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Top-Ten IT Issues, 2014: Be the Change You See

Susan Grajek

David Rotman

Cedarville University, rotmand@cedarville.edu

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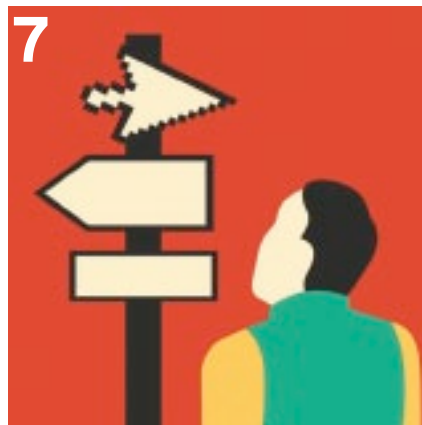
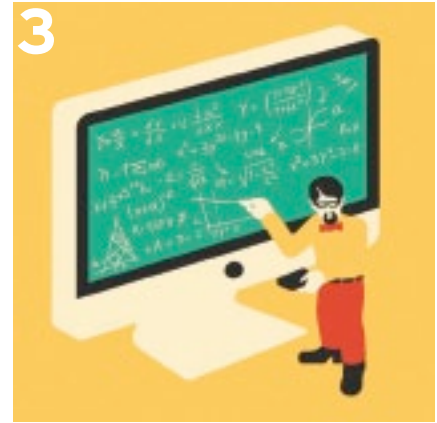
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TOP
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IT Issues, 2014

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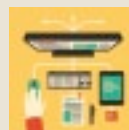
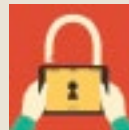
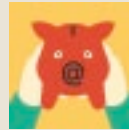
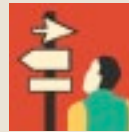
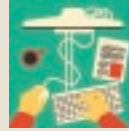
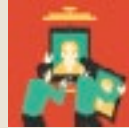
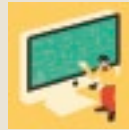
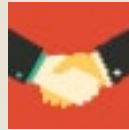
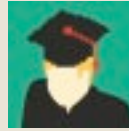


By Susan Grajek and the 2013–2014 EDUCAUSE IT Issues Panel

Fasten your seatbelts. From the looks of this year's top-ten IT issues,¹ 2014 is turning out to be an exciting year. The field of higher education information technology is experiencing a sea change that has, arguably, been building since the advent of the personal computer in the early 1980s. It was then that IT organizations saw their mainframes challenged by microcomputer upstarts and that computing began to interest more than just the scientists and accountants. What we now call the *consumerization* of information technology has been developing ever since—chip by chip, app by app, and shopping cart by shopping cart. The democratization of information technology means that faculty and students have not only the desire but also the means to reshape the way they use technology in their work, that all members of the campus community want ubiquitous access to computing, and that presidents, provosts, and trustees expect to use information technology to help realize their institutions' strategic visions.

Top-Ten IT Issues, 2014

- 1 Improving student outcomes through an institutional approach that strategically leverages technology
- 2 Establishing a partnership between IT leadership and institutional leadership to develop a collective understanding of what information technology can deliver
- 3 Assisting faculty with the instructional integration of information technology
- 4 Developing an IT staffing and organizational model to accommodate the changing IT environment and facilitate openness and agility
- 5 Using analytics to help drive critical institutional outcomes
- 6 Changing IT funding models to sustain core service, support innovation, and facilitate growth
- 7 Addressing access demand and the wireless and device explosion
- 8 Sourcing technologies and services at scale to reduce costs (via cloud, greater centralization of institutional IT services and systems, cross-institutional collaborations, and so forth)
- 9 Determining the role of online learning and developing a strategy for that role
- 10 TIE Implementing risk management and information security practices to protect institutional IT resources/ data and respond to regulatory compliance mandates
- 10 TIE Developing an enterprise IT architecture that can respond to changing conditions and new opportunities



Many of the issues are not new. We have been discussing them for several years, and many appeared in one form or another in the top-ten lists for 2011 and 2012. But they have been the purview of early adopters and innovators, fodder for case studies and opinion pieces. This year the new ideas, solutions, and models that have been accumulating in higher education and technology will hit IT organizations—and the institutions they serve—fast and hard. 2014 is the year the front part of the herd will join the mavericks, tipping the balance for the rest.

Those who have been sitting back now need to sit up. Those who have been rolling their eyes about the overuse of words such as *transformation* and *disruption* may need to look for synonyms because even if the words may be tired, the phenomena they describe are very much alive and well. It is time to stop considering whether to “be the change you *want* to see in the world” because the change is here. It is time to be—and, better yet, to *lead*—the change you already see.

According to a recent study conducted by ECAR (EDUCAUSE Center for Analysis and Research), only six of the following twenty-two technologies are in place in at least 30 percent of U.S. colleges and universities (those six are marked with an asterisk):

- Administrative or business performance analytics
- Analytics
- BI (business intelligence) reporting dashboards
- Cloud-based academic applications*
- Cloud-based e-mail for faculty and staff*
- Cloud-based office productivity suites
- Cloud-based high-performance computing
- Cloud-based video streaming solutions*
- Database encryption
- Data warehouse*
- Degree advising analytics
- Digital preservation of research data

- Digital repositories for researchers and scholars
- E-book readers and e-textbook
- Enterprise identity and access management*
- E-portfolios
- Federated ID management
- Institutional support for public cloud storage
- Mobile app development
- Mobile apps for enterprise applications
- Online courses on mobile devices
- PCI-DSS standards*

We estimate that by 2015, all will be in place in at least 30 percent of institutions and that by 2016–2017, all will be in place in at least half of U.S. institutions.²

Members of the campus communities are driving many of the issues on the 2014 top-ten list. They want to use technology to transform teaching and learning in order to attract and retain more students and better faculty. They want to develop a competitive advantage through the insights that analytics can provide. They want institutional information technology to function as effectively as the consumer solutions they experience. They want to co-create solutions, and they are willing to bypass campus IT organizations to do so. They want the IT organization to accomplish their strategic vision without additional funding. And so, the IT organization must help transform the institution's business while it also transforms its own.

As a result, half the issues on the 2014 list are about supporting institutional change, and half are about restructuring the IT organization (see Figure 1). All are about solid execution. Despite significant overlap in topics, the 2014 list has a different character from the 2013 list. This year, the desired outcomes are generally clear. In the case of half the issues, the design work is complete and institutions are focused on implementation. In the other half, design is still the challenge, but it is directed toward a specific outcome.

Cloud computing was on the 2012 and 2013 lists and appears again in 2014.

But previously, the focus of cloud was on developing a cloud strategy. This year's cloud-related issue relates to *executing* on the strategies developed in 2013 to *reduce costs*. Last year's funding issues concerned funding information technology strategically. The 2014 issue describes the need to *change* IT funding models to *sustain core service, support innovation, and facilitate growth*. Two newcomers to this year's list relate to the capabilities IT needs to develop in enterprise architecture and risk management to support new models of IT service delivery and increased strategic use of IT.

Growth in demand is still with us, though more muted. Last year, BYOE (Bring Your Own Everything)³ and wireless demand occupied two separate issues; this year, only wireless demand made the overall top-ten list.⁴

Most of the changes are centered in the institution's teaching and learning mission or the IT function itself. In 2012, instructional technology had no dedicated issue. In 2013, it had two. This year, thanks at least in part to the attention paid to MOOCs (massive open online courses), teaching and learning accounts for three issues in the top ten, and they reflect a blend of execution and strategy that indicates both an urgency to integrate more technology into teaching and learning and a rapidly changing solution space.

As for the IT organization, change engulfs the function, the organization, and the people. Everything seems to be not poised to change but actually entering a period of change: organizational structures, service delivery, enterprise architecture, funding, information security strategy, and the IT organization's

FIGURE 1. Focus Areas of the 2014 Top-Ten IT Issues

	BUSINESS OF THE INSTITUTION	BUSINESS OF THE IT ORGANIZATION
IMPLEMENTATION	#1. Improving student outcomes through an institutional approach that strategically leverages technology #3. Assisting faculty with the instructional integration of information technology #5. Using analytics to help drive critical institutional outcomes #10. (tie) Implementing risk management and information security practices to protect institutional IT resources/data and respond to regulatory compliance mandates	#7. Addressing access demand and the wireless and device explosion #8. Sourcing technologies and services at scale to reduce costs (via cloud, greater centralization of institutional IT services and systems, cross-institutional collaborations, and so forth)
DESIGN	#2. Establishing a partnership between IT leadership and institutional leadership to develop a collective understanding of what information technology can deliver #9. Determining the role of online learning and developing a strategy for that role	#4. Developing an IT staffing and organizational model to accommodate the changing IT environment and facilitate openness and agility #6. Changing IT funding models to sustain core service, support innovation, and facilitate growth #10. (tie) Developing an enterprise IT architecture that can respond to changing conditions and new opportunities

2013–2014

EDUCAUSE IT Issues Panel Members

Mark C. Adams
Vice President for Information
Technology
Sam Houston State University

Mark I. Berman
Chief Information Officer
Siena College

Morris W. Beverage, Jr.
President
Lakeland Community College

Christian Boniforti
Chief Information Officer
Lynn University

Ritchie Boyd
Academic Technology Specialist
Montana State University

Paul Campbell
Director, Information
Technology
Australian Catholic University

John C. Cavanaugh
President and Chief Executive
Officer
Consortium of Universities of the
Washington Metropolitan Area

Charles E. Chulvick
Vice President for Technology,
Assessment and Planning
Raritan Valley Community
College

Jenny Crisp
QEP Director and Assistant
Professor of English
Dalton State College

Diane Dagefoerde
Chief Information Officer, Arts
and Sciences
The Ohio State University

John Dixon
Chief Information Officer
Francis Marion University

Steve Fleagle
Chief Information Officer and
Associate Vice President
The University of Iowa

Jose-Marie Griffiths
Vice President, Academic Affairs
Bryant University

Tom Haymes
Director, Technology and
Instructional Computing
Houston Community College

John D. Hermes
Vice President for Information
Technology
Oklahoma Christian University

Richard A. Holmgren
Vice President for Information
Services and Planning
Allegheny College

Barbara Howard
Associate Professor
Appalachian State University

David R. Hoyt
Chief Information Systems
Officer
Collin County Community
College District

Butch Juelg
Associate Vice Chancellor,
Technology Services
Lone Star College System

Rebecca L. King
Associate Vice President for
Information Technology
Baylor University

Michelle Kozlowski
Associate Vice Chancellor
West Hills Community College
District

James Kulich
Vice President and Chief
Information Officer
Elmhurst College

John D. Lawson
Vice Provost and Chief
Information Officer
Western Washington University

Mur Muchane
Executive Director of
Information Technology
Services
Davidson College

Betsy Tippens Reinitz
Assistant Vice Chancellor,
Information Technologies
University of Washington Bothell

David L. Rotman
Chief Information Officer
Cedarville University

Paul Sherlock
Chief Information Officer
University of South Australia

Robert Solis
Vice President and Chief
Information Officer
University of Massachusetts

John J. Suess
Vice President for Information
Technology and Chief
Information Officer
University of Maryland,
Baltimore County

Joseph Vaughan
Chief Information Officer and
Vice President for Computing
and Information Services
Harvey Mudd College

Sue Workman
Associate Vice President
Indiana University

Francisca Yonekura
Associate Department Head
University of Central Florida

Barbara Zirkin
Associate Dean, Distance
Learning
Stevenson University

The EDUCAUSE IT Issues Panel comprises individuals from EDUCAUSE member institutions to provide quick feedback to EDUCAUSE on current issues, problems, and proposals across higher education information technology. Panel members, who are recruited from a randomly drawn and statistically valid sample to represent the EDUCAUSE membership, serve for eighteen months with staggered terms. Panel members meet quarterly for ninety minutes via webinar or in person. The meetings, facilitated by EDUCAUSE Vice President Susan Grajek, are designed as an ongoing dialogue to flesh out and refine an array of open-ended technology questions about the IT organization, the institution, and cross-institutional boundaries. The members discuss, refine, and vote on the most relevant underlying issues or options.

relationship with institutional leaders. For years we have classified the role of the CIO as either a plumber or a strategist. There is little room for plumbing on this year's list. Even the most technical issues—wireless and architecture—are

more a matter of technical strategy and effective execution. The strategist is front and center, whether developing technology strategy or partnering with institutional leaders to contribute to academic and institutional strategy. But that

strategist needs to have superb execution and sourcing abilities as well. Perhaps it is time to retire the plumber-versus-strategist debate and acknowledge a new truth: the CIO must be both strategist *and* service manager.



