t really know how to tackle it yet. At first, it may seem like an overwhelming task, but breaking the procedure down into its component parts makes the process achievable. One important effort that has emerged over the past few years, also funded by NDIIPP, is the Geospatial Data Preservation Resource Center. This site has been designed specifically to bring together “freely available web-based resources about the preservation of geospatial information.” It also gives practitioners a place to start, discover best practices, and get their questions answered.

As we go forward, we will figure out sustainable methods to manage, archive, preserve, and create access to digital information. Relatively speaking, though, we’re in the early days. It’s a process that we’ll develop and refine as we continue to work with this type of content. Long-term data archiving is a very interesting and challenging area for libraries, because we are building the digital collections of the future. Libraries have an important role to play in making sure that we provide proper stewardship and preservation of geospatial data.

Jim Baumann is a staff writer for Esri, a GIS software company. He has written about various aspects of GIS and information technology for more than 20 years.
DATA MANAGEMENT

COLLEGES AND universities are swimming in an ever-widening sea of data. We all are. Human beings and machines together generate about 2.5 quintillion \(10^{18}\) bytes every day, according to IBM’s latest estimate. The sources of all that data are dizzyingly diverse: e-mail, blogs, click streams, security cameras, weather sensors, social networks, academic research, and student portfolios, to name just a few. And it’s all coming at us at warp speed: Google alone reportedly processes 24 petabytes (that’s a quadrillion—\(10^{15}\)—bytes) every day.

In the first installment of a two-part series, CT explains Big Data and its potential for improving student learning and success. By John K. Waters
The industry buzz phrase for this phenomenon is “Big Data,” which loosely refers to data sets too large and/or diverse for conventional tools to manage and mine efficiently. For colleges and universities, Big Data presents a challenge that will only get… well… bigger. But approached with the right tools and strategies, Big Data also offers an incredibly rich resource for improving retention rates, fine-tuning curricula, and supporting students, faculty, and administration in myriad ways. In higher education, Big Data may be seen in two distinct contexts: 1) as a product of research institutions that are charged with gathering, managing, and curating a wide range of structured and unstructured data; and 2) as a resource for predictive analytics.

The former is not exactly a new phenomenon, although the sources and velocities of the data streams are expanding and accelerating. But the latter has emerged as a way to leverage a variety of data sources—some new, some not—to help guide students along course and degree paths that will lead to higher graduation rates.

Predictive analytics, which applies statistical techniques to data to forecast likely outcomes, is not a new process either. The difference now is scale: Applied to vast amounts of data from a huge variety of sources, predictive analytics now seems capable of achieving its crystal ball promise.

New Possibilities
“The thing you have to understand about Big Data is that it gives us something we haven’t had before,” says Gerry McCartney, CIO at Purdue University (IN). “Analyzing these massive data sets allows us to extract patterns, which you just can’t obtain from smaller data sets, that allow us to predict, say, how a student will do in class. That predictive capability is a direct result of the volumes of data being analyzed.”

In other words, you can see more
useful things in the data when more of it’s available. Of course, “big” is a relative adjective. One organization’s terabyte is another’s gigabyte. Traditionally, in most organizations, predictive analytics has involved data volumes in the high gigabytes and low terabytes. In small and midsize organizations today, it probably remains in that realm. But don’t expect it to stay that way.

“In the last few years, we’ve crossed a threshold,” says James Kobielus, a former Forrester analyst who now serves as Big Data evangelist at IBM. “Suddenly, we’re seeing multi-terabytes—tens, hundreds, even thousands of terabytes, aka petabytes—coming into analytic application environments in many industries. In many ways it’s still a specialized environment; it’s not as if every business intelligence application needs that much data under the covers just yet. But it’s moving toward that volume over the next several years over a wide range of use cases.”

But it would be a mistake to think that the promise—and challenge—of Big Data is simply tied up in the size of the data sets available for analysis. “In my opinion, ‘Big Data’ is kind of a misnomer,” says Darren Catalano, associate vice president of business intelligence for the University of Maryland University College (UMUC). “We’ve always had systems that have generated a whole lot of data. It’s just that now we’re paying attention to that data. We used to look at it as something that facilitates business processes—something very operational. But now we’re applying advanced analytic techniques to these large data sets.”

And it is these analytic techniques that represent the golden key to unlocking the secrets of giant data sets. As analysts peer into these very large data sets, patterns emerge, nuances appear, and trends reveal themselves. Big Data provides more granularity than smaller data sets, and—if you’ve got enough of the right type of data—you get what Kobielus calls a 360-degree portrait of a student, his world, what’s going on in his mind, and what he’s likely to do.

“You can get a deeper and more nuanced portrait of what your customers—the students—like and don’t like, or the kinds of courses they would like to sign up for, or the kinds of majors they want to pursue,” explains Kobielus. “This isn’t just a way of selling a customer more stuff or signing up students for more expensive courses; it’s about making those students happier and more fulfilled, and maybe leading them on their way to faster completion of a course of study, based on giving them fine-tuned guidance throughout their time at the university.”

The Three V’s

The analytic techniques and algorithms needed to identify actionable trends are far more complex than similar efforts of previous decades, for one simple reason: The data sets encompass data points that go way beyond easily quantified measurements.

“If you go by the numbers, most of the data being generated now is unstructured and semi-structured data,” says Anjul Bhambhri, IBM’s vice president of Big Data. “It’s not just social data, although you hear a lot of talk about social data in Big Data circles. But enterprises are collecting a lot of log data, and there’s a structured and unstructured component to this type of data. For example, enterprises are doing a lot of work around network-performance management, predicting maintenance-schedule requirements, and analyzing logs. I was at a conference recently where a company with a solution in the log analytics space talked about 2.5 exabytes [2.5 quintillion bytes] of log data being generated every two days.”

The sheer variety of data is one of three defining characteristics of Big Data, commonly referred to as the Three

“I think Big Data is going to have a bigger impact on regular people than the internet.”
—Gerry McCartney, Purdue University
V's—variety, volume, and velocity. For many higher education institutions, velocity and variety—not volume—are the trickier aspects of Big Data to manage, says Charles Thornburgh, CEO and founder of Civitas Learning, an Austin, TX-based predictive analytics company.

“The variety of the data causes the first hurdle,” notes Thornburgh. “Many different autonomous systems are collecting very different types of data. Even schools that have deployed a data warehouse are unlikely to be centralizing all of the data in a manner that supports empirical mining.”

