

# TOP 10 IT ISSUES, 2017



Susan Grajek and the 2016–2017 EDUCAUSE IT Issues Panel

The 2017 EDUCAUSE Top 10 IT Issues are all about student success.<sup>1</sup> Information technology in higher education continues to have many priorities and serve numerous constituents. IT service catalogs comprise hundreds of services to meet the many needs of faculty, students, and staff in various fields: the humanities; social, biological, and physical sciences; law; music; theater; art; business; and healthcare and allied professions. You name it, higher education offers it, and the IT organization supports it. Every academic and administrative area makes its own, separate demands on the IT organization, at any time and from any place. Despite the many and disparate requirements of each user and each technology, a predominant focus has risen to the top for higher education information technology in 2017, and that focus is student success. Colleges and universities are concentrating on student success to address concerns about the costs, value, and outcomes of higher education. Student success initiatives are making use of every available resource and opportunity and are involving every relevant stakeholder. Institutional technology is all three: resource, opportunity, and stakeholder.

# FOUNDATIONS FOR STUDENT SUCCESS

# 2017 Top 10 IT Issues

## 1. **Information Security:**

Developing a holistic, agile approach to reduce institutional exposure to information security threats



## 6. **Data Management and Governance:**

Improving the management of institutional data through data standards, integration, protection, and governance



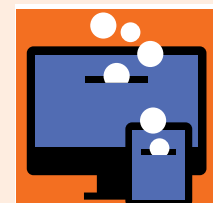
## 2. **Student Success and Completion:**

Effectively applying data and predictive analytics to improve student success and completion



## 7. **Higher Education Affordability:**

Prioritizing IT investments and resources in the context of increasing demand and limited resources



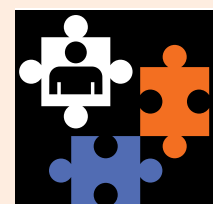
## 3. **Data-Informed Decision Making:**

Ensuring that business intelligence, reporting, and analytics are relevant, convenient, and used by administrators, faculty, and students



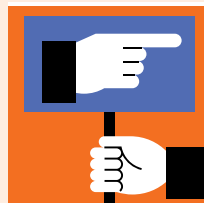
## 8. **Sustainable Staffing:**

Ensuring adequate staffing capacity and staff retention as budgets shrink or remain flat and as external competition grows



## 4. **Strategic Leadership:**

Repositioning or reinforcing the role of IT leadership as a strategic partner with institutional leadership



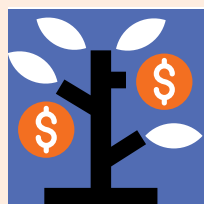
## 9. **Next-Gen Enterprise IT:**

Developing and implementing enterprise IT applications, architectures, and sourcing strategies to achieve agility, scalability, cost-effectiveness, and effective analytics



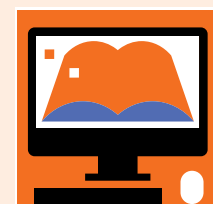
## 5. **Sustainable Funding:**

Developing IT funding models that sustain core services, support innovation, and facilitate growth



## 10. **Digital Transformation of Learning:**

Collaborating with faculty and academic leadership to apply technology to teaching and learning in ways that reflect innovations in pedagogy and the institutional mission



- Middle Tennessee State University (MTSU) launched a predictive analytics platform two years ago. By February of this year, the institution had seen a 3 percentage point increase in first-year student retention, achieving the highest retention rate for new freshmen in fifteen years. MTSU has been selected as one of five institutions to be profiled by the Association of Public and Land Grant Universities (APLU) for best practices in implementing student success programs. Technology has a major role in MTSU's efforts, but does not predominate. As Richard Sluder, vice provost for student success, wrote: "70 percent of success involves getting the people side of the equation correct, 15 percent involves technology, and 15 percent involves process."<sup>2</sup>
- At Montgomery County Community College, focused work on student success has been under way since 2013. The institution implemented a Student Success Network that includes an early alert system, an educational planning tool that allows each student to map out his or her degree or certificate program, and a student dashboard that integrates financial aid, the learning management system, and early alert and education planning information. Both advisors and students have access to the dashboard. Student persistence<sup>3</sup> has increased steadily as students have gained greater access to planning resources and as they have received more feedback on their progress. The faculty are enthusiastically adopting the new tools and processes: their participation in midterm reporting increased from 73 percent to 90 percent, and in a change faculty asked for, class attendance reporting by the deadline required for financial aid disbursement increased 30 percentage points, to 93 percent of faculty. Celeste Schwartz, vice president for information technology and chief digital officer, emphasized: "The technology is not driving this work,

but it is a tool that can help us better serve our students on their path to earning their degree or certificate."<sup>4</sup>

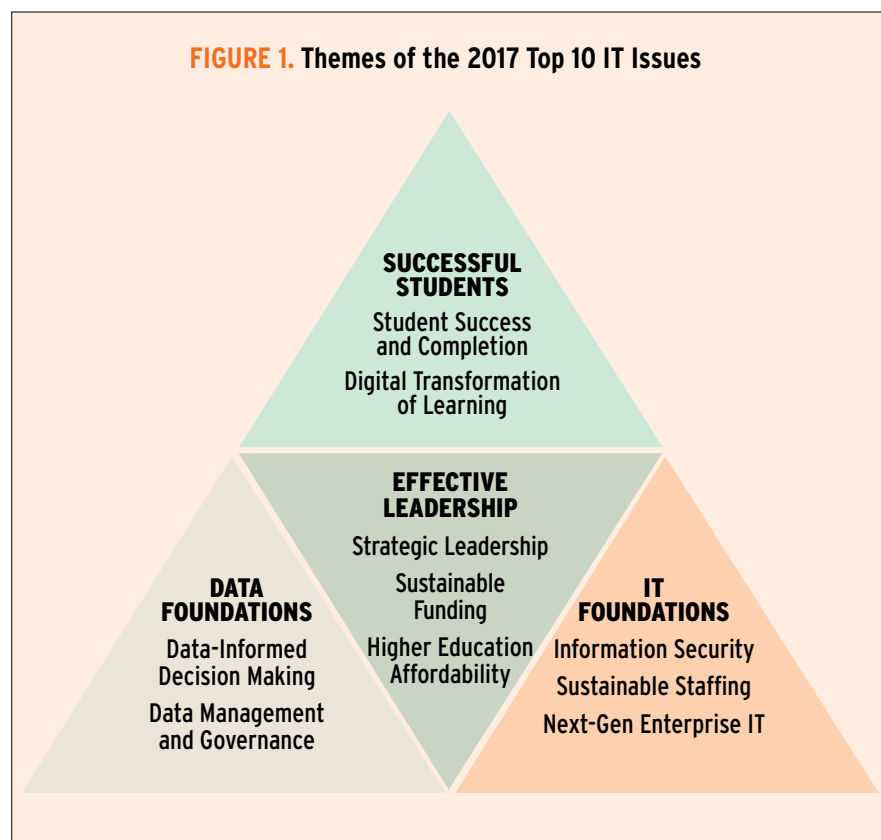
- Colorado State University (CSU) incorporates a student success focus into many areas of institutional life, including the institutional research office. Institutional Research, Planning, and Effectiveness (IRP&E) at CSU has restructured its work to move beyond accountability reporting: data review and reporting now enables more effective use of financial aid, more appropriate placement of students in foundational courses, and fuller information, shared with advisors, about at-risk students. Technology is a foundational component of the work. Laura Jensen, associate provost of planning and effectiveness, relies on technology to "automate as much of the reporting, both internal and external, as possible," and to "explore new tools . . . as technology improves, adopt it."<sup>5</sup>