ISSUE #1: Improving Student Outcomes through an Institutional Approach That Strategically Leverages Technology

Leveraging technology to improve student outcomes continues to be an important issue for higher education as public policy and funding models increasingly focus on the completion agenda.

Improving student outcomes requires an institution-wide strategy. Faculty usually approach the issue of student outcomes as a matter of passed tests and quizzes, graded assignments, final grades, and student persistence and course retention. Administrators often view the issue in terms of admissions, retention, and graduation. Institutional evaluators and assessors are concerned with course evaluations and reports of

mandated information to state, regional, and federal organizations such as the U.S. Department of Education and its Institute of Education Sciences, which includes the National Center for Education Statistics. Finally, IT professionals focus on data issues (including security, permissions, maintenance, architecture, and storage), application management and integration, vendor relations, and process automation.

Recent improvements to analytics tools have made it easier for institutions to track student achievement and to use this information for academic advising, retention improvement, and institutional assessment purposes. Commonly, these tools are connected to various learning management systems (LMSs) and collect student performance data *in situ*. Two primary uses for these tools are just-in-time intervention (e.g., with tutorials) to improve mastery learning and intrusive, or proactive,⁵ advising. Both uses can improve student retention, which in turn can increase student completion rates. A third, more specific use is to design learning assessment processes for individual courses, especially gateway courses. Such tools, when appropriately connected with academic support services, can significantly improve student learning.

The use of open educational resources (OERs) and MOOCs offers students multiple ways of learning within and outside the institution. Competency-based learning models are becoming more frequent, and institutional leaders need to consider

how to award credit for prior learning in an effort to help students keep the cost of education down and improve time to completion.

Social networks such as Google+ allow online and on-campus students to meet in a virtual space where they can feel connected to their classmates, their program of study, and the campus as a whole.⁶ Studies have shown that a sense of community can improve student retention and persistence.⁷ Educating faculty on the value of providing timely feedback, leveraging OERs, and using social media in the classroom is essential to the success of these initiatives. Thoughtful involvement of the faculty, perhaps through a teaching and learning center, can create an environment that is supportive of these tools.

The strategic issue that is most critical is the integration of these tools with the overall institutional assessment. Leveraging the information well depends on a strategic plan developed at the institutional level and endorsed by the governance structure within the institution.

Advice

- Develop a data and application architecture for learning and academic analytics tools. Consider whether that architecture would be best based on an analytics platform embedded in a core application—such as the LMS—or on an “application agnostic,” dedicated analytics solution.
- Determine key outcomes objectives and the data-driven questions that need answers to achieve those objectives. Design a program based on those, rather than on the data that just happens to be top-of-mind or most readily available.
- Establish the role of Chief Privacy Officer to address data-sharing risks and concerns; proactively allow students to control their privacy settings.
- Be sure that intervention tools (e.g., integrated planning and advising services, or IPAS) are flexible and customizable and offer one-stop shopping for both advisors and students.
- Recognize that these systems are

“Analysis of information collected routinely in the course of a given semester or year can help inform course design, program enhancements, tutoring and special assistance resource needs, admissions criteria, and course redesign activities.”

—BARBARA ZIRKIN

Associate Dean, Distance Learning, Stevenson University

immature at this point and that implementation must be agile and planned in stages in order to achieve maturity and return on investment.

Institutions with:

- Degree audit/academic progress tracking: 73%
- Academic advising systems: 66%
- Early alert systems: 46%

A sign of market instability: *The number of vendors serving these areas is inversely correlated with the percent of institutions currently using them.*

—EDUCAUSE Core Data Service 2013



ISSUE #2: Establishing a Partnership between IT Leadership and Institutional Leadership to Develop a Collective Understanding of What Information Technology Can Deliver

To establish an effective partnership, IT leaders and institutional leaders must start with a shared vision. IT leaders must be able to understand the institutional missions and strategic priorities

and align resources to support and achieve them. Recognizing that both the institutional leadership and the IT leadership bring significant perspectives to the table will benefit all.

It has always been a function of IT leadership to communicate both the promise and the limitations of technology. One change in recent years involves the level of hype surrounding IT issues, from online education to consumer electronics. Things that may seem “obvious” to non-technologists include the following:

- Online programs generate huge revenues at low cost.
- Google, Twitter, Facebook, and other consumer applications are free, so providing these kinds of services for the institution will be easy and will cost little or nothing.
- Technology will always allow us to do more for less.
- “Cloud” services cost less, work better, and reduce local staffing needs.

There are elements of truth and fallacy in all these propositions, but technologists know there are no simple answers. IT leadership needs to help educate institutional leadership on when to leverage technology and for what purposes. Within this responsibility, IT leaders need to be able to explain the challenges, total cost, and opportunities. Without a high level of trust between IT leadership and institutional leadership, decisions may be

made based on oversimplified views. One aspect of that trust is that the IT organization can deliver on services and can be counted on to run a transparent and collaborative department.

IT organizations are dealing with a fairly fast moving and growing set of demands on their resources. Expectations of service levels and flexibility are increasingly diverse and complex. The IT organization must provide an educational and research infrastructure that helps to maintain the institution’s competitive edge with respect to its peers and that is rooted in or highly dependent on robust IT services.

IT leaders must look beyond their immediate challenges and have open and candid discussions about where and how technology will transform the institution. To be sure, these transformations will happen at different rates and to different extents on different campuses, but taking a wait-and-see approach while technologies are proven at other institutions is no longer strategic. At the same time, institutional leaders must allow some level of stumbling or even failure while the IT organization takes steps to minimize the risks in its more innovative undertakings.

Current IT and institutional leaders were not raised in a ubiquitous network, device, and app world. Hence, their sense of technology capability and opportunity may not match that of the students, faculty, and staff they are trying to serve. In some cases, current

“Unless this partnership is formed, the institution itself has no hope of engaging in the type of collaboration necessary for the systemic change in higher education that is essential to its survival.”

—BARBARA HOWARD
Associate Professor, Appalachian State University

leaders may have begun their careers in a very traditional academic environment where there was a clear distinction between what the IT organization did and the academic mission of the institution. It is now incumbent on our institutional leadership to develop an intimate awareness of—indeed, wherever possible, a direct experience with—the higher education transformations that are being driven by technology—in some cases on a large scale (e.g., MOOCs), and in some cases on a very personal scale (e.g., personal learning environments and prior learning assessments). A continual exchange of information and ideas will allow the entire institution to respond swiftly and smartly to subtle and major pedagogical changes that are informed, supported, and driven by technology.

One of the most important partnerships that IT leaders must form in higher education is with academic leaders, beginning with the provost or chief academic officer and extending to the faculty.

In addition, college and university libraries sit at the nexus of technology, information, and education and, as a result, may be a vast untapped resource in terms of understanding the shifting ground beneath higher education institutions. Libraries are undergoing a profound transition and can provide insights into how to accommodate legacy models of information storage, structure, and access along with the new models that support students' changing behaviors and expectations.

Finally, students' and parents' expectations deserve strong consideration in the conversation about possible new technology projects. Students and parents (the customers of higher education) are used to a certain level of functionality in the online applications that they use every day: Amazon, Facebook, cable/satellite TV providers, and so forth. Not providing similar levels of service can hurt an institution's "brand." Although members of the Net Generation may be used to navigating an

online world, they do not always understand the underlying technologies. And that lack of understanding means they expect things to just work, like magic, because as Arthur C. Clarke wrote: "Any sufficiently advanced technology is indistinguishable from magic."

Advice

- Identify the institution's champions for effective use of information technology in education, research, productivity, outreach, and other areas. Develop strong relationships with them so that they are partners and advocates for the IT organization and not dissonant voices. Work through them to amplify the influence of the IT organization.
- Don't assume institutional leaders know how information technology can help them achieve their priorities. Meet them more than halfway by understanding their lines of business and priorities, thus building the relationship and the credibility to offer advice.
- Help educate institutional leaders about the contributions and costs of technology to help them right-size their expectations. Provide metrics that present IT data in the context of their lines of business and priorities rather than in the context of IT operations and infrastructure.
- Ensure the IT staff—whether central or distributed—who are interacting most with institutional leaders can communicate in the language they speak. Be sure those staff understand and will support the IT organization's approaches and priorities. An IT support staff may have more face time with the president than does the CIO.
- Help institutional leaders ensure that IT leaders are included in the strategic planning process and ongoing institutional governance so that the IT leadership can proactively contribute to institutional strategy and explain the IT costs of implementing that strategy.

Institutions that have:

- Alignment among leadership: 44%
- Effective IT governance: 32%
- The CIO on the president's or chancellor's cabinet: 51%
- An IT service catalog: 37%

—EDUCAUSE Core Data Service 2013



ISSUE #3: Assisting Faculty with the Instructional Integration of Information Technology

The integration of technology into higher education is no longer optional but, rather, is an essential component of a continuum of delivery environments, from the virtual to the face-to-face classroom. A strategy that combines quality design, competency in the use of LMSs, OERs, and classroom technologies is becoming the status quo.

Perspectives about how faculty should integrate technology into their teaching range from the opinion that faculty should be self-motivated to learn how to use the technologies and their applications to the view that the institution should provide as much assistance as possible so that faculty can focus on the content rather than the technology. Both perspectives have limitations.

CIOs' concerns about faculty and e-learning:

- Faculty are skeptical: 55%
- Faculty lack needed skills: 78%

—Jacqueline Bichsel, *The State of E-Learning in Higher Education* (ECAR, June 2013)

Self-motivated technology adoption, which relies on individual initiative and innovation, is strengthened by institutional resources that can supply a broader set of solutions and contexts. However, these strongly motivated faculty bring enthusiasm and excitement for using technology in teaching. In addition, faculty value other faculty as facilitators for professional development opportunities. Instructional design staff, in partnership with faculty, can form faculty learning communities to build a campus culture in which technology is essential to teaching and learning.

E-learning today:

- Faculty are rewarded for designing and delivering online courses: 38%
- Faculty play a large role in the selection of instructional technologies: 77%
- Faculty have a growing interest in incorporating technology into teaching: 78%
- Faculty have access to central IT training resources: 80%

—Jacqueline Bichsel, *The State of E-Learning in Higher Education* (ECAR, June 2013)

The IT organization has progressed from collaborating with early adopters of technology to supporting the mainstream or encouraging resistant faculty. Faculty are driven by varying factors. The overarching factor is whether they believe that the integration of technology will help their students learn. Resistance may also be due to lack of time and

incentives to develop technical expertise and adapt teaching methods and materials to take advantage of technology.

Faculty members' adoption of technology affects their students. In a recent evaluation of e-textbooks, instructors' adoption of e-textbooks was a key influencer of students' experiences. In the same study, almost 60 percent of participating institutions indicated that lack of faculty adoption was a barrier to future widespread deployment of e-textbooks.⁸ Supporting all faculty, not only the enthusiasts, is important for a number of reasons:

- First, students' expectations and experiences continue to evolve from place-based to more fluid multi-platform, cloud-based, and adaptive.
- Second, a growing body of evidence demonstrates that technology-enhanced educational approaches yield improved outcomes for students.⁹
- Finally, faculty members who incorporate technology into their curriculum can use analytics to improve their teaching and their students' academic success. Early-alert systems can work only if the information is there to support their effective use.

Posting timely feedback via LMSs and embracing digital communication tools and OERs mean that faculty must be

digitally literate and that campuses must adopt a culture of teaching and learning with technology.

It is time to actively help faculty develop higher levels of competence both in the technical literacy required to effectively use the available tools and in the pedagogical approaches that integrate technology into teaching (e.g., TPACK). In both of these areas, faculty have often been left on their own.

IT organizations need to take the following actions:

- Identify and be conversant in technical innovations that can improve teaching and learning and help keep the institution competitive.
- Ensure that strategic IT plans include support of the teaching and learning mission and are coordinated with other instructional design groups, and be prepared to advise institutional leadership on the benefits and opportunities for using technology in instruction.
- Offer faculty training not only for using the latest tool, whether it is an LMS or a specific lecture-capture tool, but also for applying technology to their curricula more generally.
- Provide support for the specific tools that faculty need in order to innovate in their selected disciplines and learning environments.
- Collaborate with academic leadership to develop and support a broad

“At many institutions we have focused the faculty on learning the latest tool at the expense of a more broadly directed effort to hone the individuals' general knowledge and problem-solving skills so that they may more readily adapt a new tool without having to have a complete re-education effort.”

—RITCHIE BOYD
Academic Technology Specialist, Montana State University

community of practice that includes faculty, IT support staff, and teaching support staff.

- Develop capabilities to assess the impact of various technologies and methods in teaching and learning.
- Recognize that not all students are the tech-savvy millennials commonly portrayed in the media and that faculty often become the first line of tech support and accordingly need strong support from the IT organization.