Today, school decisions about what data to collect are often based on compliance needs, rather than a desire to be able to use the data predictively. “Additionally,” adds Thornburgh, “the ability to scale the processing of this data in a near-real-time or even a nightly job is something that most schools could find challenging.”

Indeed, the velocity at which this data is collected is only going to get faster. “We’re now moving more toward real-time, continuous-streaming acquisition of data from various sources for a lot of different applications,” explains Kobielus.

To a certain degree, schools are beneficiaries of the fact that so much of their student information is stored in relational databases, making it easy to
THE GROWTH IN THE VOLUME of the world’s data is currently outpacing Moore’s Law, which posits that the number of transistors on integrated circuits doubles approximately every two years. In other words, notes Charles Zedlewski, vice president of the products group at Cloudera, the pace of microprocessor innovation is not keeping up with the rate at which data is being created.

“Keep in mind that an ever-higher fraction of that data cannot be readily organized into the traditional rows and columns of a database,” adds Zedlewski. “These two phenomena are basically starting to break the traditional architectures and technologies people have used for the past 20-30 years to manage data.”

Enter Apache Hadoop, an open source platform for data-intensive, distributed computing that has become synonymous with Big Data. The Hadoop project was originally developed at Yahoo by Doug Cutting, now an architect at Cloudera. (The project was named for his daughter’s stuffed elephant.)

At its core, Hadoop is a combination of Google’s MapReduce and the Hadoop Distributed File System (HDFS). MapReduce is a programming model for processing and generating large data sets. It supports parallel computations on so-called unreliable computer clusters. HDFS is designed to scale to petabytes of storage and to run on top of the file systems of the underlying operating system. Yahoo released to developers the source code for its internal distribution of Hadoop in 2009.

“It was essentially a storage engine and a data-processing engine combined,” explains Zedlewski. “But Hadoop today is really a constellation of about 16 to 17 open source projects, all building on top of that original project, extending its usefulness in all kinds of different directions.”

Cloudera is a provider of Hadoop system-management tools and support services. Its Hadoop distribution, dubbed the Cloudera Distribution Including Apache Hadoop (CDH), is a data-management platform that combines a number of components, including support for the Hive and Pig languages; the HBase database for random, real-time read/write access; the Apache ZooKeeper coordination service; the Flume service for collecting and aggregating log and event data; Sqoop for relational database integration; the Mahout library of machine learning algorithms; and the Oozie server-based workflow engine, among others.

The sheer volume of data is not why most customers turn to Hadoop. Instead, it’s the flexibility the platform provides. “It’s the idea that you can hold on to lots and lots of data without having to predetermine how you’re going to use it, and still make productive use of it later,” says Zedlewski.

Make no mistake, Hadoop can handle the big stuff. Speaking at the annual Hadoop Summit in California this summer, Facebook engineer Andrew Ryan talked about his company’s record-setting reliance on HDFS clusters to store more than 100 petabytes of data.

Hadoop is just one of the technologies emerging to support Big Data analytics, according to James Kobielus, IBM’s Big Data evangelist. NoSQL, which is a class of non-relational database-management systems, is often used to characterize key value stores and other approaches to analytics, much of it focused on unstructured content. New social graph analysis tools are used on many of the new event-based sources to analyze relationships and enable customer segmentation by degrees of influence. And so-called semantic web analysis (which leverages the Resource Description Framework specification) is critical for many text analytics applications.
Pressure to Change

Until recently, the relational database has worked fine, because the level of analysis was fairly superficial. Traditionally, higher education has tended to think of analytics as a matter of slicing and dicing basic outcomes information by criteria such as ethnicity, geography, or Pell status. Such an approach can identify big-picture gaps in equity and effectiveness, but it’s not really predictive.

Looking ahead, such a broad-brush approach is unlikely to be viable. “Higher education is facing a lot of pressure these days from an accountability standpoint,” notes Cole Clark, global vice president in database giant Oracle’s education and research industries group. “It’s really being pushed hard to improve student outcomes and demonstrate that the money spent on higher education is producing the kinds of outcomes we all want to see. That pressure has pushed schools to look at ways to pull meaningful data out of their SISs, LMSs, and, increasingly, social media.”

Purdue is one school that has invested heavily in the development of homegrown systems that leverage these kinds of resources, but its CIO believes that the majority of colleges and universities have just scratched the surface of what might be possible with Big Data analytics.

“And, in McCartney’s eyes, the payoff promised by Big Data exceeds even the initial hype. “I think Big Data is going to have a bigger impact on regular people than the internet,” he declares. “The internet is basically just a delivery mechanism. Now I can read my newspaper online, I’ve got on-demand movies, I’ve got VoIP, I can query Google. There’s not a lot in there I couldn’t do before—the internet just gave me more convenient and universal access to it. But Big Data gives me something I’ve never had before.”

John K. Waters is a freelance writer based in Palo Alto, CA.
No Time for Heroes
Working through the weekend? Haven’t taken a vacation for ages? These 6 tips for transparent, streamlined project management can help.

WHEN IT COMES TO project management, the IT department is typically its own worst enemy. “When project requests are pushed through the budgeting process by different departments, it’s up to IT to make them all work,” explains Joy Hatch, vice chancellor for information technology for the Virginia Community College System (VCCS). “Unfortunately, we’re known for doing what we need to do to get them all done,” she adds somewhat ruefully.

“At Loyola, we call it ‘heroic mode,’ because you require your staff to be heroic to get the project load done,” remarks Richard Sigler, director of Technology Services’ Project Management Office at Loyola University Maryland. “You’ve got people working over weekends and postponing their vacations. Your staff is overloaded.”

To reduce the amount of time that staff spend in heroic mode, both institutions have deployed highly transparent, planned approaches to project management—as well as a streamlined and objective method for prioritizing and approving IT projects. Here’s what they’ve learned along the way.

1) Create an Institution-wide Partnership
Hatch’s office manages projects that affect the entire 23-college VCCS system. Over time, the sheer volume of IT work threatened to unhinge even the most heroic IT staffers. “After so many years of working in crisis mode, we suddenly had to become more efficient after the economic downturn—we realized that we were no longer going to be able to do everything for everybody,” recalls Hatch. “Then the question became, who’s going to do the prioritizing? IT shouldn’t be prioritizing, because we’re just there to support our academic and business partners. But you can’t have individual departments prioritizing separately with the expectation that IT will still get everything done.”