These examples characterize the changing role of information technology in higher education. Technology is an enabler, not a primary driver, of institutional strategies and IT investments. Information technology provides the traction to move hard-to-move needles.

The theme of student success is not immediately apparent when scanning the 2017 Top 10 IT Issues list. In many ways, the list differs from previous years only on the margins. But in interviews with panel members—a new part of our methodology this year—we learned that the summative motivation for addressing today's digital challenges is student success and, accordingly, institutional success. IT leaders realize that the success and potentially the future of their institutions rest on the success of their students and that digital technology is an essential foundation for both institutional and student success.

Concerns about higher education affordability and value are one driver

**FIGURE 1. Themes of the 2017 Top 10 IT Issues**



of today's student success initiatives. Advances in technology and data science are another. Those advances make it possible to use information technology to improve students' institutional experiences, such as engaging technology-enhanced learning that helps students learn more effectively, data and analytics that assist students in planning and attaining their credentials expeditiously, and digital applications and experiences that are seamless and effective. Applications that collect and report student information provide the path into and out of algorithms that analyze and model student data and that help students, faculty, and advisors draw insights and recommendations for curricula, majors, courses, and extracurricular activities and support systems. Courseware that adapts its pace and pathway to individual learners helps optimize learning experiences. Technology does not lead student success efforts, but it is indispensable to them.

Student success initiatives exemplify major technology and process transformations, with all their attendant risks and hoped-for benefits. Like all transformative efforts, student success is multidimensional and requires strong foundations and leadership. The 2017 Top 10 IT issues coalesce into four related themes that colleges and universities are addressing: IT foundations; data foundations; effective leadership; and successful students (see figure 1).

## IT Foundations

So much rests on the IT organization's shoulders. Data needs to be available and secure, open and private. The systems and applications that run mission-critical operations and support strategic priorities like student success must be available, effective, and cost-efficient. They must provide the data that student success and other initiatives depend

**The EDUCAUSE Top 10 IT Issues website offers the following resources:**

- A video summary of the Top 10 IT issues
- Recommended readings and EDUCAUSE resources for each of the Top 10 IT issues
- An interactive graphic depicting year-to-year trends
- Top 10 IT Issues lists by institutional type
- Additional subject-matter-specific viewpoints on the Top 10 IT Issues
- The Top 10 IT Issues presentation at the EDUCAUSE 2016 Annual Conference

**<http://www.educause.edu/ITissues>**

on—which entails integrating data from multiple applications and across multiple locations including both on-premises data centers and the cloud. And of course, the effective provisioning of information technology depends on a stable, competent, and engaged IT workforce.

*Information Security* is the #1 IT issue for 2017. Last year's top challenge persists: to develop "a holistic, agile approach to reduce institutional exposure to information security threats." As both data and threats become more consequential, personally identifiable information, as well as institutional assets and reputations, is more important and more difficult to safeguard than ever. What did change this year is that the margin between the #1 issue and the other issues is smaller. Whether that is due to progress, habituation to ongoing threats, or the greater importance of the other issues is not clear.



Today's enterprise IT is no longer sufficient, and a *Next-Gen Enterprise IT* (issue #9) is needed. Institutional expectations of enterprise IT applications and architecture have changed,

thanks to priorities like student success and capabilities like analytics.

Enterprise IT costs are a significant portion of the IT (and institutional) budget and seemingly siphon off more strategic digital investments in education or research.<sup>6</sup>

Traditional enterprise resource planning (ERP) suites are costly without necessarily meeting contemporary needs, including the analytics and functionality to support degree planning, student advising, and digital learning. New cloud-based solutions and shared services offer alternatives to on-site institutional services, yet they entail significant investments of time and expertise as well as a rethinking of the

# 2016–2017

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The EDUCAUSE IT Issues Panel comprises individuals from EDUCAUSE member institutions to provide feedback to EDUCAUSE on current issues, problems, and proposals across higher education information technology. Panel members are recruited from a randomly drawn and statistically valid sample to represent the EDUCAUSE membership.

IT organizational structure and staffing. They may also require an institutional effort to redesign business processes to avoid new and ongoing future customizations. Many of the costs and implications are opaque and difficult to estimate; many of the benefits remain unproven or uncertain.

So much of the value of information technology in higher education depends on the IT staff and *Sustainable Staffing* (issue #8). IT leaders are struggling to find and retain the talent and staffing levels they need to meet institutional expectations of them. With an improv-

ing job market, especially in the technology sector, IT staff are getting restless, and the best have the most options. According to EDUCAUSE data, an astonishing 48 percent of the IT workforce is at risk of leaving. To worsen the challenge, CIOs report that it's relatively easy to secure funding for replacement positions but difficult to fund new positions engendered by priorities and advances in analytics, student success, e-learning, research computing, and changing enterprise IT architectures.<sup>7</sup>

A weak IT foundation can topple an initiative, a strategy, a career, and

perhaps even an institution. A strong one can advance the institution and provide a competitive advantage. EDUCAUSE members understand that and in 2017 are working to develop strong IT foundations.

## Data Foundations

Today's student success initiatives are building on the ongoing data and analytics revolution. Like most other

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revolutions, this one signals a great deal of reimagining and rebuilding. Colleges and universities are doing both with data, applications, and even the process of decision making. The 2017 theme of data foundations includes two issues: *Data Management and Governance* (issue #6) and *Data-Informed Decision Making* (issue #3). Institutions are eager to apply today's tools and algorithms to their data to improve individual, departmental, and institutional outcomes, such as increased efficiencies, streamlined processes, contained costs, and better experiences and outcomes for students. Putting all that data to good use is a challenge, and doing so entails providing the right people with access to the right information in the right forms at the right times. Even that is not sufficient, because those people need help and incentives to act most effectively on the

information they receive.