Finally, many campuses would benefit from a cultural shift that values, expects, and to some extent rewards faculty fluency and responsiveness with technology in the curriculum.

Advice

- Assess faculty needs and the degree to which the institution currently addresses those needs. Develop a plan that will close the gaps and that is tailored to different faculty constituents.

Identify and involve faculty members who are models of good practice in using technology in instruction, so that faculty (not administrators) are driving the plan.

- Use the EDUCAUSE Core Data Service (<http://www.educause.edu/cds>) to benchmark the institution's support for faculty instructional use of technology against that of peer institutions.
- Understand the incentives that are currently in place for faculty incorporation of technology into courses.
- Work with academic leadership and other institutional partners (e.g., academic affairs, libraries) to develop a strategic plan for using technology to advance teaching and learning and to align that plan with institutional priorities and funding.
- Develop a teaching and learning technologies architecture that can be consistently applied to contain costs and ensure that students don't have to learn multiple, redundant technologies.



ISSUE #4: Developing an IT Staffing and Organizational Model to Accommodate the Changing IT Environment and Facilitate Openness and Agility

Technologies and their management and sourcing are changing faster than ever before. Higher education institutions must develop the ability to quickly embrace sensible innovations as well as effectively retire legacy technologies that hinder advancement of the mission and goals of the institution in the short and long run. Demands to accommodate and support the new technologies, IT environments, and service models require IT organizations to be more flexible and agile than in previous years.

Today's IT demands also require a different kind of professional. Staff can no longer pick a technology platform or role and make it a career. Managers have to prepare staff for technologies and service models on the horizon, developing the talent as the technologies and models emerge. This entails hiring agile staff who are comfortable with change, building flatter organizations that allow for quick decision-making and innovative thinking, and continually developing staff.

Experience in the field alone is not enough. Today's workforce must have

Faculty support:

- 98% of institutions have faculty individual training in the use of educational technology (on request).
- 95% of institutions have faculty group training in the use of educational technology.
- 93% of institutions have instructional technologists to assist faculty and instructional designers with the integration of technology into teaching and learning.
- 84% of institutions (up from 81% in 2012) have intensive support for faculty who are heavy users of instructional technology.
- 82% of institutions have instructional designers to help faculty develop courses and course materials.
- 80% of institutions have a designated instructional technology center available to all faculty.
- 73% of institutions (up from 68% in 2012) have a faculty teaching/excellence center that provides expertise on technology.
- 66% of institutions have student technology assistance available to help faculty use technology.

—EDUCAUSE Core Data Service 2013

highly developed soft skills or at least the predisposition to develop them. CIOs, managers, and individual contributors all consider technical skills to be less important to their success than soft skills such as effective communications, project management, strategic thinking, and influencing. It is likely that given equivalent levels of technical skills, the communication and other soft skills will differentiate professionals and provide a competitive advantage. This does not mean technical roles are less important, however. The roles in shortest supply include developers, database administrators, programmers, and information security specialists. In addition, IT staff rate formal technical training as the most important activity contributing to professional growth and development.¹⁰

The IT professional of the 21st century must be able to work in cross-functional teams to gain an understanding of the bigger picture and specific requirements. Those requirements could be related to business, finance, web technology, user experience design, medical equipment, and so forth. IT staff must be able to effectively communicate and quickly troubleshoot issues, whether by working alone or by tapping into broader communities of expertise. IT staff need to be very well connected with fellow professionals in their field through venues such as meet-ups, conferences, social media, and service opportunities within the institution or the community at large.

Today's IT organization will need to change as well. The maturation of the cloud is resulting in increasing moves of applications, platforms, and infrastructure outside the institution. These moves are disrupting traditional IT organizations. According to a July 2013 ECAR survey of more than 2,000 IT professionals, nearly half of college and university IT organizations experienced at least a minor reorganization in the past year.¹¹ In-house staff are not the only or optimal option in many

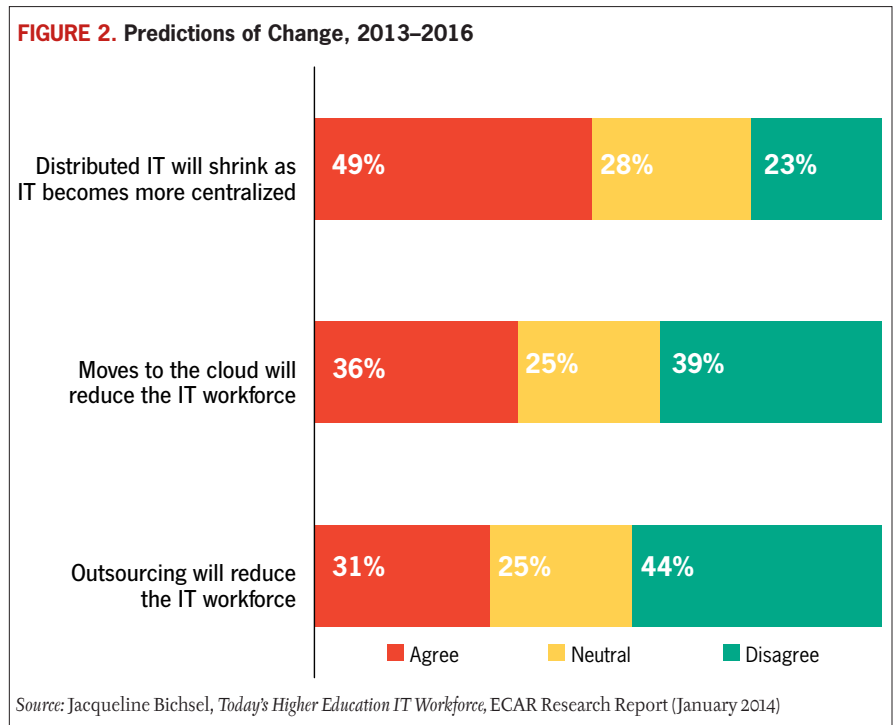
cases. Alternatives such as consultants or contractors, outsourced services and platforms, and shared services (whether internally or with a system or consortium) can augment organizational capabilities or capacity, reduce or contain costs, and/or accelerate projects (see Figure 2).

Thus far there is little evidence of workforce diminishment. Nearly half—46 percent—of IT organizations added staff in the last year, and only 16 percent reported layoffs. Instead, new roles replaced previous ones. In 2013, 38 percent of IT managers and staff were hired to fill newly created roles, rather than to replace or augment existing roles.¹² Technical roles are still needed, whether integrators, architects, security analysts, instructional technologists, or identity management engineers. But additional roles are also increasingly needed, including business analysts, analytics professionals, project and process managers, vendor management specialists, and service management professionals.

These changes place special demands on senior IT and human resources (HR) leaders. Robust and

innovative staff development programs can help retool and retain existing staff and lessen workforce disruptions. Venues such as “hack days” can foster staff creativity, learning, and experimentation. Colleges and universities should consider emulating industry, including such companies as 3M, Google, and Hewlett Packard, which all have programs that support staff exploration and experimentation and that, not incidentally, also help those companies thrive and innovate. Quality of life is one of the most important factors keeping IT professionals at their current institution, significantly outweighing salary.¹³ Those HR policies and IT management practices (e.g., telecommuting, flex time, sufficient resources) that help the IT workforce maintain the quality-of-life factor will help retain and motivate staff.

Finally, the way faculty, staff, and students work has changed too. Faculty collaborate across institutions. Staff are on assignment in remote locations. Many institutions are venturing into online education for the first time. The entire campus community expects to be able to access institutional resources



“In today’s environment we need our organizations to be lean and mean, and yet we also need enough depth and cross-training that things don’t fall apart when a key person goes out on a long-term FMLA.”

—MARK BERMAN
Chief Information Officer, Siena College

at any time and from any location or device. Both institutional leadership and IT leadership must provide the required policies, procedures, technology, and support to facilitate work in distributed ways. Developments such as federated identity, cloud computing, and SaaS (software-as-a-service) are certainly ways to accomplish some of

these challenges, but more needs to be done—and more quickly.

Advice

- Ensure that organizational and staffing goals derive from strategic priorities. If you are moving to the cloud, you will need a different structure than if you intend to

source your services internally. Similarly, determine the optimal blend of distributed and centralized IT at your institution to support innovation close to the customers while concurrently taking advantage of the economies of centralization.

- Develop priorities by doing scenario planning to envision different potential futures for technology at the institution. What would the institution need from the IT organization if most development and commodity services were outsourced? What would the institution need from the IT organization if the institution placed a major emphasis on research, or if it wanted to initiate an ambitious development campaign, or if it made international education a major part of its business model?

The EDUCAUSE Top-Ten IT Issues website

(<http://www.educause.edu/ITissues>)

offers the following resources:

- A video summary of the top-ten IT issues
- Top-ten lists for various institutional subgroups
- “Balancing Innovation with Execution” (a discussion among five members of the IT Issues Panel)
- Recommended readings and EDUCAUSE resources for each of the top-ten IT issues
- An interactive graphic depicting issues trends year-to-year
- An interactive graphic depicting issues by institutional characteristics
- Top-ten IT issues presentation / slides
- HTML and PDF links to this *EDUCAUSE Review* article

- Initiate talent planning to identify star performers and rising stars, and ensure they have robust and realistic development plans. Approach talent planning with a spirit of generosity. Those plans should not assume that the IT department is the only place to grow and develop. Spend as much time developing staff with potential as is spent managing staff with performance issues.
- Identify the talent gaps that exist now or will exist depending on future needs and create a plan to fill them, ideally repurposing talent to motivate the entire organization. Talent gaps can be negative as well as positive. Identify the roles that should be phased out as well as the roles that are needed.
- Learn from peer organizations to

get ideas about new organizational structures and roles.

- Proactively develop a strong partnership with the HR department to make organizational work easier, faster, and more effective.

IT workforce financials:

- Spending on travel/training/conferences has stayed at approximately 1% of the IT budget since FY10.
- 22% of institutions outsourced at least some staff in FY13.
- 55% of FY13 IT expenditures were for compensation (up from 52% in FY11).

—EDUCAUSE Core Data Service 2013



ISSUE #5: Using Analytics to Help Drive Critical Institutional Outcomes

Freeman Hrabowski, Jack Suess, and John Fritz have stated that assessment and analytics, “supported by information technology, can . . . change institutional culture and drive the transformation in student retention, graduation, and success.”¹⁴ If implemented properly, analytics provide a powerful tool to help guide the assessment of student learning outcomes. Given that these tools are often connected to LMSs, they may most easily be used with hybrid and online courses. However, the potential is there for learning outcomes to be measured for all students. These tools can also be tied to various retention tools, such as just-in-time intervention and intrusive advising.

From an institutional research point of view, such data is critical to meeting the requirements of various accreditation associations, as well as to increasing student retention and credential completion. When performance metrics are tied to funding, student analytics tools can play a key role in documenting institutional progress toward goals.

Campus enterprise solutions contain enormous amounts of data including student demographics, enrollments, financial aid information, and student learning outcomes. Unfortunately, the information is seldom readily available or organized in a meaningful way. By leveraging analytics,

institutions can develop the trends and forecasting models to make informed decisions regarding academic program and course offerings, support services, and distance learning options—in other words, to decide where and when to invest (or divest) in response to student demands. Institutions need to develop best practices and to identify gaps in data collection, mining, and management, as well as reporting and application processes.

The IT organization can contribute to analytics initiatives by

- building the campus culture for evidence-based decision-making and management,
- building partnerships outside the IT organization with institutional research and academic leaders,
- showing how data in separate systems can become very useful when captured and correlated, and
- refining the associated business processes to collect critical data that might not have been collected institutionally and to ensure that the data is defined and collected consistently across departments and units.

According to an EDUCAUSE Expert Panel on the Future of Administrative IT, higher education is “now at a potential inflection point where the right investments in analytics could generate exponential increases in strategic returns. The

question is whether institutions can make those investments.” Thus, leveraging administrative systems to focus on their analytics potential rather than simply their transaction-processing capabilities “expands the value proposition of administrative systems from essential operational infrastructure to key strategic asset.” The panel suggested that one of the steps necessary to prepare the ground for analytics—refining and standardizing business processes—can help overcome unnecessary customization in services and systems and thereby achieve savings that can be used to fund analytics investments.¹⁵

Vendors are key partners in analytics initiatives, and information technology can facilitate the deep collaborations needed at this time to enable higher education to extract maximum, relevant value from analytics. Today, many providers of LMS and other foundational higher education applications are integrating analytics capabilities into their solutions. It is not yet clear whether integrated analytics capabilities or stand-alone BI tools will be the more effective or affordable solution. The EDUCAUSE Expert Panel expressed concern about whether today’s integrated capabilities are actually meeting institutions’ analytics needs. This marketplace is changing rapidly, and many institutions’ strategies will be driven at least as much by their budgets as by their needs.