To resolve the issue, VCCS formed a project board made up of vice chancellors of the Academics, Finance, Workforce Development, and Advancement departments; the director of internal audits; and a representative from Grants, Budget, and Procurement. The board approves project proposals, prioritizes them, and determines which ones to set aside if resources are unexpectedly shifted in a different direction. “By having everybody in the same room, using the
The same procedures, and making decisions as a group, everybody gets on board," explains Hatch.

2) Make Participation Painless
At Loyola, project advocates used to deliver five- to 10-minute presentations in person to the Technology Services Advisory Committee (TSAC). "Inevitably, each presentation took much more time than it was allotted," recalls Sigler. "The presentations became very burdensome on the TSAC group, which is not something you want." So, in 2009, the school switched to a system in which the entire project pitch is done online via a project-proposal form. Similar to VCCS's project board, TSAC consists of representatives from each division of the school, including students from the Student Government Association. To make it easier to review proposals, the TSAC subcommittee for project selection—open to all members of TSAC—created a scoring methodology and questions used to objectively measure the impact, cost, and effort behind every proposal. "We've really streamlined the process," notes Sigler. "Using the scorecard, it takes five to 10 minutes to score each project."

Members of the subcommittee are also involved in reviewing each project's detailed cost estimates and evaluating the risk of failure—factors that determine how closely a project must be managed for a successful outcome. At the end of the process, the subcommittee creates a list of projects recommended for funding, based on priority and available capital and resources. This list is then submitted to the broader TSAC group for final approval.

"There has been a lot of enthusiastic participation by TSAC members," says Sigler. "Nobody's required to participate in the TSAC subcommittee for project selection, but people want to. I think that really testifies to the fact that the process has been embraced and is seen as useful."
3) Reduce Information Clutter

When it comes to pushing a project proposal through the approval process, both institutions have found that too much information is not necessarily a good thing.

At Loyola, the first step has always been to perform a high-level investigation of the estimated cost and hours needed to complete a project. An IT director has typically performed this task, which could take as much as four to eight hours. “When you’re getting a lot of project proposals, this becomes very burdensome,” notes Sigler.

To lighten the load, the institution now paints in broader strokes. “We’ve since adopted very broad ranges for the investigation parameters based on the Project Management Institute’s definition of rough order of magnitude,” he says, “so that this high-level investigation can be done quickly, and we can have the information we need to continue the scoring.”

To stay out of the informational weeds has benefits beyond savings in staff time. VCCS recently revamped the proposal reports it provides to the project board in order to increase their clarity. “The project board is made up of executives—let’s get them in and out,” insists Hatch. “Let’s give them the least amount of paperwork they need—just enough to explain what they need to know without burying them in details.”

4) Share Progress Throughout the Process

Once a project is in motion, it’s important that the entire community be kept abreast of its progress. “It’s incredibly helpful for our customers to be able to see the whole of what we’re doing,” notes Sigler. “One of the realities is that sometimes very critical projects consume more resources. Folks need to understand why resources originally allocated to their project have to be transferred temporarily to another project. By having everything in front of them,
they can recognize the value of the project that the resources have been assigned to."

Loyola has automated its reporting procedures throughout the project management process. Once a project is approved, a team website is created using a designated SharePoint template. Thereafter, the project manager posts simple status reports, whose frequency is determined by the level of oversight that TSAC felt was needed during the project-review process. These status reports are automatically e-mailed to the project team, the project advocate (the person who submitted the project), and the project sponsor. Real-time reporting is also available through a series of dashboards built into the project management system.

“We find that TSAC is also interested in the high-level status for each project in the portfolio,” remarks Sigler. He used to give brief updates on each project at TSAC meetings, but quickly found that it was more efficient to distribute a monthly newsletter, which is also posted on the internal Technology Services website.

5) Track Your Available Resources

Even if you have enough money to cover every project, you need to ensure that you have enough man-hours available to complete the projects without overburdening your staff. “If our project list requires 300 development hours, but we only have 200 development hours available, we’re going to be right back in crisis mode,” says Hatch.

VCCS IT staffers currently track and measure how they use their time. The goal is to create an accurate accounting of the time available to spend on new projects, and how much time is typically spent within each division of IT maintaining existing projects. “Once a project like our new decision-support system rolls into production, how much time does that free up?” posits Hatch. “How many of those hours will then go into maintenance and are no longer available for development time?”

Loyola uses a project portfolio-management system called AtTask to track its available resources against projects under consideration. “The system allows us to see folks who would be overtaxed by the [proposed project load],” explains Sigler. “Then we have the opportunity to remove projects, working backward in priority order...until we’re taking on enough work without overloading our resources.”

6) Encourage Collaboration

For a resource-strapped IT department, cross-campus collaboration can help distribute the load. “When people can see what’s happening in other departments, they have the ability to work together so they’re not working on overlapping projects,” says Hatch. “There’s a synergy that’s gained from two people from two departments suddenly realizing that they can use the same product to meet both their needs.”

Sigler agrees on the importance of sharing resources among different areas of the institution. Recently, TSAC received a proposal for a new scheduling system from Alcohol and Drug Education and Support Services, followed by a similar proposal from the Counseling Center. “We were able to find a solution that met both of their needs, which led to tremendous efficiency,” explains Sigler.

Jennifer Demski is a freelance writer based in Brooklyn, NY.
Researchers who need to process vast amounts of data can buy an HPC cluster or rent a cloud-based solution. Increasingly, though, scholars are opting for a third, hybrid option. By Michelle Fredette

RENT OR BUY? It's a question we ask about everything from housing to textbooks. And it's a question universities must consider when it comes to high-performance computing (HPC). With the advent of Amazon's Elastic Compute Cloud (EC2), Microsoft Windows HPC Server, Rackspace's OpenStack, and other cloud-based services, researchers now have the ability to quickly rent space and time on an HPC cluster, a collection of linked nodes that run as if they were one computer. As with any major leasing or purchasing decision, though, plenty of factors bear on the selection process: In the case of HPC, researchers must consider the scope and duration of the project; the number of people using the system; the type of work to be done; and who's footing the bill.
With budgets under pressure across higher education, cost is always going to be a major factor. Weighing in favor of the buy option is the fact that HPC equipment has become far more affordable: Systems that cost hundreds of thousands of dollars 10 years ago are now priced in the tens of thousands. As HPC prices have decreased, though, the amount of research that requires such high computing power has dramatically increased. An in-house HPC cluster that might have sufficed a decade ago may now be swamped by the demand.