Data-informed decision making depends on reliable data. That foundation is still being built at most institutions, one element at a time. The very abundance of data that is enabling the data revolution is also undermining it. Multiple sources of data need to be inventoried and coordinated through data standards and governance and need to be integrated through architecture. Making data both more available and more useful through reports and analytics also makes it more consequential and exposed. Students, faculty, and staff have privacy rights and preferences, all of which need to be accounted for. Many institutions are working to adopt data management and governance structures and policies to clarify and strengthen roles, responsibilities, and standards.

## Effective Leadership

Leadership is the not-so-secret key ingredient in institutional success. Some experts say follow the money, but most will place their money on the leadership. The 2017 Top 10 IT Issues make explicit the implicit and deepening interdependence of IT effectiveness and institutional success.

Most important is *Strategic Leadership* (issue #4): repositioning or reinforcing the role of IT leadership as a strategic partner with institutional leadership. As institutional strategy becomes increasingly digital in nature, institutional leaders need a competent and coherent IT capability to achieve their strategic priorities. That means presidents, provosts, and other executives

## Top 10 Strategic Technologies and Trend Watch

The EDUCAUSE IT issues research is complemented by *Higher Education's Top 10 Strategic Technologies for 2017* and *Trend Watch 2017* from the EDUCAUSE Center for Analysis and Research (ECAR). The two ECAR reports provide a snapshot of the relatively new technological investments on which colleges and universities will be spending the most time implementing, planning, and tracking, as well as the trends that influence IT directions in higher education. Together, the trends and forecasts reported in the Top 10 IT issues, strategic technologies, and trend research help IT professionals enhance decision making by understanding what's important and where to focus.

need to do more than just talk with CIOs; they need to continually collaborate with them. CIOs need to be credible and informed partners. They need to be strategically influential. EDUCAUSE data indicates that CIOs who are members of the presidential cabinet are more likely to engage in discussions about institutional decisions and help shape administrative and academic directions. With only about half of CIOs serving on the cabinet today, there is room for growth.<sup>8</sup>

And yes, institutional and IT leaders do need to follow the money. Finding it is the first challenge. As institutional priorities have increased and as technology solutions have changed, CIOs are having difficulty locating sufficient and usable funding—that is, *Sustainable Funding* (issue #5). Campus leaders view technology as both a solution and a concern for institutional affordability and look to IT leaders to

- run the IT function more efficiently by containing or reducing infrastructure costs,
- manage the cost of *growth*, whether in information security risks or bandwidth or mobility, and
- invest in *transformation* (such as student success technologies, business intelligence, e-learning, and research computing).

Of total central IT spending, 80 percent is spent on running the institution and only 13 percent on growth and 5 percent on transformation.<sup>9</sup> Gartner's cross-industry average for these categories is 70 percent, 19 percent, and 11 percent.<sup>10</sup> Without effective IT governance that brings together institutional and IT leadership to communicate and collectively negotiate and set IT priorities and fund them realistically for *Higher Education Affordability* (issue #7), IT leaders are left with an IT budget that can never match the institution's run, growth, and transformation needs.

## Successful Students

Higher education IT leaders get it. Their goal is not simply a balanced budget, a fully staffed organization, a useable and reliable infrastructure, effective dashboards, or sufficient security. All these achievements are *in service* to the institution and the success of its students. Relevant priorities include (1) *Student Success and Completion* (issue #2), using analytics to help students, faculty, and advisors improve retention, course completion, and credential attainment; and (2) *Digital Transformation of Learning* (issue #10), applying technology to

improve teaching and learning in ways that are informed by both pedagogy and institutional culture and mission.

Student success analytics and technologies are recent arrivals in higher education. Some institutions, such as those profiled at the beginning of this article, are leading the way and providing examples of innovations and lessons in execution for mainstream institutions, many of whom are just beginning to define their priorities and plan their initiatives. Many of these new technologies reach beyond the classroom, to give students access to feedback and resources to plan their education and understand where they stand and how to get help, and to give faculty and advisors tools and resources to help them advise and support students.

EDUCAUSE supports early adopters in this area through the Integrated Planning and Advising for Student Success (iPASS) grant challenge, a program in which EDUCAUSE helps develop models for the field by working closely with a small number of institutions that are pioneering iPASS systems. As Ana Borray, EDUCAUSE director of iPASS implementation services, describes the work: "Every one of our grantee sites has involved a mix of many different technologies and a very strong commitment to 'breaking silos' in order to deploy these solutions and address the students more holistically—throughout the many touchpoints in their educational journey. So the complexity of integrating technologies is just the start. The monumental work of 'change'—breaking walls, changing processes, sharing information across units about the student, and being able to see and analyze results throughout the 'areas' (academic, support, financial, etc.) to address student success—is the big task at hand."<sup>11</sup>

Another set of innovations is occurring inside the classroom, and here higher education has years of experience in developing and delivering technology-augmented teaching and learning. Advances in technology,

bandwidth, and mobility have broken many of the barriers that inhibited earlier generations of educational technology from providing the access and experiences desired. In parallel, faculty and instructional technology staff have had years to learn how to adapt technology to pedagogy, and vice versa. Students have never been more eager to use technology to learn, and faculty have never more open to using technology to teach.<sup>12</sup>

Our choice of “Foundations for Student Success” as the subtitle and overall theme for the 2017 Top 10 IT Issues article is not simply joining the growing chorus of voices raising student

2017 and *Trend Watch 2017* reinforce student success as a central theme for higher education information technology in 2017. Indeed, more than half of the EDUCAUSE Top 10 Emergent Technologies pertain to student success:

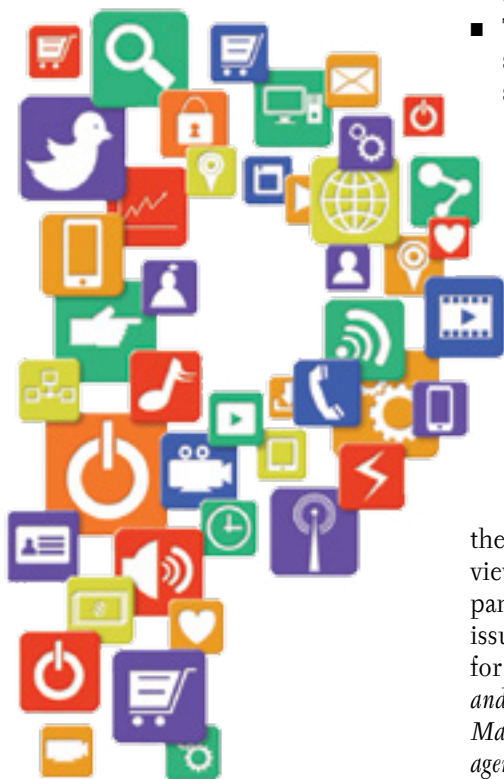
- Active learning classrooms (e.g., student-centered, technology-rich learning environments)<sup>13</sup>
- Technologies for improving analysis of student data
- Incorporation of mobile devices in teaching and learning
- Technologies for planning and mapping students’ educational plans
- Technologies for triggering interventions based on student behavior or faculty input
- Technologies for offering self-service resources that reduce advisor workloads<sup>14</sup>

The annual *Trend Watch* report tracks the influence of various trends (36 for 2017) on IT strategy.