Regardless of the still-maturing marketplace, institutions are moving rapidly

By the end of 2015, approximately half of institutions will have implemented data warehouses (52%) and BI dashboards (47%). Analytics technologies account for four of the EDUCAUSE Top-Ten Strategic Technologies for 2014 (and for five of the top twelve).¹⁶

Advice

- Begin with strategic priorities—that is, the questions and decisions the data should support—before determining the data or the tools that are needed.
- Develop an analytics architecture that fits the institution’s analytics priorities and budget and that includes tools, data, and process flows.
- Complete the *ECAR Analytics Maturity Index for Higher Education* (<http://www.educause.edu/ecar/research-publications/ecar-analytics-maturity-index-higher-education>) to assess the current maturity of analytics at the institution and to help determine the level of maturity that is desired. The gaps revealed by the assessment will help identify service and capability priorities.
- Ensure analytics outputs are built into ongoing planning and management processes.
- Determine who needs to be trained in analytics concepts and develop a plan for doing so.
- Review the EDUCAUSE “Top-Ten Strategic Technologies in 2014” list to identify the analytics technologies that higher education is emphasizing.

“By leveraging analytics, we can develop the trends and forecasting models to make informed decisions regarding academic program and course offerings, support services, and distance learning options—in other words, where and when to invest (or divest) in response to student demands.”

—MORRIS W. BEVERAGE, JR.
President, Lakeland Community College

Percentage of institutions planning or implementing the following in 2014:

- BI reporting dashboards: 47%
- General analytics: 40%
- Business performance analytics: 35%
- Course-level analytics: 35%
- Degree-advising analytics: 32%

—Susan Grajek, “Higher Education’s Top-Ten Strategic Technologies in 2014” (ECAR, February 2014)



ISSUE #6: Changing IT Funding Models to Sustain Core Service, Support Innovation, and Facilitate Growth

Colleges and universities everywhere are under significant financial pressure. This is naturally translating into pressure on the IT budget. CIOs will need to employ increasingly innovative strategies to attract new funding that will sustain core services, provide space for innovation, and facilitate growth.

Four aspects of technology in higher education are causing these cost pressures:

1. The rate of growth in new technology adoption is moving faster than the rate of decrease in costs—meaning that institutions spend the same or more overall.
2. The lack of reliable funding for large-scale infrastructure improvements often means that when funding is secured to replace equipment, institutions overprovision—thereby spending more—because of uncertainty about how long the equipment will need to operate before being replaced. This overprovisioning flies in the face of Moore's law and causes a variety of problems for institutions.
3. Because of the resistance to change

in higher education, vendor consolidation in software and cloud services is driving up costs.

4. With increased consumerization, most members of the campus community have their own, personal technology; however, institutions continue to provision and even

require redundant technologies that don't maximize their productivity. For example, preliminary analysis of a dataset of 529 institutions that participated in both the 2012 and the 2013 EDUCAUSE Core Data Service surveys suggests that demand for public computing resources

“Small productivity gains are no longer the name of the game. CIOs need to identify paradigm shifts and new ways of operating to meet the budget pressures. Outsourcing, co-sourcing, co-development will all be important.”

—PAUL SHERLOCK

Chief Information Officer, University of South Australia

has mostly remained stable or even increased in the past year.¹⁷

For most institutions, the ERP (enterprise resource planning) system and its associated components are the single biggest source of IT costs. Institutions need to rethink the approach to ERP with the aim of reducing the cost of administrative systems. ERP costs are compounded because higher education has highly customized these systems, thus needing large staffs to maintain the customizations with each software upgrade and new system integration.

Private industry is moving enterprise systems to the cloud—either as a service or as infrastructure as a service—and using third parties such as Amazon Web Services (AWS). Higher education IT leaders need to begin examining similar strategies to move infrastructure from a capital or one-time cost to an annualized cost that can be easily adjusted as demand warrants.

Another, longer-term strategy is for IT leaders to engage with academic departments to rethink what software is used for instruction. With the increase in consumerization, institutions might consider leveraging open-source software that students and faculty can use on their personal machines. However, most academic departments have been slow to adopt these new packages, and institutions maintain licenses for dozens of commercial packages that have open-source alternatives (e.g., commercial statistical packages vs. R).

The funding model for IT staffing may also need to change. The overall pressure on annual budgets due to staff salaries and benefits makes it difficult to continue to expand the staff to add new tool and skill sets. The IT organization may have to allocate more funding to hire consultants and contractors to implement new technology initiatives and projects that would have been accomplished by IT staff in the past.

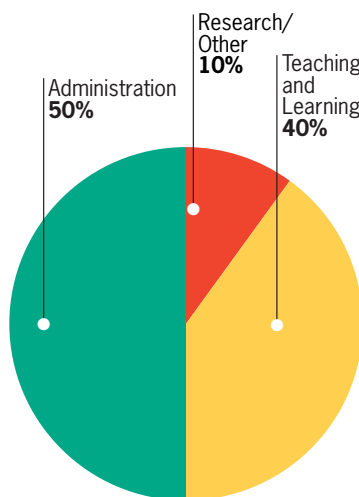
Equally important will be gaining greater insight into the current cost of various IT services, so that they are no longer seen as a free good. For example, how much does a simple system development (e.g., adding a new report or

changing an entry screen) really cost? If business owners had this information, they could make an informed decision about whether their request is worth the cost (and they could be billed on this basis).

Current cost and budget models were designed twenty-five to fifty years ago, when information technology was very different. A number of strategies are likely to be required, all supported by analytics that will help demonstrate the value add of the IT investment being made. Chargebacks and cost allocations are common funding models for core services. One strategy that institutions should consider is evaluating their current allocation and chargeback strategies and applying the right methods to the right types of core services. According to Gartner, the following are the seven most common chargeback and cost-allocation methods:

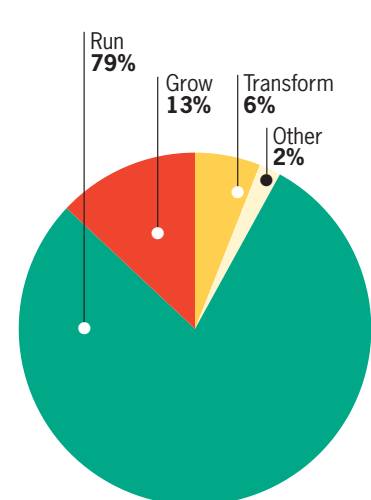
1. Service-based pricing
2. Negotiated flat rate
3. Tiered access
4. Measured resource usage
5. Direct cost
6. Low-level allocation
7. High-level allocation¹⁸

FIGURE 3. IT Expenditures by Institutional Mission



Source: EDUCAUSE Core Data Service 2013

FIGURE 4. IT Expenditures Used to Run, Grow, or Transform the Institution



Source: EDUCAUSE Core Data Service 2013

Each method has its strengths, weaknesses, and trade-offs that must be considered before settling on a particular method for a particular need. A negotiated flat rate for storage is simple and predictable, but it might not be a good choice in cases where one user consumes significantly more resources than was originally estimated. Storage might be better served by a measured resource-usage method in which individuals are charged for the storage they consume. Service-based pricing is complex (think AWS pricing schedules), but if done properly, it gives individuals significant control over how much they pay based on how much they consume. For example, being able to set up a cloud-based multi-node cluster to run an experiment and then shut it down on completion of the project means that a research team pays

only for the server resources it consumes. By opting for a service-based pricing model, the team could avoid tying up tens of thousands of dollars in a hardware cluster that might sit idle 40–60 percent of the time.

Supporting innovation and facilitating growth require funding models that are tied to strategic plans. Innovation investments in particular tend to be IT project-focused: upgrade a lab building to 10GB or more to facilitate large-scale data sharing; launch a proof-of-concept initiative to explore data visualization; streamline administrative processes by shifting to electronic signatures. A milestone-based funding approach—in which funding is earmarked for the project but not distributed until the next milestone is achieved—can help both institutions and project teams innovate quickly

and deliver results more consistently, all while keeping finances from getting out of control.

Advice

- Benchmark the institution against others by participating in the EDUCAUSE Core Data Service to compare institution spending and staffing for administrative information systems, IT expenditures by institutional mission (see Figure 3), and IT expenditures for running vs. growing vs. transforming the institution (see Figure 4).
- Ensure that the institutional leadership is committed to changing traditionally rigid IT funding models to more dynamic ones that reward or incentivize desired outcomes.
- Create and maintain a service catalog that includes a method of prioritizing

the mission differentiation and criticality of each service.

- Estimate the TCO (total cost of ownership) for each service, and use the prioritization to help determine which services are commodities that should cost as little as possible and which are mission-differentiating and mission-critical, thus warranting higher investment and emphasis.
- Develop a plan to drive down the costs of commodity services through outsourcing, centralizing, moving to the cloud, or using consortia.
- Identify services that can be sunsetted.
- Integrate these foundation approaches into institutional IT governance to support informed decisions about funding priorities and needs.

Percentage of institutions able to:

- Calculate the ROI or NPV of IT projects: 20%
- Calculate the TCO of IT services: 18%

—Eden Dahlstrom, *Assessing Your Fiscal Bandwidth* (ECAR, May 2013)



ISSUE #7: Addressing Access Demand and the Wireless and Device Explosion

The top issue in 2013, *the wireless and device explosion* continues to challenge many IT departments. Media reports covering the impact of the wireless explosion on higher education note that institutional wireless networks are struggling to keep up with demand.¹⁹ The *ECAR Study of Undergraduate Students and Information Technology, 2013* found that 58 percent of students own three or more wireless-capable devices.²⁰ This explosion of wireless-capable devices on campus networks is challenging many institutions (see Figure 5, page 36). The IT organization is

expected to accommodate and, indeed, embrace the increased demands on the infrastructure.

The BYOE trend has not been shaped by any institutional policy or plan but, rather, by students' expectations that they will have the same resources on campus as they have in their home or at Starbucks. This dynamic has already placed demands on technology infrastructure and resources. Although some of this use of resources is academic, a great deal is directed to students' personal use of the Internet. This is true for residential as well as commuter schools. Given that most coffee shops supply free Wi-Fi, institutions run the risk of being regarded as substandard if they fail to accommodate their students' (and visitors') demands for easy and robust networking capacity. In addition, though their numbers are smaller, faculty and staff are increasingly bringing a plethora of devices to the workplace; they too expect to be able to work seamlessly and efficiently within and beyond their offices, classrooms, labs, and conference rooms.

As faculty, staff, and administrators become increasingly aware of the potential of mobile devices to transform educational and business processes, they will expect their IT colleagues to be ready to advise and provide institutional solutions. Faculty want to introduce mobile devices into the classroom. This introduces additional demands on IT resources and support. The need to ensure adequate bandwidth and quality of service to support a full and active classroom can tax the wireless infrastructure more than the simple volume of casual users outside the classroom. Beyond the classroom, many faculty are exploring new and emergent learning modes and models that discard the dated assumption that students need to perform their work at a formal, institution-supplied location (e.g., computer lab, library, residence hall). Faculty can now create learning opportunities that exceed

“We launched a program where all incoming freshmen received a university-provided iPad mini. Our institution added some 1,000 iPads to its wireless network. This has driven our IT department to more than double the count of access points across campus.”

—CHRISTIAN BONIFORTI
Chief Information Officer, Lynn University

the boundaries of the institution both in space and in time and free students to pursue a much more anytime/anywhere approach to their education. Students hope to be able to combine their own personal learning environments and devices with the leadership and scaffolding their instructors create for them. The IT organization needs to coordinate with faculty to determine and develop the necessary infrastructure and procedures to support instruction in a mobile environment.

In addition, faculty and staff may be willing to use their own devices and resources of their choosing and funding in exchange for the option to work at times and in locations more convenient and productive to them. Institutional leaders will need to understand the opportunities and risks that such a model presents and develop

the needed resources, processes, and policies.

As faculty and students are un tethered from institutional facilities, administrators can shift some resources away from things like classroom infrastructure and toward more innovative types of learning environments, whether real or virtual. Similarly, as the trend of staff bringing their own devices continues to grow, the institution can focus on methods of improving productivity and communications rather than on upgrade cycles and software licenses.