According to Dennis Gannon, director of cloud research strategy for Microsoft Research Connections, a lot of universities are trying to analyze the cost benefits of each option. To provide some answers, he attempted to compare the costs of buying a little cluster of servers—120 processors—with the expense of renting comparable space.

“I concluded that if you’re running this cluster of yours 24 hours a day, seven days a week for the lifetime of the resource, it’s probably cost effective compared to doing the same thing in a commercial cloud,” explains Gannon. The catch is that almost nobody runs a cluster like that. A more usual scenario is that researchers use the cluster in bursts, as the research requires, and it sits idle the rest of the time. And if it is run at full capacity, it means that some work is inevitably not done, because the cluster is fully booked.

That’s exactly what happened to a team in the Department of Engineering Science at the University of Oxford (UK). Projects across the research group were becoming more and more computationally complex. One project, by Dan Lussier, a Ph.D. candidate at the time, was particularly intensive: It used a molecular-modeling approach to study the behavior of liquid droplets. In this simulation, each atom in the system was modeled explicitly, producing a vast number of atom-to-atom interactions. Calculating these interactions would have bogged down a regular desktop
machine for months, maybe a year. “That’s just not feasible when you want an answer back,” explains Lussier. “And getting an answer back is necessary for making adjustments.”

The team considered renting HPC space from a central university resource before deciding to fund the purchase of a dedicated HPC cluster with part of its grant money. Lussier used the new cluster extensively until he reached a “pinch point” in his research when he needed to run some simulations but couldn’t get time on the HPC cluster that he shared with his colleagues.

Despite such drawbacks, buying HPC clusters for in-house research remains a common scenario, because it also has some obvious benefits. Lussier’s experience notwithstanding, researchers on projects with their own HPC cluster generally don’t have to wait in line for time and space on the system, which means the research keeps moving forward. And they can configure the cluster to suit their needs and load the applications they choose. Plus, with the equipment right there on campus, teams don’t have to worry about transporting massive chunks of data, and they can troubleshoot issues as they arise with local, dedicated IT support.

The Case for the Cloud

So what of the alternative? Does the cloud offer research teams a more reliable and cost-effective way to do their work? Unfortunately, it can be very difficult to compare applications on cloud-based HPC systems with in-house systems.

UNDERSTANDING THE FLAVORS OF HPC

IT’S IMPORTANT TO recognize that not all high-performance computing systems work the same way. Indeed, choosing between a cloud-based or in-house HPC solution may well depend on the kind of processing work that needs to be done. Dennis Gannon, director of cloud research strategy for the Microsoft Research Connections team, analyzed the work performed by about 90 research groups that were given access to Microsoft Azure cloud resources over the last two years. He concluded that four major architectural differences between cloud clusters and supercomputers—machines running thousands, even tens of thousands of processors—determine which types of high-performance computing should be done where:

- Data centers (or cloud networks) are made up of racks of basic servers. They don’t currently offer the graphics enhancements offered by GPUs (graphics processing units) that supercomputers use for simulations, and they don’t have “other accelerators.”
- Data centers communicate via internet protocols, while supercomputers communicate over high speed “physical and data link layers” and have minimal interoperation with the internet.
- Each server in a data center hosts virtual machines, and the cloud runs a fabric scheduler, which manages sets of VMs across the servers. This means that if a VM fails, it can be started up again elsewhere. But it can be inefficient and time-consuming to deploy VMs for each server when setting up batch applications common to HPC.
- Data in data centers is stored and distributed over many, many disks. Data is not stored on the local disks of supercomputers, but on network storage.

Given these differences, Gannon and his coresearcher Geoffrey Fox believe that clouds are good for large-data collaboration and data analytics like MapReduce (a strategy for dividing a problem into hundreds or thousands of smaller problems that are processed in parallel and then gathered, or reduced, into one answer to the original question). In contrast, large-scale simulations or computations that require individual processors to communicate with each other at a very high rate are better suited for supercomputers. However, with data center cloud architecture rapidly evolving, commercial clouds are beginning to offer more supercomputing capabilities.
HPC performance optimization can add up to big—but hard to quantify—savings over the lifespan of a study.

Lussier experienced the fog of cloud solutions firsthand. When he was unable to complete his research on the in-house HPC cluster, he went looking for a pay-as-you-go HPC service, but found it hard to comparison shop because each service offers slightly different options. Ultimately, he decided to go with Penguin’s On Demand HPC Cloud Service.

“They spoke my language,” recollects Lussier. “They were offering all of the things I wanted in terms of high-performance computing rather than a web service; they built their cluster as an HPC cluster, so between the nodes—between the boxes on a rack—they had high speed interconnect, which lowers the cost of communication between the separate processors.”

In addition, Penguin set up Lussier’s software, Large-Scale Computing through Collaboration.

Pete Siegel, CIO at the University of California, Davis, is thinking about data. In particular, he’s thinking about the exponentially increasing amounts of data generated by genomic sequencing, satellite surveys, seismic sensors, viticulture sensors—you name it. By around 2015, the amount of data from just one discipline, such as genetics, will equal the amount of data produced in the entire world in 2010. And he’s worried about how universities are going to contend with all of it.

“No campus can build the resources that it needs in this space,” explains Siegel. “The data requirements are so large that it has to be done through collaborations and aggregation.”

Siegel envisions enormous regional data centers, perhaps run by big institutions like Google, Amazon, Microsoft, or the National Security Agency that have experience managing big data, or perhaps created by consortia of universities. To sort through and analyze all this data, high-performance computing clusters would be situated near these data centers to reduce the distance that the data would have to travel.

“You would still have HPC on campus, but it would be for visualizing matter and for specialized high-performance computing and experiments on the data,” posits Siegel. In fact, Siegel expects the lower cost of HPC hardware to result in multiple clusters in every lab on campus, and throughout hospitals as well.

Siegel hopes to complete a feasibility study of this model by the end of the year. “Universities that try to solve this problem on their own will fail,” he warns. “It’s not just about putting our heads together. It’s about the efficiencies of putting all the resources in one place.”