Of the three most influential 2017 trends (i.e., those that influence IT strategy at 61%–80% of institutions), two are pertinent to student success: student success focus/imperatives; and data-driven decision making.

Perhaps even more compelling is the fact that during the IT issues interviews that were the basis of this report, panel members spontaneously linked issues to student success, particularly for seven of the issues: *Student Success and Completion*; *Data-Informed Decision Making*; *Strategic Leadership*; *Data Management and Governance*; *Higher Education Affordability*; *Next-Gen Enterprise IT*; and *Digital Transformation of Learning*.

IT foundations, data foundations, effective leadership, successful students: The 2017 Top 10 IT Issues touch every aspect of information technology and the institution, but they also collectively support higher education’s focus on student success.



success as a priority; rather, it is true to our times, data-driven—supported by insights from the panel and data from EDUCAUSE members. The Top 10 IT Issues is part of an annual EDUCAUSE series of reports. The soon-to-be-released *Top 10 Emergent Technologies for*



## Issue #1: Information Security

*Developing a holistic,  
agile approach to reduce  
institutional exposure to  
information security threats*

**Timothy M. Chester, Patricia  
Patria, Marden Paul, and  
William R. Senter**

**L**ike all other assets that an institution maintains, including physical and intellectual assets, information assets are highly valuable. A lot of people would love to steal those assets, whether they be the identities of current and former students or financial information such as credit card numbers. Unlike physical assets, because of the Internet, information assets are vulnerable anywhere, anytime, from any place on the planet. Risk management provides layers of protection, but bad actors (whether individuals or nation-states) are constantly searching for the soft underbelly of institutions’ information assets.

To contextualize this, a staff member at one major research university reports that each day, 100,000 people access the



“People think that information security is about technology, but it is really about educating people. 90 percent of all breaches have some sort of human component.”

—Patricia Patria, Vice President for Information Technology, Becker College

university network using two to three devices, 75 percent of incoming email is spam, and 1,000-plus attempts are made to penetrate the campus network *each second*.<sup>15</sup> Community members connect from home, offices, classrooms, labs, dormitories, airports, and other locations, locally and around the world. Vast amounts of valuable research data and personally identifiable information are stored, transmitted, and accessed. All

colleges and universities have a commitment to openness, yet the many thousands of services and devices on campus are often managed in a very distributed manner and to differing standards. How safe do you feel?

Information security is not binary: there is no state of complete security. Instead, security is layered and constantly adapting. A comprehensive security program that emphasizes risk reduc-

tion can greatly reduce exposure. That program should encompass people, process, and technologies:

- Educate users
- Develop processes to identify and protect the most sensitive data
- Implement technologies to encrypt data and find and block advanced threats coming from outside the network via from any type of device

### Who Outside the IT Department Should Care Most about This Issue?

- End-users, to understand how to avoid exposing their credentials
- Unit heads, to protect institutional data
- Senior leaders, to hold people accountable
- Institutional leadership, to endorse,

fund, and advocate for good information security

## The Misconceptions

- Someone else is taking care of security.
- Security is a one-time project and not an ongoing process.
- IT staff can handle security issues by themselves. (Information security is multilayered and must involve everyone within an organization.)
- Security is binary: we are either secure or we are not. (There are different maturity levels throughout the organization. A continual process of monitoring, operating, and implementing improvements must be repeated to keep up with the threat landscape.)
- Security is all about technology. (Although security technologies are critical to protecting information and networks, 90 percent of all breaches have some sort of human component. Human factors—such as education on information security practices—are essential adjuncts.)
- A data breach might happen. (A data breach *will* happen. You must prepare, because it is going to happen to you.)

## The Risks

- Ignoring the risk: a major incident can reduce application volumes, damage a capital fundraising campaign, and/or destroy the institution's reputation and brand
- Underestimating the likelihood and impact of breaches
- Hesitating to get started or taking a long time to make decisions and implement security protections
- Incompleteness: failing to involve the entire institutional community, institute sufficient process, or implement many layers of technology

## The Opportunity

A well-run program decreases institutional liability for information security. Individual faculty, staff, and students

## EDUCAUSE Benchmarking Service

Higher education leaders can measure progress on campus-wide information security and risk management strategic initiatives by reviewing their EDUCAUSE Benchmarking Service information security capability report, which includes data contributed to the information security maturity and deployment indexes in the EDUCAUSE Core Data Service (CDS). The EDUCAUSE Benchmarking Service is built on the CDS database, but it broadens both audience and application. The service takes the use of analytics to the next level by providing capability reports comprising maturity and deployment indexes for analytics, culture of innovation, e-learning, IT GRC, information security, research computing, and student success technologies. Participants gain access to semi-customized benchmarking reports, which can be used to (1) assess the organizational capability for initiatives and (2) communicate the value and relevance of information technology. (Note: Currently the EDUCAUSE Benchmarking Service is a beta service available only to ECAR and ELI member institutions. The service will be available to all EDUCAUSE members starting in July 2017.)

<http://www.educause.edu/benchmarking>

retain their intellectual and personal assets. Funds and time not spent on a poorly run information security program can be spent more productively elsewhere.

## Advice

*To get started:*

- Create data classification and compliance policies (e.g., PCI, HIPAA) and procedures. Find low-hanging fruit to move forward (e.g., procurement policies that require encryption on new machines).
- Engage in network protection activities (e.g., firewalls, application protection, building assurances into the network).
- Educate constituents on risk and the dangers that arise daily. Focus on simple awareness messaging: don't leave laptops in the car, use the VPN (virtual private network) to access files remotely. Provide training.
- Use the resources of those who have gone before you.