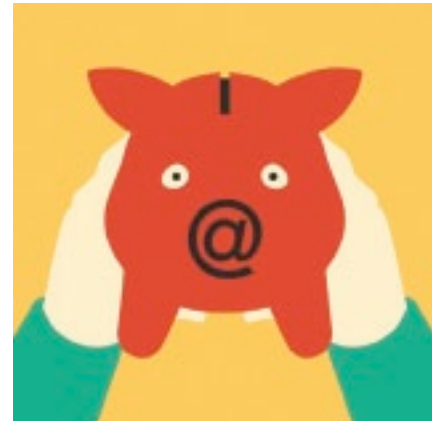
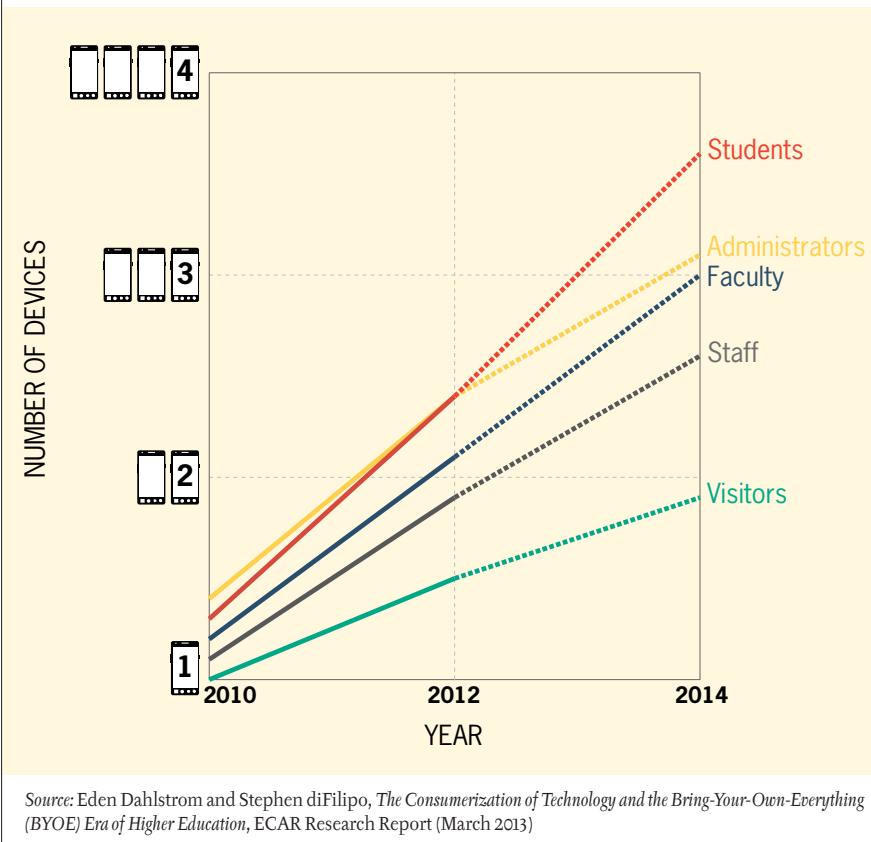
IT leaders need to prepare for and help shape institutional expectations related to the BYOE trend. Like many other developments in technology, the understanding of what is needed financially as well as technologically can easily be underestimated. Indeed,

the popular belief of many CEOs and CFOs has been that the BYOE trend will result in immediate savings by reducing the need to replace and keep current the traditional PC labs on campus. Yet more IT leaders have experienced, and are expecting, cost increases related to BYOE rather than savings.²¹ The potential for decreased spending on devices is more than offset by the increased spending needed to provide a robust infrastructure and new, secure mobile services.

Advice

- Prioritize the services and applications the institution will make available in a mobile environment, and ensure that the prioritization aligns with institutional strategic priorities.
- Review the ECAR Research Report *Progress in Meeting Demand for Mobile*

FIGURE 5. Average Number of Internet-Capable Devices Accessing Institutional Networks



ISSUE #8:
Sourcing Technologies and Services at Scale to Reduce Costs (via Cloud, Greater Centralization of Institutional IT Services and Systems, Cross-Institutional Collaborations, and So Forth)

The funding crisis for higher education is placing pressures on institutions to make the available dollars stretch as far as possible so as not to reduce services. Information technology, which accounts for a median of 4 percent of institutional budgets, is central to many institutions' plans for cost reduction or at least containment. It represents a concentrated source of spending, and therefore savings, and it offers the promise of automating work or otherwise introducing efficiencies that will thereby reduce costs. This duality can challenge IT organizations, which may feel called to lower spending at a time when they are also being asked to resource new initiatives. Something has to give. Fortunately, several alternatives may help IT organizations—and thus institutions—reduce their costs if they are prepared to make the changes that will truly deliver efficiencies. Those alternatives include centralizing IT services and systems; purchasing at scale; outsourcing services, platforms, and infrastructure; and standardizing business processes.

IT to compare the institution's progress in mobile application frameworks and deployment with that of other institutions and with advancements in the field.²²

- Ensure that the institution has policies and procedures to support and manage student, faculty, staff, and visitor use of the wireless network, mobile applications, and personal devices and that the policies and procedures can and will be enforced.
- Understand and support faculty members' needs for and expectations of mobility in their instruction, scholarship, and research.
- Monitor wireless demand and capacity on an ongoing basis, and plan for continued growth in both.
- Ensure that security programs balance rigorous standards with end-user convenience. Manage risk by securing data rather than

devices and by conducting ongoing education and outreach with all constituents.

- Reconsider reimbursement plans for BYOE, and retain these plans only if the institution has sufficient political and financial resources to support them.

Institutional wireless:

- Proportion of wireless access points that are 802.11n: 48%
- Institutions that provided open access to the public Internet in 2012: 31%
- Institutions that provided open access to the public Internet in 2013: 37%

—EDUCAUSE Core Data Service 2013

Centralizing IT services and systems. The management philosophy that many institutions, particularly large institutions, have followed of “every tub on its own bottom” is no longer viable. With that model, each department, school, unit, or even lab in an institution would do its own purchasing, run its own systems, and have its own administrative structure allowing it to operate fairly independently from the institution. Many larger institutions found value in distributing IT services and placing resources in various schools and administrative departments to run local file servers, install and maintain faculty and staff devices, provide personal support and training, deploy patches, and conduct a plethora of other administrative duties. Faculty, staff, and students received support tailored to their subject matter needs and personal preferences. Today, with cloud services (both internal and external deployments), technologies that automate software installations and patching, centralized printing, centralized or cloud storage, and application and desktop virtualization, a few centrally located employees can perform much of the routine work that was distributed to numerous employees in multiple environments. When designed and executed optimally, the balance between centralized and distributed IT services and systems can shift, significantly reducing duplication of effort but retaining mission-specific support and solutions as well as the close faculty, student, and staff ties that can foster innovation. This is not easy to accomplish, because each distributed IT group orga-

nizes and staffs work differently. In many cases, distributed IT staff have a blend of IT and business-area responsibilities. Reconciling the current staff, work, and organizational structures with the new service model can lead to service disruptions (due to poor execution), awkward fits (because distributed IT staff are often generalists and centralization tends to lead to greater specialization), and diminished savings (due to entrenched local resistance).

Purchasing at scale. Higher education has long been taking advantage of enterprise agreements, using the scale of the institution or, when applicable, the system to reduce costs per head or device, rather than agreeing to multiple contracts within the institution or even individual purchases. For small institutions, the opportunities to reduce cost by increasing the scale of purchasing lie largely in the area of cross-institutional collaboration. Purchasing consortia—such as the CIC Licensing Group, NERCOMP (<http://www.nercomp.org>), Five Colleges, Incorporated (<http://www.fivecolleges.edu>), the New York Six Liberal Arts Consortium (<http://www.newyork6.org>), or the Midwestern Higher Education Compact (<http://www.mhec.org>)—gather interested parties for even larger negotiations. More recently, Internet2 has introduced the NET+ initiative, which negotiates proven products and services on behalf of Internet2 members. In enterprise licenses, contract terms often take as long to reach agreement as does the cost. With NET+, contract terms that are acceptable to most higher education institutions are negotiated, and cost

also scales to an even larger audience. Internet2 provides the interactions with the vendors, relieving institutions of such activities and allowing institutional resources to be dedicated to other tasks. The Net+ program is geared primarily toward cloud-based services (delivered over the network).

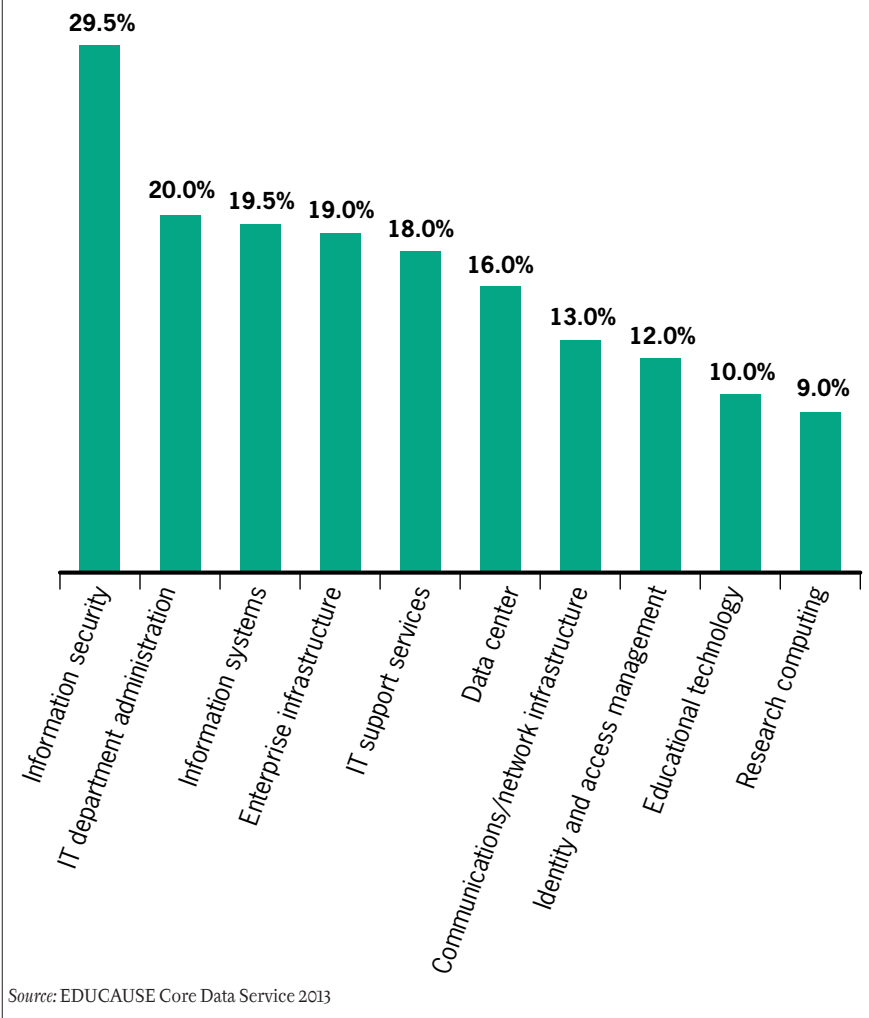
Outsourcing services, platforms, and infrastructure. As cloud solutions are maturing, colleges and universities are able to move data centers, applications, and even business processes outside the institution, where commodity costs can be realized. Cloud providers enable institutions to respond to spikes in usage and demand quickly and cost-effectively. It is no longer necessary to overprovision internal infrastructure to accommodate usage spikes. But the most common IT function to be outsourced is information security (see Figure 6, page 40).

Standardizing business processes. Business processes that have been optimized for multiple local groups must be reconciled before they can be centralized and/or moved to the cloud. Although higher education does have requirements that differ from those of other sectors, and although various institutions (e.g., state institutions) are subject to specific business rules, it is difficult to deny that colleges and universities have overcustomized and overadapted applications and processes to existing customs and preferences. If they are willing to adopt institution-, system-, consortia-, or even industry-wide processes, higher education institutions have the opportunity to purchase, implement, and deploy near-vanilla solutions that could greatly reduce the need for customized code and configurations, which are not implemented once and done but, rather, need ongoing adaptations. Business process standardization is likely the initial step to take in order to achieve significant cost reductions through either centralization or outsourced applications or services. Institutions and groups that commit to standardization may have an opportunity to improve the functionality of “vanilla” and influence vendors to adopt

“Cloud services and other options can greatly reduce the duplication of effort in various schools/departments and free those resources for more valuable, mission-critical use.”

—SUE WORKMAN

Associate Vice President, Indiana University

FIGURE 6. Percent of Staff Outsourced (among Institutions Outsourcing IT Functions)

a set of standards that have been developed on behalf of higher education.

Advice

- Participate in the EDUCAUSE Core Data Service to compare the institution's spending and staffing with that of peer institutions. Establishing baseline measures will help track savings and service improvements.
- Business process reengineering (BPR) can promote the standardization needed to reduce costs and improve services (e.g., through best practices and economies of scale), as well as to enable shared-services models. A key consideration is to take steps to capture any savings resulting from

BPR to support strategic objectives, as opposed to letting those resources disappear within functional areas.