Siegel’s vision of organized colonies housing exascale-level data paired with HPC clusters for analyzing the data seems almost utopian compared to the current state of affairs. At the moment, researchers anticipate losing a major data set every nine or 10 months, either because the disks on which the data is stored are lost or because data is jettisoned as researchers run out of storage space. As for infrastructure, at many schools it’s currently quicker to FedEx large data sets to colleagues than to upload them via the school network.
Atomic/Molecular Massively Parallel Simulator (LAMMPS), for him. “It’s open source. It can be a bear to build. You have to make sure it’s configured properly for the system it’s running on,” he says. “So instead of me having to learn their system, they did it so it was properly done the first time.”

Lussier says he was able to start working on the Penguin cluster within days of selecting its HPC service. He felt his data was in good hands, because Penguin had a strong login and encrypted transmission between himself and the cluster. And, as an added bonus, he wasn’t charged for temporary data storage or for moving data on and off the Penguin cluster.

A significant benefit of a cloud-based HPC solution like this is flexibility. If researchers have a huge job that needs to be done quickly, they can request the use of more processors. This way, a job that might take two weeks on a proprietary system of 120 processors could be done in a week on 250 processors instead.

**Follow a Hybrid Approach**

After his experience, Lussier feels that the best solution is not an either-or proposition. The best value, he believes, often lies in a hybrid of in-house and external solutions. An in-house HPC cluster running at full capacity provides the best return on investment, while cloud solutions give research teams a flexible conduit for additional work or analysis that must be completed quickly.

According to Gannon, the hybrid model is already popular among commercial customers, who use cloud-based options when they need to get something done but their on-premise computing is running at capacity. The cloud HPC system “gives them as much as they need, for as long as they need it,” he explains. “And they can stop paying for it when they’re done.”

Michelle Fredette is a freelance writer who lives in Portland, OR.

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3 Keys to Better Recruiting

The right technology can help admissions offices better communicate with prospective students—and can ultimately lead to higher enrollments.

**RECRUITMENT IS an expensive business:** In 2010-2011, the median cost to recruit an undergraduate was $2,185 among private colleges and universities, according to Noel-Levitz, an enrollment management consultancy. In these tough fiscal times, admissions departments are under pressure to keep those costs down even as they pursue higher enrollment and better-caliber students. To meet the challenges, schools are increasingly turning to tech solutions to give them a competitive edge. Here are three tech tactics that are gaining traction on campuses:

1) **Mine Data Efficiently and Use It**
Without the ability to put student data to good use, it's hardly worth the effort to gather it in the first place. This was the problem facing the Sage Colleges (NY). A powerful admissions application tool was collecting enormous amounts of information, says Bryan Lester, director of enrollment information and admission processing, “but to input all that data into our student information system was extremely time-consuming.”

To make the jump from collecting data to using it for targeted communications, Sage adopted TargetX’s Student Recruitment Manager (SRM), a cloud-based customer relationship management system for admissions offices, with data integration provided by Informatica.

Today, Sage is doing a better job of communicating with prospects. Administrators mine data from the SRM and use it to customize e-mail and print campaigns for specific audiences (according to extracurricular interests, for example).

Sage is also communicating with prospects’ parents—something the institution has never been able to do before. The SRM’s e-mail campaign tool allows the school to e-mail parents directly or simply copy them on e-mails to their children. Since launching the SRM in 2009, Sage’s overall application and enrollment numbers have increased each year. Internal processes have shifted from mostly manual to nearly fully automated, allowing the institution to handle the increase in applications without additional staff.

**Cedarville University** (OH) has also embarked on a drive—literally—to streamline its collection of admissions data. Admissions counselors are on the road at college fairs for several weeks at a time. Traditionally, gathering,
sorting, and sending information back to the admissions department have been a slow, manual process. By the time the admissions office followed up with prospects identified during these fairs, the students’ interest had often waned. Now, counselors use digital pens that instantly transmit data gathered at recruitment fairs. This unique approach came about after Mark Weinstein, director of admissions, tasked the IT department with finding a way to quickly connect with prospects following campus trips. Digital smart pen and paper technology from ExpeData proved to be just the thing.

When written on specially patterned paper with a ball-point-type digital pen, students’ data is stored and then routed to a database via USB or Bluetooth connection. With students filling out one-page forms, each pen can capture information from 200 prospects. “We’re communicating in real time,” notes Weinstein. “We’re not letting distance hinder us.”

Thanks to an internally developed analytics tool, the data captured by the smart pens is separated into categories—such as major, extracurricular interests, or other salient attributes—so customized communications can be delivered speedily.

The biggest advantage of the smart pens, says Weinstein, is the turnaround time in communicating with students. While admissions officers used to take as many as six to eight weeks to contact students after a college fair, they now communicate in just four to five days. As a result, a larger number of prospects are visiting campus.

While it’s too early to know if the pens are having a positive impact on enrollment, Cedarville is on track this year to having one of the highest freshman enrollments in the university’s history. “Whether we see a higher enrollment or not, having the smart pen technology is making a difference in our communication plan and campus visits,” concludes Weinstein. “Students want to be communicated with and they are impressed when we do so in a timely and personal way.”

2) Harness the Power of Peers
Forging early connections is a significant factor in whether a high school student will commit to a particular college, says Diane Gayeski, dean of the Roy H. Park School of Communications at Ithaca College (NY). With that in mind, the school has completely changed its approach to social media. IC Peers was once a private social media page reserved for those Ithaca College students with acceptance letters in hand. Today, all college applicants are invited, with the result that membership numbers have exploded from 9,000 to 14,000.

The site is powered by SocialEngine and integrated with Ellucian’s Banner Student system. Members can engage with other applicants, recent enrollees, present students, and faculty. In addition to gleaning useful insights from their peers, prospective students sometimes meet their roommates through these interactions, too.

Furthermore, all of these interactions are visible to college administrators, providing them with valuable intelligence on prospects. “There’s a wealth of data available when you have the ability to listen to a conversation,” says Bonny Griffith, director of recruitment marketing. “Plus, we’re providing a service where students want it—online.”

Tracking and analyzing 100 variables, such as the number of logins and activity level, also help Ithaca to predict enrollment levels.