*To develop further:*

- Require annual information security awareness training that is meaningful and compelling: it should be done in a way that staff and faculty can take seriously.
- Identify where your most sensitive data is stored, and implement technologies, including two-factor authentication, to protect that data.
- Create a governance structure, such as an information security council that includes representation across the community. Develop KPIs and metrics to assess and communicate the state of information security.
- Move beyond low-hanging fruit (e.g., network protection) to technologies such as next-generation

(continued on page 25)



# Information Security: Risky Business

Joanna Lyn Grama and Valerie M. Vogel

For the second year in a row, *Information Security* is the #1 issue in the EDUCAUSE annual Top 10 IT Issues list. Since 2000, this is the 15th appearance of *Information Security*, either on its own or layered in with another issue, and the third time it has landed in the top spot (#1 in 2008 as well). While some may debate whether this designation is beneficial or whether it simply brings more scrutiny to campus information security departments,<sup>1</sup> there is no doubt about the ongoing risks facing our higher education institutions and the need for strong leadership to help mitigate those risks.<sup>2</sup>

Starting in 2015, two Higher Education Information Security Council (HEISC)<sup>3</sup> working groups began to conduct informal polls during their monthly calls to identify the top information security risks on campus. The polls provided HEISC members with the opportunity for more in-depth discussions that often led to the creation of new resources for the broader higher education community. This summer we consolidated the polls and expanded the survey to all six HEISC working groups. Since August 2016, four issues rose to the top of our community's risk poll: (1) phishing and social engineering; (2) end-user awareness, training, and education; (3) limited resources for the information security program (i.e., too much work and not enough time or people); and (4) addressing regulatory requirements.

## #1: Phishing and Social Engineering

Phishing—a form of social engineering—is a relentless challenge for institutions. Presidents and board members are just as vulnerable to social engineering attempts as are students, faculty, and staff. Over the past two decades, phishing scams have become more sophisticated and harder to detect. Traditional

phishing messages sought access to an end user's institutional access credentials (e.g., username and password). Now ransomware and threats of extortion are common in phishing messages, leaving end users to wonder if they have to actually pay the ransom. Campuses have upped their game by providing online training (e.g., Harvard's IT Academy for IT staff, Texas A&M's Aggie Life and Football Fever games for students), by collecting examples in "phish bowls" to help raise awareness (e.g., Cornell and Brown), and by launching phishing simulation programs to educate end users. This type of self-defense training—teaching end users how to spot and handle phishing messages—is critical to protecting institutional resources.

"We've blanketed our institution with the message to contact our security team with any concerns in an effort to address potential and actual threats from social engineering," said Sharon Pitt, CIO at Binghamton University and HEISC co-chair. "Our security communications team and security leadership have developed targeted communications for specific audiences (e.g., staff with financial authority, faculty,

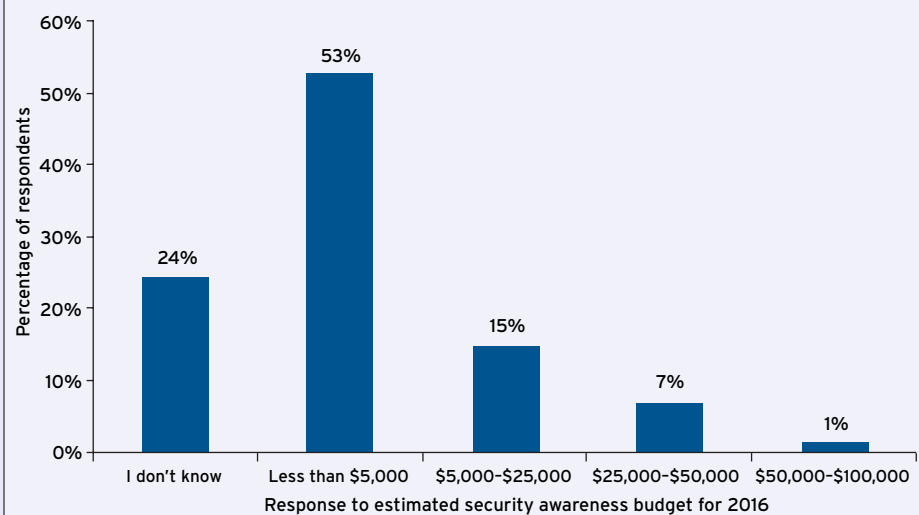
and leadership) regarding our awareness of specific threats and reminders of security practices. We have also developed phishing campaigns to help with student awareness, including giveaways of Goldfish crackers and candy Swedish Fish."

## #2: End-User Awareness, Training, and Education

Directly related to the first issue, end-user awareness, training, and education is critical as campuses combat persistent threats and try to make faculty, students, and staff more aware of the current risks. Although the majority of U.S. institutions (74%) require information security training for faculty and staff,<sup>4</sup> those programs tend to be leanly staffed with small budgets (see figure 1).

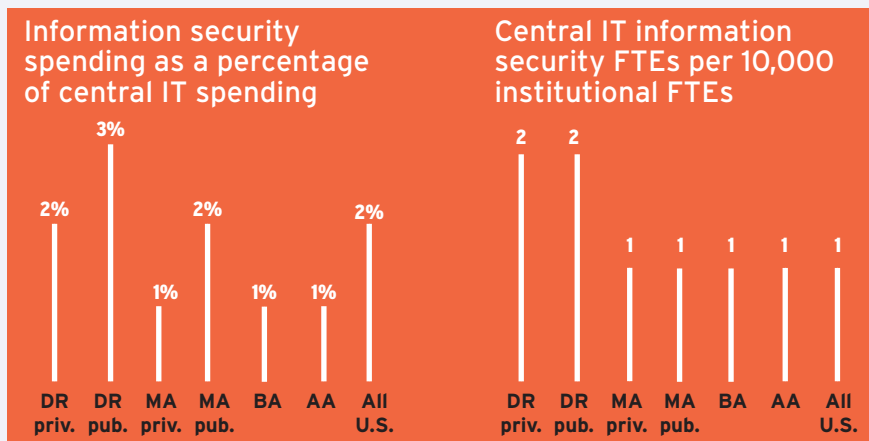
"We've established information security awareness and training as a priority, and are aligning resources to address it," said Melissa Woo, vice president for information technology and CIO at Stony Brook University and HEISC co-chair. "It helps that we don't have to reinvent the wheel because both the community and vendors already offer usable solutions."

FIGURE 1. Estimated 2016 Security Awareness Program Budget



Source: Joanna L. Grama and Eden Dahlstrom, *Higher Education Information Security Awareness Programs*, research bulletin (Louisville, CO: ECAR, August 8, 2016)

**FIGURE 2. Information Security Spending and Staffing, 2015**



Source: Joanna L. Grama and Leah Lang, *CDS Spotlight: Information Security*, research bulletin (Louisville, CO: ECAR, August 15, 2016)

With limited resources, higher education institutions must be creative and collaborative in addressing information security awareness needs. To help institutions continue to improve end-user security awareness in 2017, the HEISC Awareness and Training Working Group has prepared the Campus Security Awareness Campaign (<http://www.educause.edu/securityawareness>), a framework that includes ready-made content that security professionals and IT communicators can customize and integrate into their information security education communications.