- Prepare to move systems and processes to the cloud by understanding their TCO in terms that can be compared with cloud offerings.
- Ensure that institutional leaders (including the president, provost, chief business officer, and governing board) understand the potential value of this work and support the possible changes to institutional processes and ownership.
- Understand the strategic importance of institutional information systems, and prioritize efforts and investments, by classifying systems

as "high" and "low" along the dimensions of mission criticality and mission differentiation.

Core information systems in the cloud:

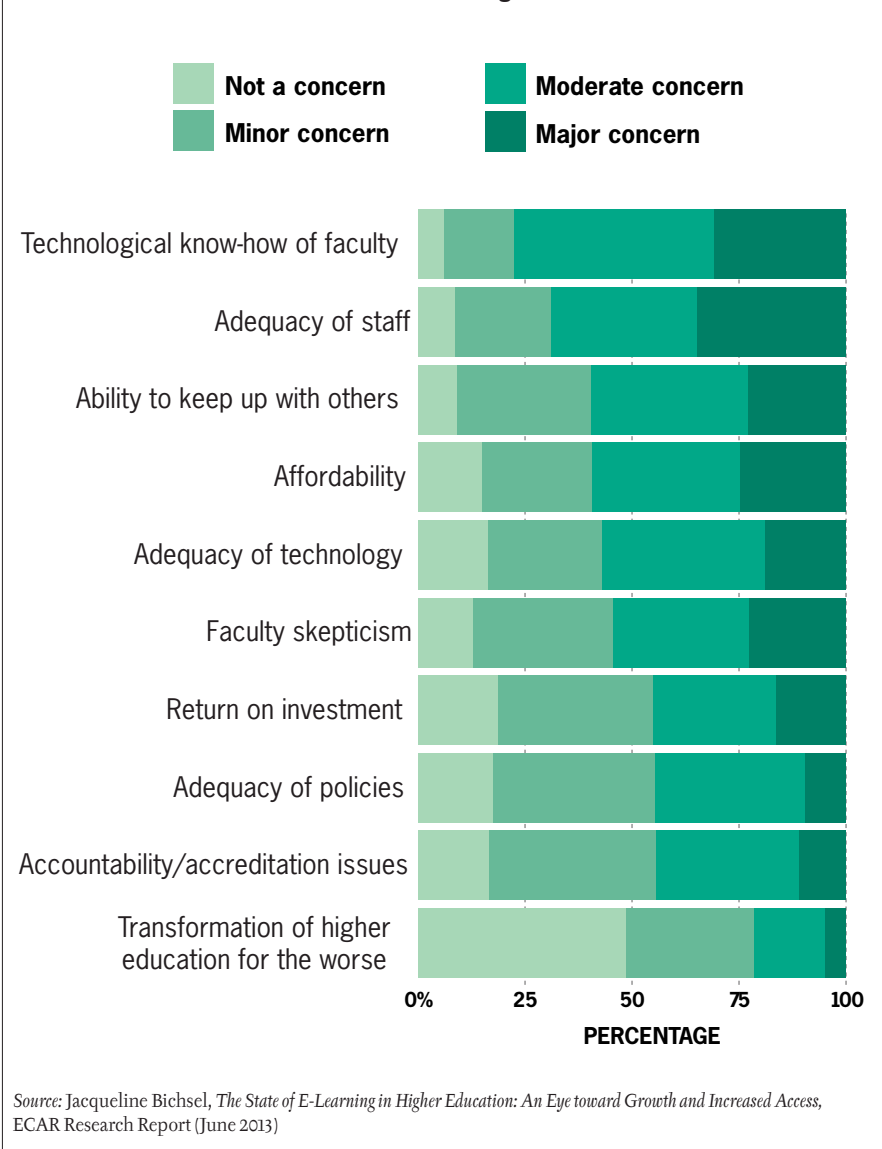
- 51% of institutions have at least one core information system in the cloud. Half of those have two cloud implementations, and 25% have three.
- 8% of institutions have all core information systems in the cloud.
- 2% of institutions have outsourced middleware development and support, help desks, and/or data center services beyond disaster recovery.

—EDUCAUSE Core Data Service 2013



ISSUE #9: Determining the Role of Online Learning and Developing a Strategy for That Role

A key strategic issue regarding online learning is not whether to engage, but how. Increasingly, the issue concerns electronic content and how that content

FIGURE 7. Institutional Concerns about E-Learning

gets delivered through various mechanisms (e.g., LMSs, YouTube, MOOCs, etc.). The strategic discussion should be focused on: (a) the quality assurance of the content; (b) access to the content; and (c) the ability to aggregate the content into various “packages,” such as courses. These discussions will help keep the emphasis on learning. Such an emphasis will then necessarily focus the discussion on student learning outcomes and their assessment (Issue #1).

The strategic needs that follow these discussions are then built on the academic side in terms of deciding what the

institution means by “online learning” (e.g., content that enhances traditionally delivered courses, hybrid courses, asynchronous courses, fully online degree programs), which naturally leads to determining the needed “backbone” support structures. Most important, the linkages among academic and IT (broadly defined) support structures need to be tight and well-functioning in order for this to work well.

The push for online learning is increasingly being driven by forces outside academic institutions—funding organizations, regional accrediting

bodies, and federal, state, and discipline-related regulatory oversight agencies—as well as by student and faculty demand. Each of these groups brings different rules to the table.

Outside forces are beginning to have increased influence in the role and strategies for online learning. Funding such as that generated by the Next Generation Learning Challenges and others has led to directional changes in the subject matter and methodology by which online learning is delivered. The resurgence of interest in remedial courses in college, in the importance of the transition from high school preparation to college-readiness, and in the increased use of third-party information purveyors has led many institutions to change some of the IT and academic direction and strategies for the use of their online learning resources. Other organizations, such as the American Council for the Blind, have had a major impact on accessibility strategies and statutory mandates for online learning.

National accrediting bodies within discipline areas (e.g., NCATE, ABA, CAHME, CNE) have also had an impact on the role of online learning and on the strategies each institution develops to meet accrediting bodies’ demands. For example, the need to demonstrate greater interactivity and accountability has led many providers to question the role of online learning and the strategies that will be deemed successful within a particular area of study. This need has led, in turn, to increased demand for IT resources that were not necessary previously—resources such as the ability to access data for accountability purposes (e.g., to demonstrate increased retention for a program or degree option).

Federal and state regulatory organizations require adherence to standards set by federal higher education reauthorization activities, which were driven, in part, by issues raised as a result of the financial aid missteps of a few and by the gross misunderstanding about the rigor of online learning in general. State regulations have had a greater impact on the

ability of many institutions to continue to develop and deliver online learning outside of their own home state. These regulations and the resulting pressure on the regional accrediting bodies have led to a greater scrutiny of online learning across the board.

Students and faculty are demanding access to increased online resources for learning, whether for delivering courses, programs, and degrees solely online, in a hybrid format, with

a flipped classroom orientation, or for delivering courses, programs, and degrees in a traditional face-to-face setting. Students and faculty are increasingly demanding that learning become “anytime/anywhere/on any device.” The ability of instructional staff, faculty, and IT personnel to meet these demands requires institutional foresight and planning for online learning activities. The level of strategic planning for the needed resources, funding, and personnel has arguably not been seen before in academic institutions. All of this leads to institutional concerns (see Figure 7).

No current discussion of online learning roles and strategy is complete

without recognizing the impact of MOOCs. Clayton Christensen’s seminal work about disruption for colleges and universities has helped spur the frenzy about MOOCs.²³ Still to be determined are their role within traditional institutions, their use by online learning providers, the degree to which they can contribute to promulgating the flipped classroom concept, and the impact of credentialing, badging (see Figure 8), and credit—all of which disrupt traditional concepts about learning in general and online learning in particular.

Traditionally, the IT organization has played a role in providing support for an LMS or a collection of other tools

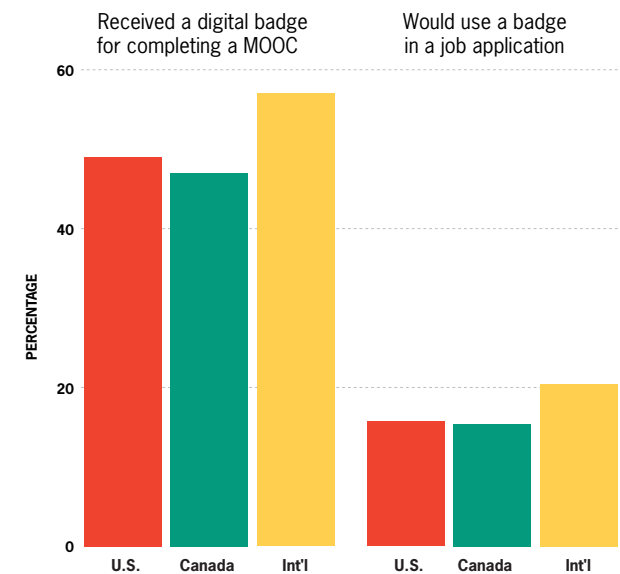
used in the classroom or online for distance or hybrid delivery. With more hosted (cloud-based) LMS services and the growth of MOOCs, the support role for the IT organization is evolving. The infusion of mobile devices in the classroom will continue that evolution.

In summary, the issue of determining the role for online learning and developing a strategy for that role is under constant revision by faculty, administrators, instructional designers, and, most important, the IT personnel and resources that make it all happen. Clearly, the amorphous nature of online learning requires agile and adaptable strategies, along with strategists who are committed to furthering student learning and to finding the best means to accomplish this singular goal that is at the heart of all institutional activity.

Advice

- Make e-learning initiatives part of the institution’s strategic plan and budget, and set specific goals for e-learning initiatives.
- Benchmark the institution against peer institutions through the *ECAR E-Learning Maturity Index for Higher Education* (<http://www.educause.edu/library/resources/state-e-learning-higher-education-eye-toward-growth-and-increased-access>), the EDUCAUSE Core Data Service, and the EDUCAUSE “Top-Ten Strategic Technologies in 2014” list.
- Incorporate faculty-development programs and incentives in online learning programs and projects.
- Designate an office or center specifically for online learning management.
- Develop a strategy for identifying students who need technology training.
- Make course-design support as flexible as possible to avoid constraining faculty and pedagogical innovation.
- Consider increasing the number of staff to support online initiatives.
- When selecting online learning technologies and services, focus on

FIGURE 8. Students’ Experiences with and Attitudes toward Badging



Source: Eden Dahlstrom, J.D. Walker, and Charles Dziuban, *ECAR Study of Undergraduate Students and Information Technology, 2013*, ECAR Research Report (September 2013)

“The definition of online learning will also be influenced by parties outside the institution—publishers, accreditors, vendors, and competing education sources.”

—CHARLES E. CHULVICK

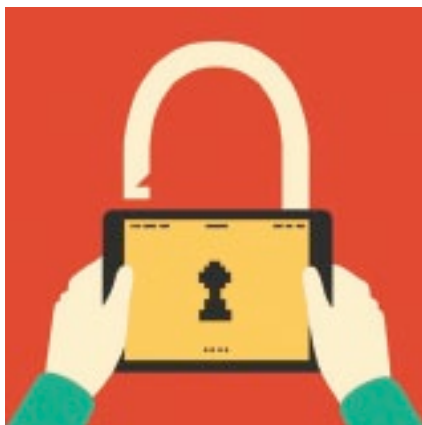
Vice President for Technology, Assessment and Planning, Raritan Valley Community College

ease-of-use criteria (including accessibility), specific features, contribution to learning objectives, ease of integration, security reliability, and effectiveness. Cost should not be the primary criterion.

Online learning:

- Institutions with an LMS in the cloud: 12%
- Institutions with an online learning platform: 65%
- Institutions that had had no discussions to-date about online learning in 2012: 11%
- Institutions that had had no discussions to-date about online learning in 2013: 9%

—EDUCAUSE Core Data Service 2013



**ISSUE #10 (TIE):
Implementing Risk Management and Information Security Practices to Protect Institutional IT Resources/ Data and Respond to Regulatory Compliance Mandates**

For over a decade, information security has been a recurring top-ten IT issue.

FIGURE 9. Institutional Adoption of IT Risk Management Programs or Methodologies

Has your institution adopted an IT risk management program or methodology?