Grockit, a maker of online test prep products, takes a different approach. It combines users’ test scores and other data with information mined from Facebook to suggest compatible schools to students. Using the company’s School Match tool, students can see which schools their friends have attended, are attending, or are interested in, and receive recommendations about schools they might like.
First, School Match weighs Grockit practice test results, public data from colleges and universities, and Facebook Social Graph data. Next, the system factors in a prospective student’s relationship to specific schools and their admissions requirements. The student then receives profiles of suggested schools, along with the names of friends and potential classmates who may share a connection with them. Students can also solicit school reviews from friends and alumni.

While Grockit is oriented more toward students than admissions offices, it can reduce the amount of time and money that schools spend on recruitment. For instance, School Match allows users to request information from schools with the click of a button, giving colleges and universities direct access to potential students with a proven interest in the school.

“Having this kind of knowledge allows schools to tailor their recruitment efforts,” explains Farb Nivi, founder of Grockit.

3) Offer an Unforgettable Campus Tour

As a campus tour leader, David Meyer was once told that if tour-takers retained just 10 percent of what he shared, he’d done his job. Now as owner of CampusScene, a startup developing an augmented reality (AR) tour app, he’s hoping to increase retention to 90 percent.

At schools piloting the technology—including Brown University (RI), Duke University (NC), and Tufts University (MA)—tour-takers can point their smartphone or tablet cameras at campus landmarks and have informative graphics, video, and sound layered on top of the image. For those prospects unable to visit in person, a virtual guided tour of the campus is available online. All users can save information to a personal dashboard for future reference, a handy feature that keeps schools from blurring together.

For colleges and universities, the true value of the AR tours lies in the information collected. Each data point features a feedback area where students can comment and tag locations on social media. A back-end administrative system automatically tracks users’ stops, records which locations are showing best, and analyzes what visitors are thinking. Armed with these insights, schools can target their communications better to engage potential students.

AR tours that rely on software’s ability to recognize campus buildings face some difficult technical challenges. A potentially easier way to educate prospects about what they’re seeing is via QR codes. That’s the approach taken by Bob Rafferty, former director of new media at Wittenberg University (OH) and cofounder of Knowble Media, a provider of web, mobile, video, and multimedia campaigns for colleges and universities.

“Admissions offices need to be focused on experience-based media,” insists Rafferty. “Creating memorable experiences for campus visitors is of the utmost importance.”

Last year, with that aim in mind, he identified points of interest at Wittenberg, uploaded content that complemented the university’s media strategy, and deployed QR codes on buildings campuswide, creating what was touted by the university as the first-ever smartphone campus tour—based on Knowble’s Q.R. Campus platform. When scanned by a mobile device, a code launches a website that displays video, photos, and text descriptions about that location. The only downside is that users need to download a QR reader.

Whether schools provide such tours via QR codes or more dynamic technology, the ramped-up experience provides universities with an innovative way to educate prospects and sell them on the school—even when the admissions office is closed. Plus, usage reports help schools improve the tours and—more important—initiate a relationship with prospects that they hope will last a lifetime.

Alicia Brazington is a freelance writer based in Portland, OR.
Planning the Unplannable: IT Management of Anytime-Anywhere Learning

Learning and instruction are changing in higher education, owing largely to the proliferation of consumer technologies on today's campuses. A growing number of institutions are moving away from the traditional instructor-focused teaching model to a new student-centric approach that favors a more personalized, collaborative, anytime-anywhere—from any device—learning experience. As these colleges and universities move forward, what technologies and policies should they have in place to support their academic needs?

Campus Technology spoke with Texas A&M University, South Arkansas Community College, and telecommunications provider Verizon to get insight on how to build an IT infrastructure that supports the ever-changing landscape of 21st century learning.

1) Today's students don't want to be tethered—to a device or a classroom. How does virtualization and cloud computing support anytime-anywhere-any-device learning?

CAROL FOX HENRICHS: Today's investments in technology for teaching and learning should be geared toward removing barriers that impede access. That's the same advice I would have given ten years ago—the barriers however, have changed. The explosion of mobile devices has created the latest barrier to access. Students do not want their access to be limited to a specific time, to any one device, or to a specific place. The use of cloud computing and virtualization helps to break down barriers of device and place, while time is more closely tied with course design.

TECHNOLOGY INSIGHT FROM VERIZON: Educators are deploying mobile strategies to enable students to learn on the go and when they are able. This type of dynamic learning environment requires robust support to allow students to be able to access learning apps and data from their mobile devices on-the-go.

Virtualization and cloud computing allow campuses to focus resources on core competencies and evaluate how they can enhance those competencies by sharing resources and optimizing service delivery models to ensure their offerings align to rapidly evolving campus needs.

2) How do you combat the potential threats introduced by such personal devices, while maintaining standards for academic integrity and honesty?

TIM KIRK: This question raises several issues: the possible introduction of malware via personal devices and the ability of students to collaborate or use outside resources when the faculty member is expecting independent effort.

To combat the malware threat first requires a philosophical change: You cannot eliminate all of the threats—there will be insecure devices with malware in the campus environment. To reduce the number of infections and their impact, the college has implemented an ongoing program of end-user education, made college-purchased software solutions available to our students and staff, and implemented policies in the network-switch fabric to reduce the impact of malware and its ability to replicate. Our current hardware vendor supports policy implementation at the switch-port level…

TECHNOLOGY INSIGHT FROM VERIZON: Protecting restricted data and internal network resources from vulnerabilities or breaches is a top priority to support the high-availability needs of the critical applications required on today’s campus. Hacking or unauthorized access to data or computing resources are potential security risks that are blatant and intentional; however, data systems or networks can be compromised unintentionally as well…

3) What policies and technologies do campuses need to have in place to protect both their network and users' privacy in today's open, collaborative learning environment?

Meet the Contributors:

CAROL FOX HENRICHS, assistant director of Instructional Technology Services, Texas A&M University
TIM KIRK, chief information officer, South Arkansas Community College
TAMARA CLOSS, senior consultant, business development and strategic planning, Education Vertical, Verizon
KIRK: As noted above, network administrators must now assume that compromised devices are present on their network and take steps to lessen their impact. Two examples are restricting direct communication between two wireless devices on an access point, and requiring peer-to-peer traffic to pass through higher-order network electronics, which permits the network administrator to apply policies that lessen the risks of using a wireless network. Once again proactive user education is a must as administrators cannot protect what students give away. Our policies permit our users to use a wide variety of devices on the college network; however every device must authenticate itself (just as students need an ID to borrow material from the library). I encourage network users to assume that, with only a few exceptions, that no communication is truly private. Further, digital data is forever.