### #3: Limited Resources for the Information Security Program

Resource constraints are nothing new to those in higher education, but for an information security department, limited resources can pose an even greater challenge. The 2015 EDUCAUSE Core Data Service survey showed that across all U.S. institutions, about 2 percent of total central IT spending is on information security and that there are 0.1 central IT information security FTEs per 1,000 institutional FTEs.<sup>5</sup> Put another way, there is only 1 central IT information security staffer per 10,000 student, faculty, and staff FTEs (see figure 2). Adding

to the staffing challenge, security skill sets continue to be among those in short supply in higher education.<sup>6</sup>

“Our information security team is a sought-after resource on campus with an ever-growing portfolio of security toolsets to deploy, regulatory compliance assistance, and security awareness engagements,” said Cathy Bates, higher

**“Our information security team is a sought-after resource on campus with an ever-growing portfolio of security toolsets to deploy, regulatory compliance assistance, and security awareness engagements.”**

education IT consultant and former CIO at Appalachian State University. “We have a small team with no immediate ability to add staffing to this area, so we are working to extend our capabilities with graduate assistants and with an information security liaison program across campus. The liaison program supports a two-way working relationship between campus departments and this small team, fostering campus ownership of security responsibilities.”

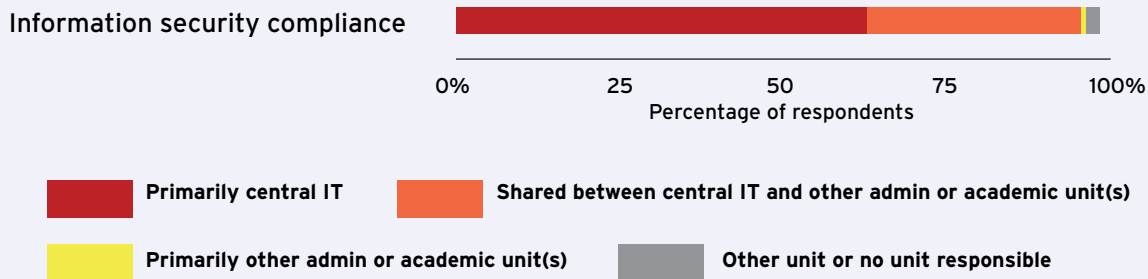
### #4: Addressing Regulatory Requirements

The regulatory environment impacting higher education IT systems is complex. Since the United States tends to adopt data-protection laws based on underlying industry (as opposed to one national data-protection law), data elements in higher education IT systems may be protected by a patchwork of different federal and/or state laws. For instance, student data is traditionally protected by the Family Educational Rights and Privacy Act of 1974 (FERPA), although some types of student data, when it is held in healthcare IT systems, may be protected by the Health Insurance Portability and Accountability Act of 1996 (HIPAA).

In addition, some types of student and institutional employee financial data may be protected by the Gramm Leach Bliley Act (GLBA). State laws may have data-breach notification requirements, and contractual agreements may have their own list of security technological controls that must be implemented and validated in IT systems.

At the center of this pastiche is the information security professional, who must ensure that the institution's IT systems are operated in a way that meets these varied regulatory requirements.<sup>7</sup> At many institutions, reviewing and addressing these compliance requirements is a service delivered (for the most part) by central IT units. However, other institutions take a shared approach to meeting information security compliance requirements (see figure 3).

**FIGURE 3. Responsibility for Information Security Practices**



Source: Grama and Lang, *CDS Spotlight: Information Security*

### Taking Action

As *Information Security* lands in the #1 spot on the Top 10 IT Issues list for the second year in a row, it is clear that higher education institutions must continue to improve the maturity of their information security programs to protect their IT systems and data. The EDUCAUSE Cybersecurity Initiative offers the following advice to help institutions and IT leaders improve their information security programs:

- Assess the current status of your program using the HEISC Information Security Program Assessment tool. This 101-question assessment tool helps leaders quickly understand the institution's operational information security activities.
- Access the institution's EDUCAUSE Core Data Service results in order to review core metrics on IT services (e.g., information security services) and to benchmark against peer institutions.
- Measure progress on campus-wide information security initiatives by reviewing your EDUCAUSE Benchmarking Service information security capability report.
- Review strategic IT risks with the IT Risk Register, and understand where information security is a risk that

could impact institutional business operations.

- Educate those using the ready-made information security awareness content in the 2017 Campus Security Awareness Campaign framework.
- Collaborate and share tips with other information security professionals by participating in the EDUCAUSE security and privacy discussion groups, joining a HEISC working group or committee, or writing a blog post on current security topics.

*Information Security* is a favorite on the EDUCAUSE Top 10 IT Issues lists, and it is likely that this topic will remain top-of-mind for institutions and IT leaders in the future. As institutional programs respond to and reduce information security risk, IT organizations will be better poised to meet and accomplish their institutional missions.

#### Notes

1. In 2016, four information security leaders debated this very topic. See Joanna Grama, Michael Corn, Sharon Pitt, Neal Fisch, and David Escalante, "Video: 4 IT Leaders Debate Security, Part I," *EDUCAUSE Review*, October 17, 2016.
2. See Cathy Bates et al., *Technology in Higher Education: Information Security Leadership* (Louisville, CO: ECAR, March 2016).
3. HEISC (<http://www.educause.edu/security>) supports higher education institutions as they

improve information security governance, compliance, data protection, and privacy programs. HEISC publishes the *Information Security Guide*, which features toolkits, case studies, and best practices to help jump-start campus information security initiatives.

4. EDUCAUSE 2015 Core Data Service (CDS) survey, *CDS Almanac*, February 2016.
5. *Ibid.*
6. Jeffrey Pomerantz and D. Christopher Brooks, *The Higher Education IT Workforce Landscape, 2016*, research report (Louisville, CO: ECAR, April 2016). The security management skill set was also listed among the top 10 positions in short supply in Jacqueline Bichsel, *Today's Higher Education IT Workforce*, research report (Louisville, CO: ECAR, January 2014).
7. Bates et al., *Technology in Higher Education: Information Security Leadership*.

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**Valerie M. Vogel** is Senior Program Manager of the Cybersecurity Initiative for EDUCAUSE.

(continued from page 21)

firewalls or adaptive security appliances.

- Start testing security and compliance plans. Create and test business continuity, disaster recovery, and incident response plans. Conduct penetration tests.
- Keep thinking about how to reduce the institution's size as a target. Make sure new systems are secured properly before being placed online. Train IT staff thoroughly and continually: they are on the front line. Purchase third-party services to help protect your network and data.

To optimize:

- Take a leadership role in the community, and communicate what you are doing. Allow other institutions to influence you and where you are going. Peer collaboration among the most mature institutions can help advance all of higher education.
- Keep abreast of new technologies. Learn from peer communities to identify and collaboratively assess the newest technologies (e.g., email data loss prevention or advanced threat protection that is anomaly-based).
- Remember that what may have kept you secure in the past may not help you today.