Source: Joanna Grama, "IT Risk Management Poll, April 2013" (ECAR)

When security was first added to the list of top-ten issues in 2002, it was initially a technology issue: how do we architect the network and systems with the proper equipment or technologies to ensure security? The result was the focus on adding firewalls, intrusion detection (now intrusion prevention), virus protection, spyware detection, and other technologies to address fundamental weaknesses and issues. Though all of these efforts have been necessary, they have not been sufficient to ensure security. As a consequence, colleges and universities are focusing more broadly on people and processes, often leveraging frameworks such as ITIL or ISO 27001 to align people and processes with technology. These frameworks, which often include risk management methodologies, help institutions prioritize the protection of resources (see Figure 9).

Information security organizations were early adopters of risk-management practices—which served those organizations well in prioritizing risks and responding to them. However, foundational risk-management practices—such as risk identification, prioritization, and response activities—need to move beyond the purview of just the information security organization to protect insti-

tutional data and resources. Increasingly, institutions are turning to enterprise IT risk-management programs to look at the strategic, operational, financial, legal, and reputational risks inherent in operating IT systems. Whether homegrown or based on a well-recognized standard, these programs offer a more holistic approach to understanding a variety of types of risk across the institution and prioritizing strategic resource allocation accordingly. Looking across the institution for risks also provides the best opportunity for protecting institutional resources and data.

Protecting institutional data is also heavily influenced by external IT compliance requirements and the penalties for failing to meet those requirements. Increased regulatory requirements and renewed enforcement efforts are a sign of the times, and colleges and universities are not immune. Ironically, legislative, regulatory, and contractual compliance issues that dictate how data should be secured and protected are burdening colleges and universities at the same time that institutions are under increased pressure to reduce costs. This compliance burden extends beyond the day-to-day operations of institutional IT systems. Often faculty members and research-

“The most important security tool available to institutions is the collective intelligence of our community.”

—REBECCA L. KING

Associate Vice President for Information Technology, Baylor University

ers find that their research computing systems must meet certain security standards in order to accept federal grants or to even be competitive in the grant process. Institutional IT organizations are expected to be able to provide that level of expertise to meet those mandates. To add to this complexity, IT compliance is but one element of a multifaceted institutional compliance issue.

Two of the core values of higher education are community and the sharing of information. Community-based resources are some of the most effective tools in the practitioner's toolkit. Tools for higher education information security include the following:

- The Higher Education Information Security Council (HEISC) was established by EDUCAUSE and Internet2 in July 2000. Its mission is to improve information security, data protection, and privacy programs across the higher education sector through its working groups of volunteers who coordinate activities and collaborate with partners from government, industry, and other academic organizations.
- The HEISC *Information Security Guide: Effective Practices and Solutions for Higher Education* is a compendium of information providing guidance on effective approaches for the application of information security at institutions of higher education.
- The HEISC IT Security Assessment Tool is modeled on the ISO 27002 security standard. This tool allows organizations to get a broad picture of the overall strengths and weaknesses of their IT security program.
- The Research and Education Networking–Information Sharing and Analysis Center (REN-ISAC) is supported by Indiana University and a relationship with EDUCAUSE and Internet2. Part of the national ISAC structure since February 2003, the REN-ISAC is an integral component of the higher education strategy to improve network security through

information collection, analysis, and dissemination, early warning, and response.

- EDUCAUSE conferences, specifically the Security Professionals Conference, bring together higher education IT practitioners in forums that are focused on issues unique to higher education IT organizations.
- The EDUCAUSE IT Governance, Risk, and Compliance (IT-GRC) program was established in January 2014. This new program will bring together higher education leaders and practitioners to create tools to help institutions tackle integrated issues of governance, risk, and compliance.

Cybersecurity risks and threats continue to escalate, and higher education is not an exception.²⁴ Sustained, complete security is impossible, and even if it were possible, it would be onerously expensive and excessively restrictive to ease of use and the open sharing of information that is an academic cornerstone. The result is that today, IT organizations must prioritize where they focus their resources and effort. Compliance mandates stipulate minimum security standards. Risk-management programs attempt to calibrate the impact of risks and of alternative mitigation approaches so that institutions can prioritize their responses.

Advice

- Know the institution's top-ten strategic risks and their IT implications.
- Ensure that the IT organization participates in any institutional risk assessments. At the very least, align the IT risk-assessment process with institutional risks and process.
- Make IT risk management an ongoing process by assigning an owner to each risk's response, monitoring risk-response activities, and periodically updating and reprioritizing IT risks.
- Complete the HEISC Information Security Program Assessment Tool.
- Get involved: join EDUCAUSE and the REN-ISAC to contribute to the community's body of knowledge.

IT risk management programs:

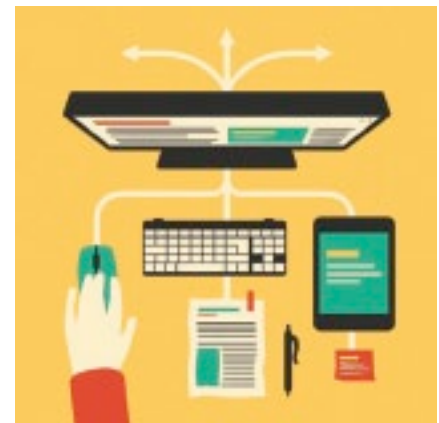
Methodology used by institutions

- Industry standards (e.g., COBIT, ISO, NIST, MoR) 47%
- Homegrown methodology 39%

Uses of IT risk management programs

- To set IT priorities and direct IT capital investment 29%
- To inform institution's enterprise risk management program 29%

—Joanna Grama, "IT Risk Management Poll, April 2013" (ECAR)



ISSUE #10 (TIE): Developing an Enterprise IT Architecture That Can Respond to Changing Conditions and New Opportunities

Mobility/BYOE consumerization, social networks, MOOCs, and the data being generated in today's highly connected world are affecting expectations for teaching and learning, student services, and assessment/accountability in colleges and universities. Distance is dead, and "things" are on the Internet, spitting

out information. Information technology should be a facilitator for, rather than a barrier to, rapidly adapting to our connected, social, collaborative world.

One of the key challenges and opportunities facing IT leaders is how to optimize the mix of technology services delivered from on-premise, cloud, or hosted sources. Each week, new SaaS offerings present solutions to key campus issues. Similarly, new infrastructure-as-a-service (IaaS) offerings allow institutions to outsource components of their infrastructure in a way that might never have seemed possible years ago.

IT leaders are challenged to integrate these discrete services and systems into a holistic environment that is usable and secure, scales to meet demand, provides for multiple integration points, and can be integrated back to provide useful data for decision-making. For many IT organizations, this requires a new level of agility and flexibility in service delivery and often also requires new skills for affected staff.

This approach requires conversations between IT leaders and institutional leaders to discuss the impact of new or changing technologies on the existing architecture. Budget discussions about new technologies should consider architectural implications.

Institutions' approaches for managing institutional IT architecture:

- Follow the architecture of a primary system or suite (e.g., SCT, the Oracle applications suite, Workday, Kuali): 47%
- Locally integrate the architectures of multiple major systems: 53%
- Have local IT architecture standards and conform local and vendor systems to that architecture: 15%

—Susan Grajek, “Higher Education’s Top-Ten Strategic Technologies in 2014” (ECAR, February 2014)

“IT is in a unique position to see the institution more holistically than many areas. We should leverage that vision to develop an enterprise IT architecture that has excess capacity, is nimble, and provides for multiple integration points.”

—DAVID R. HOYT

Chief Information Systems Officer, Collin County Community College District

Gartner emphasizes the need to develop an *exostructure*, a seamless extension of the internal IT infrastructure, to deliver information services that support the institution from the outside rather than the inside. An exostructure can provide increased agility through scalability, cost-effectiveness, and a community of standards. These infrastructure architecture changes are particularly critical as the institution makes decisions about its approach to online learning opportunities.²⁵

An important element of enterprise IT architecture is to understand key standards or approaches that are emerging and to leverage these as cornerstones of IT activities. ITANA (the IT Architect in Academia), a higher education working group supported by EDUCAUSE and Internet2, is dedicated to enterprise, business, and technical architecture in higher education architecture and has many resources to support institutions at various stages of exploring, planning, and implementing enterprise IT architecture. IMSglobal has spent many years working on standards for learning tools. Making certain that cloud solutions follow these standards is important in promoting interoperability as new tools emerge. Similarly, one of the most daunting challenges is managing risk and security when outsourcing services. The Internet2 NET+ program, in accordance with HEISC and the Cloud Security Alliance, has developed a security-assessment tool that institutions can use to evaluate the

Percentage of institutions that are an identity and/or service provider for:

- InCommon in 2012: 31%
- InCommon in 2013: 36%
- eduroam in 2012: 14%
- eduroam in 2013: 24%

Institutions with federated access: 35%

—EDUCAUSE Core Data Service 2013

security of SaaS and IaaS solutions.²⁶

Usability is key to the successful delivery of cloud services, and one of the primary enablers is an identity-management and identity-authentication strategy that works within the institution and in the cloud. The InCommon federation has been working on this issue on behalf of higher education for over a decade and has open-source and commercial solutions that allow campuses to move to the cloud without constantly asking users to enter their password for every link they click.

Finally, as analytics increases in importance to higher education, it is important to have a data architecture—a strategy for organizing and managing data across disparate systems, including those in the cloud. Without an understanding of how to integrate data elements, institutions can lose valuable data that could be helpful in predictive analysis.

Today every project is an IT project.

Enterprise and IT Architectures

Jim Phelps

Enterprise Architecture and Information Technology Architecture are two practices that focus on the strategic fit of information technology in an enterprise. Enterprise Architecture (EA) works with IT and business leadership to define strategies and build roadmaps for the future. IT Architecture plans and facilitates the IT projects that build out the roadmap. The Enterprise Architect is like the city planner who figures out where it would be best to build shopping areas and what areas should have multiuse facilities. The IT Architect then designs solutions to fit that strategic plan.

In a presentation about EA, my good friend Paul Hobson presented what he said was a time-lapse movie of his institution's IT systems deployment. It was a video of a game of Tetris: oddly shaped blocks rotating, sliding, and dropping, trying to fit into gaps.

That is how the IT services and infrastructure of many higher education institutions have been built over the years, with layer after layer of systems being added to fill gaps without long-term vision or planning.

This accretion of technology was tolerable when systems were relatively static and each stood alone and unconnected to other systems. Users learned to work in each new system, and that was where they spent most of their time.

In higher education, IT ecosystems are now extremely complex and face a very high rate of change driven by a multitude of forces. Students' and workers' processes now cross many systems. The increasing rate of change and the complexity of IT landscapes have created a need for new responses to these challenges.

Each response will have to maximize the impact of strategic thinking while reducing complexity and redundancy where possible. IT leaders will have to do all of this in a time of shrinking budgets and constraints on resources. In other words, the IT response will have to be well designed and architected. Tetris will no longer work.

The two practices of EA and IT Architecture work to lock together business and technical strategies and then align their IT execution. They work to make sure that every piece in the IT system is put in place with purpose

and with an understanding of the impact that piece will have on the strategic goals. The practices help identify existing pieces to be eliminated or replaced due to redundancy, risk, or age. They strive to get the maximal value out of everything that is kept or adopted. These two practices, together, can help move higher education's IT governance away from Tetris-like responses and into well-designed, well-functioning IT service "city plans."

Enterprise Architects deal in both business and technical domains, facilitating the discussion, creation, and communication of strategic plans. IT Architects bring a deeper understanding of the current and future states of the technologies employed. Together, they keep in balance the evolution of their IT systems—knowing when to leverage an existing system and when to look for something new.

The following are suggestions for ways to successfully leverage these practices:

- The institution should establish an EA practice that brings business, administration, and IT people together. This mixed team should agree

on a common strategy and goals for the institution.

- The Enterprise Architect should develop clear and simple communication tools to help convey the strategy and design goals and roadmaps.
- The IT Architect should pick up these roadmaps and goals and then design the best technical solutions based on current and future IT plans.
- The Enterprise and IT Architects should look for opportunities to leverage what exists, finding efficiencies where applicable.
- When a new technology is needed, Enterprise and IT Architects should work to make sure that it fits the roadmaps and that the institution gets the greatest impact from investment.
- Both Enterprise and IT Architects should look to build more agile and efficient business and technical architectures while staying focused on the strategic goals of the institution.

Jim Phelps is Enterprise Architect and Senior IT Architect at the University of Wisconsin–Madison and is Chair of ITANA, a peer group for enterprise, business, and IT architects in higher education.

And certainly the IT organization has a unique view into academic, research, and business processes across higher education institutions. From that perspective, the IT organization must support the "wide array of personal connections, resources, and collaborations"²⁷ available to students today. This will most likely involve leaving some current methods and tools behind and moving

them to the cloud to realize the promise of improved agility and flexibility and to take advantage of the opportunities before us.

Advice

- Develop and document an IT architecture to guide decisions about technology solutions and sourcing as well as decisions about technologies that

need to be replaced or eliminated.