TECHNOLOGY INSIGHT FROM VERIZON:
In addition to the intellectual property, copyright and other regulations that impact academic engagement on campus, there are other legal and regulatory compliance requirements that impact campus operations. Everything from the Privacy Act to the Payment Card Industry Data Security Standard (PCI DSS) to the Health Insurance Portability and Accountability Act (HIPAA) requires careful risk assessment and implementation of policies and technologies to protect the campus and its constituents, in order to maintain public trust and meet rigorous compliance requirements...

HENRICHS: Many of our colleges use iTunesU to distribute their content. We also support Confluence, a wiki product from Atlassian, Camtasia Relay for lecture capture, and SABA Centra for videoconferencing and synchronous meetings. We are in the process of moving to Blackboard Learn for our centrally supported LMS and plan to make use of the collaborative tools included. There is no denying BYOD is affecting the campus budget for technology. Initial efforts included installing wireless access points in instructional areas, dorms and common gathering areas. More recently, resources are being directed toward providing wireless access as students move from one building to the next. One nice thing about recent trends in computerization is the reduction in space needed for servers, which equates to smaller data centers.

4) What applications are used to create an engaging, social experience for your institution’s virtual students? How does the trend of IT computerization/BYOD affect campus IT budgets and planning?

HENRICHS: Many of our colleges use iTunesU to distribute their content. We also support Confluence, a wiki product from Atlassian, Camtasia Relay for lecture capture, and SABA Centra for videoconferencing and synchronous meetings. We are in the process of moving to Blackboard Learn for our centrally supported LMS and plan to make use of the collaborative tools included. There is no denying BYOD is affecting the campus budget for technology. Initial efforts included installing wireless access points in instructional areas, dorms and common gathering areas. More recently, resources are being directed toward providing wireless access as students move from one building to the next. One nice thing about recent trends in computerization is the reduction in space needed for servers, which equates to smaller data centers.

5) What’s the one piece of advice you would give to a fellow technology director who is still in the beginning stages of planning for anytime-anywhere learning?

KIRK: Technology alone cannot create an engaging learning experience; that begins with an engaged faculty member. There is no one device for all students in all situations. Moreover, students will use technology in unforeseen ways. If we are fortunate, the devices that we use five years from now will be cooler than we can imagine today. Of course, you can never have enough bandwidth for a college network. And finally, remember that educating your users is a far better approach than attempting to control them.

TECHNOLOGY INSIGHT FROM VERIZON:
With continued advancement in technology, higher-education institutions are only limited by imagination and organizational will. But, there is a need for campus-wide strategic planning, governance and prioritization to move to new technology platforms that optimize the education ecosystem. Anytime-anywhere learning enables students to take learning to the next level only when planned well. The planning process needs to take into account any inherent limitations of existing infrastructure at the initial stage to help properly support anytime-anywhere learning.
Apprent-IT-ships

IT shops are turning to students to staff help desks, troubleshoot, and more. For schools, it’s a way to cut costs; for students, it’s a learning experience and a pathway to employment.

BY KEITH NORBURY

EARLY IN HER freshman year at Quinnipiac University (CT), Brooke Eder took her laptop computer for servicing at the university’s student help desk. Out of curiosity, she asked the person at the desk to explain the problem and how it was fixed.

“Oh, it’s really complicated,” came the reply.

Aaron Sacco
Eder, who was majoring in public relations, felt comfortable with computers but not with that attitude. She resolved to discover for herself how complicated such a repair would be. So she applied for a job of her own on the student help desk.

“It turned out to be the best decision I made,” recalls Eder, who graduated from Quinnipiac in 2011 and now works full-time as a computer support specialist in the IT department at Boston University Medical Campus (MA). “The knowledge that I got as a student worker at Quinnipiac gave me the skill set I needed even though I didn’t major in a computer field.”

Helping students land tech jobs after graduation may be one of the most gratifying benefits of involving students in campus IT—but it’s not the only one. Student workers can reduce IT costs and, equally important, they bring to the table a useful perspective: They are, after all, the IT department’s constituents and can often provide insights that grizzled IT professionals might overlook.

Most colleges and universities utilize student workers in some IT capacity, ranging from grunt work to sophisticated software development. In the vast majority of cases, though, the work comprises entry-level duties. In such cases, a school’s primary motivation is usually cost reduction.

Typically, students earn considerably less than full-time staff. At Oregon State University, for example, students earn $9 to $11 an hour. In comparison, the salary range for full-time, unionized IT consultants is $32,000 to $55,000 a year, according to Lucas Turpin, interim director of technology support services. That equates to $16 to $27 an hour. At Quinnipiac, students working in the schools’ three Technology Centers start at the state minimum wage of $7.25, but they can earn up to $11 as a student supervisor.

Before rushing out to hire students, though, take time to ensure that the relevant union—if any—understands and supports what you are trying to achieve. In the case of OSU, for instance, “the union sees the benefit of student employees, because we’re helping to prepare the workforce as part of students’ education,” notes Turpin.

It would also be a mistake to see student involvement solely in terms of dollars and cents—even for these entry-level positions. Students come to the table with a lot more than a willingness to work for less. “Oftentimes, students come at problems in a different way, because they have grown up with technology,” says Turpin.

And, if the customer is always right, then it makes sense to understand that viewpoint at the outset. “Getting your customers involved in solving problems is the best way to make sure the solutions you come up with actually do what your customers want,” explains Jim Waldo, CIO at Harvard University (MA).

### Of the nearly 100 students working in IT at Oregon State University, as many as 35 staff the general help desk.

While IT managers will sometimes tap especially talented students to work as consultants or developers (see “Tapping Student Expertise” on page 34), most students work within established programs with clearly defined—and often limited—responsibilities:

- **Help Desk.** The most common student IT hire is help desk support. Of the nearly 100 students working in IT at OSU, for example, as many as 35 staff the general help desk. “They are the support folks,” explains Turpin. “They answer the phones. They help write how-to articles for our websites. They keep the websites updated.”

At Quinnipiac, student workers provide “the first tier of support,” according to Bill Murphy, manager of client services. “That frees up the full-time staff that works at the help desk to do more things related to faculty, labs, and the like.”