## Issue #2: Student Success and Completion

*Effectively applying data  
and predictive analytics  
to improve student success  
and completion*

Darcy A. Janzen,  
Deborah Keyek-Franssen,  
Patricia Patria, and Eric Sakai

Over a very few years, data-driven decision making and student success have become critical to most higher education institutions. Colleges and universities today are collecting huge amounts of data at the micro and macro levels. By combining and collectively analyzing data stored in retention management, learning management, and student information systems, institutions can develop a better understanding of how students interact with technology systems and how students interact with and flow in and out of curricular programs and majors. With sufficient investment and considerable data, institutions may develop a holistic picture of each student. With this kind and amount of

data, and especially with collaborations across campuses at the national level, higher education can begin to move from descriptive to predictive analytics and can use those predictive analytics to make changes in the services provided to students.

Predictive analytics allows us to track trends, discover gaps and inefficiencies, and displace “best guess” scenarios based on implicitly developed stories about students. Analytics can take the guesswork out of advising and can provide faculty with immediate feedback about course- and student-level success indicators.

However, predictive analytics usually entails identifying students who may be at risk, and the resulting changes can involve “intrusive advising.” Predictive analytics raises significant concerns: about privacy, about placing institutions *in loco parentis*, and about the extent to which the goal for student completion overrides students’ volition and their ability to learn and grow from failure.

### Who Outside the IT Department Should Care Most about This Issue?

- Leadership (president, CAO, cabinet), to set the agenda and the strategy and to provide resources
- Student support services, enrollment management, advisors, and faculty, to ensure that analytics are useful and used

### The Misconceptions

- More data is better. (People need know what data is useful and how to use it.)
- Advisors and others will misuse or misinterpret and misapply course and performance data.
- Prescriptive data is nothing new. (Traditional descriptive data shows how students are performing or what they are doing, but prescriptive data entails an entirely new level of analysis that facilitates action and use.)

“It’s easier to keep a student than recruit a new one, especially given current demographics. The president and his or her cabinet need to care most about predictive analytics for student success, because frankly, if they don’t, nothing is likely to happen.”

—Eric Sakai, Dean of Academic Technology, Community College of Vermont

### The Risks

- Not allocating appropriate resources, which can stall progress and set initiatives back
- Not sufficiently attending to student privacy and other compliance considerations
- Assuming that all faculty will easily provide data in the same way and at the same levels of detail. If that doesn’t happen, data will be partial, incomplete, and inadequate, undermining credibility and jeopardizing progress.
- Not realizing that predictive modeling is both an art and a science. If the model is incorrect, it might target the wrong people, and the students who need help won’t get it.
- Failing to develop a shared understanding of institutional commitments and obligations regarding predictive data about individual students and the actions the institution must, might, or might not accordingly take
- Assigning too much responsibility to vendors and assuming they know whether data is measuring what it should be. Data definitions and algorithms should be thoroughly defined and discussed to ensure alignment

between vendor models and institutional reality.

### The Opportunity

Institutions that excel will have measurably greater completion rates, graduation rates, persistence rates, and optimized



course enrollments. The student experience will be better because students will have a more holistic support structure as advisors, faculty, and student support staff share information and work collaboratively and in multiple areas on behalf of students.

### Advice

*To get started:*

- Use the EDUCAUSE iPASS program resources to gain information and insights.

- Ensure integrated support across campus, including leadership and a collaboration among the IT organization, student services, and faculty.
- Partner with other institutions and organizations for ongoing student success initiatives and support.
- Communicate the purpose and nature of student success initiatives to all stakeholders, especially faculty, students, and undergraduate students’ parents.
- Set goals, determine data requirements and availability, and form a team to create and execute a plan.
- Ensure that planned future systems can be integrated and that all needed features can be used.
- Staff initiatives adequately. Running analytics requires significant time and expertise. The work cannot simply be added to existing workloads. It requires special skills and training.
- Understand that communication is crucial to achieve buy-in. This applies particularly to faculty because the information they supply about how students are doing needs to be provided in a consistent way in order to be able to apply analytics.

*To develop further:*

- Continue to follow the advice listed above.
- Start a cycle of continuous improvement. Review and assess goals: Were the intended outcomes achieved? Were the changes effective? What needs to be tweaked, stopped, or started to move forward?

*To optimize:*

- Scale up existing efforts across more programs, divisions, and/or students.
- Share successes nationally to help other institutions get started and be successful.
- Reassess outcomes and goals, and set new, deeper, or greater targets.
- If current programs target advisors and other staff, provide just-in-time alerts and suggestions directly to students.<sup>16</sup>



## Issue #3: Data-Informed Decision Making

*Ensuring that business intelligence, reporting, and analytics are relevant, convenient, and used by administrators, faculty, and students*

Kirk Kelly, Patricia Patria,  
and David Starrett

Colleges and universities are striving to improve their value by helping more students attain more credentials more quickly and less expensively. Data can help these efforts by providing information to help institutions track performance against targets. Making data-informed decisions is one of the most important and most difficult issues that institutions face.

Higher education information systems generate vast amounts of data daily (including the classroom/LMS). This potentially rich source of information is underused. Even though most institutions have created reports,

dashboards, and other distillations of data, these are not necessarily useful or used to inform strategic objectives such as student success or institutional efficiency. Today's challenges include integrating data into ongoing decision making throughout the institution, making data easily accessible for all the people who need it when and where they need it, and moving beyond basic reporting to analytics that are predictive and contextualized.

### Who Outside the IT Department Should Care Most about This Issue?

- Institutional leadership, to advocate for good, timely information to help allocate scarce resources most effectively
- Academic and student development leadership, to ensure good information and analytics for student success
- Institutional researchers, to provide institutional expertise for data compilation, analysis, and use

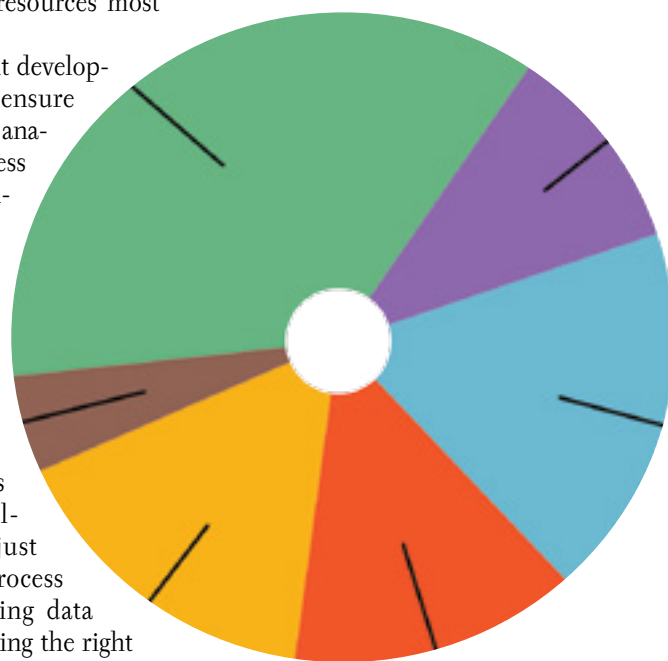
### The Misconceptions

- Data collection is the endpoint. (Collecting the data is just the first step in a process that includes ensuring data integrity and conducting the right data analysis, such as using appropriate predictive models to predict outcomes.)
- Progress requires "big data." (It is possible and even sensible to make a difference on campus using the data at hand to make better decisions.)
- Existing transactional data can be used to inform decisions. (Although it is good to start with data at hand, the data often needs to be reformatted or even completely redesigned to ensure that it is consistent over time and measures what is needed.)