- Ensure that the IT architecture aligns with institutional strategic directions and standards and best practices for technology in higher education. Use annual planning and budgeting cycles to evaluate the IT architecture. Identify needs to adapt the architecture and also architectural gaps or upgrades that might be addressed

-
- with incremental or redirected funds.
- Ensure that the security and identity-management/authentication dimensions of the IT architecture are consistently applied to both on-premise and cloud solutions.
 - Integrate the IT architecture with institutional and distributed procurement strategies so that the entire institution is supporting and reinforcing the architecture.
 - Get the institution involved in ITANA by joining the EDUCAUSE IT Architects Constituent Group, which supports an e-mail list and a meeting at the EDUCAUSE Annual Conference.

Different Groups, Different Lists?

What is perhaps most striking about the top-ten issues is how widespread they are, despite the great variability in edu-

cational systems and IT organizations. The top-five issues made everyone's list, regardless of institutional type, the survey respondent's role, whether the IT organization was centralized or distributed, or the IT organization's approach to innovation.

Differences among institutional types reflect the different funding models and constituents (see Table 1, page 52). Statistical comparisons revealed some noteworthy differences. Members at private doctoral institutions rated *Improving student outcomes through an institutional approach that strategically leverages technology* lower than did all other institutional types: it was their #10 issue, although it topped every other institutional list except baccalaureate institutions, whose members ranked it #5. *Assisting faculty with the instructional integration of information tech-*

nology was more important at private than public institutions. *Developing an enterprise IT architecture* was rated more important outside the United States: it was the #2 issue among international institutions. The largest baccalaureate institutions (over 8,000 FTEs) were more concerned than smaller ones (less than 4,000 FTEs) about *Harnessing the trends toward IT consumerization and bring-your-own device* and about *Identifying and optimizing new models and business processes*. Overall, all types of smaller institutions rated *Implementing risk management and information security* more highly than did larger institutions. Finally, *Supporting the research mission through high-performance computing, large data, and analytics*—the one issue on the ballot that did not make any group's top-ten list—was more important at private doctoral universities with fewer

The International Top-Ten IT Issues, 2014

About 10 percent of the participants in the 2014 IT Issues survey were from higher education institutions outside the United States. Making inferences about international higher education from the responses of 46 institutions is risky business. If higher education within the United States is diverse and complex, then “international” higher education is certainly exponentially so. The international participants represented a very wide range of continents, countries, and economies.

In future years, perhaps the survey will have sufficient international participation, at least from some regions or countries, to warrant the compilation of selected regional Top-Ten IT Issues lists. For now, we offer the following observations.

In their collective Top Ten, non-U.S. institutions included two IT issues that U.S. institutions did not:

- *Harnessing the trends toward IT consumerization and bring-your-own-device*
- *Establishing and implementing IT governance*

throughout the institution to prioritize institutional IT investments

Two of the U.S. Top-Ten IT Issues were not included in the collective Top Ten for non-U.S. institutions:

- *Addressing access demand and the wireless and device explosion* (Issue #7)
- *Implementing risk management and information security practices to protect institutional IT resources/data and respond to regulatory compliance mandates* (Issue #10)

The non-U.S. participants were much more likely than U.S. institutions to adopt technology at the pace of their peers: 58 percent of non-U.S. participants adopt technology at the pace of their peers, compared with no more than 41 percent of U.S. community colleges and as few as 22 percent of U.S. private doctoral institutions.

This higher rate among the non-U.S. institutions corresponds with the fact that they are not late adopters of technology overall: whereas late adopters in the United States ranged from 24 percent (community colleges) to 41 percent (bachelors colleges), only 12 percent of non-U.S. institutions were self-described late adopters. Early adopters in the United States ranged from 23 percent (bachelors colleges) to 41 percent (private doctorals), with non-U.S. institutions in the middle at 30 percent. We cannot say whether this difference is reflective of non-U.S. institutions in general or of these participants. Certainly institutions that would choose to overcome international barriers in order to participate in this survey would seem to be more interested in tracking (and following/adopting) IT trends.

COUNTRY/ REGION	NUMBER OF PARTICIPANTS
Canada	15
Europe and the United Kingdom	10
Australia/New Zealand	7
Asia	4
South Africa	4
Middle East	2
Mexico	2
South America	2

than 8,000 FTEs than at those with 8,000 or more.

Not surprisingly, responsibility influenced raters’ perspectives. CIOs and managers were in almost complete agreement on the list, except that managers elevated IT governance to the top ten and did not include risk management. CIOs were more concerned than other respondents about *Using analytics* and *Implementing risk management and information security practices*. Individuals with responsibility for instructional technology viewed the three related issues—*Improving student outcomes through an institutional approach that strategically leverages technology*; *Assisting faculty with the instructional integration of information technology*; and *Determining the role of online learning and developing a strategy for that*

role—as more important than did other raters. IT administrators were more concerned about *Sourcing technologies and services at scale*, *Establishing and implementing IT governance*, *Developing an enterprise IT architecture*, and *Optimizing IT efficiency and excellence*. *Implementing risk management and information security practices* was a more important issue to those responsible for research computing, the data center, networking and communications, infrastructure, information security, and identity management. And IT support, networking and communications, and information security leaders and professionals were more concerned than were others about *Harnessing the trends toward IT consumerization and bring-your-own-device*.

Central and distributed IT staff

placed the top-seven issues in their top ten. Distributed IT professionals were less concerned about *Implementing risk management and information security practices* and *Establishing and implementing IT governance* than were central IT organizations. But most mission-related issues (*Determining the role of online learning and developing a strategy for that role*, *Assisting faculty with the instructional integration of information technology*, and *Supporting the research mission*) were more important to distributed IT staff.

The IT organization’s pace of technology adoption—whether early, late, or in the middle of the pack—affected the way respondents ranked issues. Early adopters were less interested in *Addressing access demand and the wireless and device explosion*, but they were the only group to

TABLE 1. Summary of Institutional Differences in the Top-Ten IT Issues, 2014

GROUP	NEW ISSUES INCLUDED	ISSUES OMITTED FROM TOP TEN
Community Colleges	<ul style="list-style-type: none"> ■ Harnessing the trends toward IT consumerization and bring-your-own-device ■ Competing for IT talent when higher education compensation is lower than market rates 	<ul style="list-style-type: none"> 6. Changing IT funding models to sustain core service, support innovation, and facilitate growth 8. Sourcing technologies and services at scale to reduce costs (via cloud, greater centralization of institutional IT services and systems, cross-institutional collaborations, and so forth) 9. Determining the role of online learning and developing a strategy for that role
Baccalaureate Institutions (public and private)	<ul style="list-style-type: none"> ■ Harnessing the trends toward IT consumerization and bring-your-own-device 	<ul style="list-style-type: none"> 10. (tie) Developing an enterprise IT architecture that can respond to changing conditions and new opportunities
Public Master's Institutions	<ul style="list-style-type: none"> ■ Harnessing the trends toward IT consumerization and bring-your-own-device ■ Optimizing IT efficiency and excellence (via frameworks such as ITIL, strategic sourcing, service life-cycle management, metrics, and so forth) 	<ul style="list-style-type: none"> 8. Sourcing technologies and services at scale to reduce costs (via cloud, greater centralization of IT, cross-institutional collaborations, and so forth) 9. Determining the role of online learning and developing a strategy for that role 10. (tie) Implementing risk management and information security practices to protect institutional IT resources/data and respond to regulatory compliance mandates
Private Master's Institutions	<ul style="list-style-type: none"> ■ Establishing and implementing IT governance throughout the institution to prioritize institutional IT investments 	<ul style="list-style-type: none"> 6. Changing IT funding models to sustain core service, support innovation, and facilitate growth.
Public Doctoral Institutions	<ul style="list-style-type: none"> ■ Competing for IT talent when higher education compensation is lower than market rates ■ Identifying and optimizing new models and business processes (e.g., rebalancing central vs. decentralized IT services) to reduce complexity and improve operational efficiency 	<ul style="list-style-type: none"> 7. Addressing access demand and the wireless and device explosion 10. (tie) Implementing risk management and information security practices to protect institutional IT resources/data and respond to regulatory compliance mandates
Private Doctoral Institutions	<ul style="list-style-type: none"> ■ Balancing innovation with execution 	<ul style="list-style-type: none"> 7. Addressing access demand and the wireless and device explosion

place *Balancing innovation with execution* in their top ten (at #6). Late adopters were more concerned about *Establishing and implementing IT governance* and *Competing for IT talent* than were others, and they placed less emphasis on *Sourcing technologies and services at scale*.

Conclusion

The higher education IT marketplace is diverse and in different stages of readiness, as shown by the differences among the issues included in various groups' top-ten lists. BYOE is challenging some institutions more than others, some institutions are having a more difficult time

attracting and retaining talent, some are focusing more intensively on efficiency, and some are more concerned with innovation. Almost all of these institutional differences reflect variations in the IT organizations' priorities. The institutions' IT priorities—instruction, analytics, and partnership—are universal.

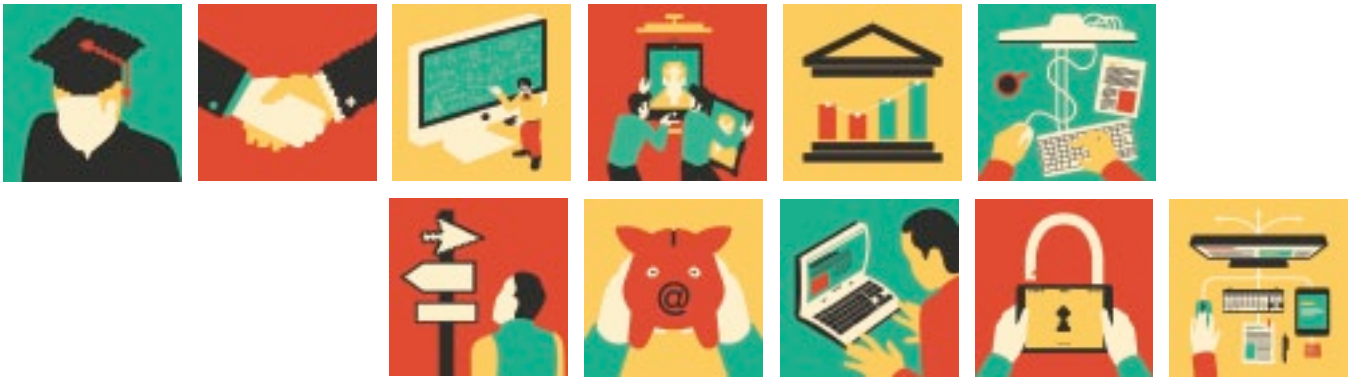
Those of us in higher education information technology are just turning the corner of change. This cycle of disruption is likely to last many years. Some options that seem so promising may turn out to be brief segues to more enduring models. Indeed, “enduring” might even become a quaint concept of

the past. The convergence of two cycles of disruption—in technology and in education—is likely to play out unevenly and unpredictably. We are at the center of this convergence. What an exhilarating place to be. ■

Notes

Joanna Lyn Grama is instrumental to the ongoing operations of the EDUCAUSE IT Issues Panel. She managed their meetings, recruited panel members, and spearheaded members' contributions to this article. Without her capable and collegial help, this article would not have been possible.

1. In 2012 and 2013, EDUCAUSE IT Issues Panel members both identified and prioritized the top-ten lists. For 2014, the EDUCAUSE membership was added to the process. Panel members identified an initial set of 18 priority issues, and EDUCAUSE members were invited



- to select their top ten in an October–November 2013 survey. A total of 443 members participated, and the final selection and ranking is based on their prioritization. This addition to the methodology has enabled us to better validate the issue prioritization and to examine variations among institutional types and roles.
- Data from Susan Grajek, “Higher Education’s Top-Ten Strategic Technologies in 2014” (ECAR, February 2014). Those technologies followed by an asterisk (*) are the six already in place in at least 30 percent of institutions.
 - BYOD (Bring Your Own Device) is too limited for the challenges of IT consumerization, so EDUCAUSE uses the term BYOE. For details, see Eden Dahlstrom and Stephen diFilipo, *The Consumerization of Technology and the Bring-Your-Own-Everything (BYOE) Era of Higher Education*, ECAR Research Report (Louisville, Colo.: EDUCAUSE Center for Applied Research, March 2013), <http://www.educause.edu/library/resources/byod-and-consumerization-it-higher-education-research-2013>.
 - BYOE made the top-ten lists of community colleges, baccalaureate institutions, and public master’s institutions. See Table 1: Summary of Institutional Differences in the Top-Ten IT Issues, 2014.
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Susan Grajek (sgrajak@educause.edu) is EDUCAUSE Vice President for Data, Research, and Analytics.