Murphy’s department currently hires about 60 STARS.
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Student Technology Academic Resources) each year to staff the Technology Centers. The number of student staff-
ers is expected to grow as the program is extended to Quinnipiac’s new medical school.

“They actually have a lot of responsibility,” notes Murphy. “The [student] supervisor basically runs the front desk, because I have to manage all three of our locations.”

Even venerable Harvard hires student computing technicians for its Walk-in Support Center. The work typically involves installing antivirus software, adding memory to laptops, or helping recover homework that was accidentally deleted. For most—but not all—applicants, the job’s appeal probably lies in the $12-an-hour pay, with an opportunity for raises of $1 an hour annually. “Very few Harvard graduates end up as computer technicians,” notes Waldo. “But knowing what a computer technician does is a useful thing no matter what you end up doing.”

A/V Aides. At Quinnipiac, as at many other institutions, student workers also help with audiovisual services. This includes checking equipment in and out, and providing basic support in the classroom should an instructor have trouble using a projector.

OSU’s media services group even has a student multimedia services division, staffed primarily by students. They check out laptops, camcorders, cameras, and other devic-
es. “And they’ll actually sit down and train [other students] how to use these devices,” notes Turpin.

In addition, students help set up the university’s enhanced classrooms. “They help pull wire in the rooms, wire up TVs, and all that kind of fun stuff,” adds Turpin.

**Internships.** Certain institutions, such as Michigan Technology University, hire interns to do more advanced work. At Michigan Tech, interns work with the user service, operations, infrastructure, and services teams on projects that “both assist the full-time employees and allow the interns to work and learn profound skills,” says Margaret Landsparger, a senior personal computer specialist in the IT services and security department.

Aside from hiring about 90 of its own students to work in basic IT, Bowdoin College (ME) has an internship program that brings in five students each year from nearby Southern Maine Community College and Central Maine Community College.

“The interns work at a much higher level than the [Bowdoin] students would be working,” explains Mitch Davis, CIO at the college, noting that most of the applicants are working toward networking degrees at the community college (see video at left).

By the time the interns leave the Bowdoin program, they will likely have received certification in the Red Hat operating system and acquired at least two network certifications, such as Cisco Certified Network Associate.

“The goal is that, in a year’s time, they could do it independently and could actually be the lead on a networking group,” notes Davis. Another aim of the program is to create homegrown IT professionals in Maine, which has had difficulty attracting skilled workers from elsewhere.

**One-Off Projects.** Student participation does not have to be confined to established programs. Sometimes, it helps to enlist students for short-term initiatives. At Harvard, for example, Waldo’s department sought input from the student senate on identifying wireless dead spots on campus. “They’re more than happy to tell us they’re having trouble with wireless,” notes Waldo.

Bowdoin had a similar problem with cell phone reception, which was “horrible,” according to Davis. So he charged a student advisory group with calling service providers about erecting a cell phone tower. After about two months of negotiating with Cingular (now AT&T), a tower was installed that provides four bars of coverage across campus.

“AT&T pays us about $24,000 a year to have that tower there,” says Davis. “And that was all done with students. They learned how to negotiate. And they learned what it’s like to work with vendors.”

**The Hiring Process**

For students seeking a position in IT, the application process varies widely from institution to institution. Quinnipiac has “a huge process,” according to Murphy. Applications are submitted via the university’s career site; a program coordinator, who is also a student, then meets with the applicants before passing them along to Murphy and the other managers for interviews.

At Bowdoin, on the other hand, almost any student who wants to work in the Technology Centers can do so until the positions are filled, says Davis—there’s not a rigorous
interview process. The same cannot be said, however, for the five interns whom Bowdoin hires each year from nearby community colleges.

“Usually the top 2 percent of the class is recommended to be part of the internship program,” explains Davis, “and we work with the community colleges and the professors to make sure that it’s a good fit.”

While technical expertise is an asset for any student worker or intern, it is far from the only quality that campus IT departments covet.

“We look for a strong work ethic, basic skills in the area where they will be placed, a positive attitude, and an interest in learning new skills,” says Michigan Tech’s Landsparger.

OSU hires students from every discipline, including a “very good showing” from engineering but—interestingly—few computer science students apply. The school asks prospective student workers about their interests and majors, so they can be slotted into jobs that play to their strengths. For example, an accounting major was recently able to gain real-world experience by working with a full-time staff member on the university’s billing system.

Since customer service is a major part of tech support, the focus there is more on people skills. “It’s less about technology and more about making sure the customers have what they need and that they’re happy,” explains Turpin. “It doesn’t matter if you are the best person in the world at fixing something: If you can’t tease out what the problem is that [a customer is experiencing], you’re never going to be able to fix it.”

Tackling the Challenges

While the potential to save money and give students a leg up in the workplace has a powerful allure, IT managers should be aware that hiring student workers comes with its own set of challenges.

The biggest drawback is that “they are students first and employees second,” notes Turpin. This means they aren’t always available for a shift because of pending examinations or even social activities. Plus, students are usually restricted to a maximum of 20 hours of IT work a week during school terms, which further limits their availability.

The easiest way to mitigate this is by overstaffing. “We’re not able to provide all the hours that all of our students want,” says Turpin.

Quinnipiac solved its shift-management headaches with an online scheduling tool known as WhenToWork. Students sign in and indicate their availability for the coming week. “You just push on a button and it fills in the whole schedule for you based on when you can work,” explains Murphy.

Scheduling aside, students do also require supervision, especially in the beginning. “Typically, they’re always with a full-time staff member,” says Turpin. “But it may be one full-time staff member working with anywhere from one to five students.”

Finally, schools must be aware of privacy and security issues: Students may not be allowed access to certain data, machines, or networks. “We have a rule here that basically says staff support staff, students support students,” notes Murphy.

Student Benefits

Whatever managerial hassles might be involved, bringing students into IT is generally a win-win proposition for both parties. And it’s extremely gratifying when students go on to fulfilling careers in technology. That was certainly the case for Brooke Eder and for Turpin, who was a student IT worker himself in the mid-1990s.

“I learned how to punch down cables in the switch room, deploy phones, and program the phone switch,” he recalls. It’s an experience that he is happy to pay forward in his present role as interim director of technology support services. Former student IT workers have returned years later to thank him for their training, “because it really helped prepare them to be successful in whatever their industry is.”

Keith Norbury is a freelance writer based in Victoria, British Columbia.
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