- Simple questions are easy to answer. (Sometimes it takes a long time to find the answers to seemingly easy questions.)

### The Risks

- Wasting an asset by doing little or nothing with the data
- Not ensuring data quality and integrity. Institutions need to understand how data is generated to understand how it can (and can't) be used.
- Not ensuring data security, which is especially important for personally identifiable information
- Not being successful with initiatives or not meeting campus needs. Good,



thorough planning can reduce the risk of failure.<sup>17</sup>

- Failing to continually assess the usefulness and accuracy of data and analytics models. Analytics and reporting tools need to get into the right hands (e.g., advisors and counselors) and into the right decisions.

### The Opportunity

Institutions that excel with business intelligence, reporting, and analytics



can put data to work. Data can inform resource allocations to reduce or contain costs and improve institutional value, can enhance the classroom and learning experiences to improve student outcomes, and can help students understand how to attain their degree more efficiently, which will save them money.

## Advice

*To get started:*

- Ensure that sufficient leadership and resources are in place.
- Identify the primary objectives. What decision areas have the highest priority: Student success? Institutional efficiency? Resource allocations?
- Get buy-in from all stakeholders. They need to be comfortable with the goals of data analytics programs, how the data is gathered, and what it is being used for.
- Take baby steps. It takes years to optimize data-informed decision making. Starting small ensures that you can provide some answers to some questions right away.
- Jump-start analytics efforts. Form an agile team to quickly develop a proof of concept on the analytics that matter to leadership.

*To develop further:*

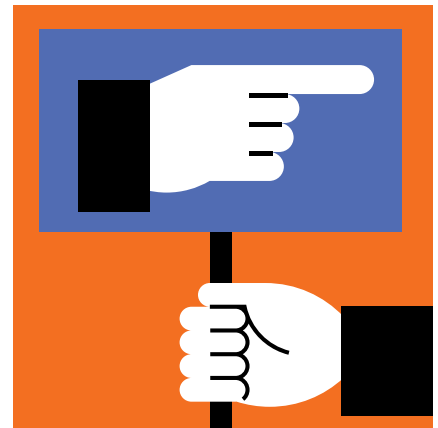
- Solidify your foundations. If you

haven't already done so, make sure that common definitions of terms are used and that data confidentiality and security standards are set and met, particularly for personally identifiable data.

- Ensure that data, reports, and analytics are reaching the people who need them; are easy to consume, understand, and manipulate; and are actually informing (and used to inform) their decisions. This will require extensive and ongoing outreach, interaction, and modification of existing reporting and analytics. It's a process, not a project.

*To optimize:*

- Introduce interactive forms of access to data to enable everyone to drill down into the data to answer questions in context.
- Continue expanding the questions that data can answer and the people who can use data to answer their questions. Make access to data as intuitive and unmediated as possible.
- Deepen the questions that data can answer. Use data for predictive purposes (to inform what will happen) and to optimize services and outcomes (to identify the best that can happen).
- Do what higher education does so well: share knowledge and experiences with others.



## Issue #4: Strategic Leadership

*Repositioning or  
reinforcing the role of  
IT leadership as a  
strategic partner  
with institutional  
leadership*

**Victoria Duggan, Dwight  
Fischer, and John P. Landers**

**T**oday's students have been living with technology since they were born. It is part of everyone's daily lives. Everything that students, faculty, and other constituents do in higher education has a touchpoint with technology. Decisions about institutional strategy are inevitably decisions about technology. IT leadership needs to participate in those decisions.

CIOs have two challenges in this regard. The first is getting to the table. Contemporary requirements for IT leaders position them well for strategic leadership.<sup>18</sup> Those requirements include expertise in management and business practices, project portfolio management, negotiation, and change leadership. However, business-savvy CIOs can alienate some academics,

*“If you can take data and create efficiencies, best practices, and processes that enhance the classroom and learning experience, then you are really enhancing the efficiency and effectiveness of the institution and student outcomes.”*

**—David Starrett, Provost and Vice President for Academic Affairs,  
Columbia College**

particularly those opposed to administrators as leaders. Worse, not all CIOs are well-equipped for a position at the executive table.

The second challenge is staying at the table. CIOs are accountable not only for strategy but also for operational oversight. Major incidents (e.g., significant security breaches, system failures, and service outages) will preempt CIOs from strategic leadership to crisis management.

Even CIOs who don't report to the president or sit on the cabinet have opportunities to discuss objectives and goals with leaders throughout the institution. Establishing conversations and relationships that enable CIOs to learn about academic and administrative aspirations and challenges and to offer realistic solutions may not get CIOs to the table, but doing so will position CIOs as strategic leaders. Influencing strategy should be the goal, not the reporting relationship.

Trusted advisor: that's key—and a great place for IT leaders to be.

### Who Outside the IT Department Should Care Most about This Issue?

- Boards, to ensure that risks are managed responsibly and because technology is so often a major component of new institutional investments
- The president, because technology is required to attain so many of today's most important strategic objectives and because technology-related decisions are complicated and risk-laden

- Institutional leaders who are seeking transformative change and overseeing a transition of IT leadership

### The Misconceptions

- Innovation, influence, and strategic leadership are intrinsic. (IT leaders need time, patience, and effort to cultivate those skills. Reputation and impact need to be re-created with each new leadership role and even each new relationship.)
- Institutional strategy is separable from IT strategy. (The more broadly, to understand the full context of all institutional objectives, and the earlier, even at the visioning stage, that IT leaders can be involved in institutional strategy, the better.)
- Institutional strategy is the largest determinant of IT investments and resources. (Marketplace changes such as vendor-driven migrations to the cloud, mergers and acquisitions, and end-of-life decisions drive IT costs and "investments" as much as institutional strategy.)

### The Risks

- Not understanding the environment. IT leaders are higher education leaders. They need to understand each aspect of the institution well enough to know the type of technologies needed.
- Not fully understanding the institution's needs and requirements or the solution's functionality and usability. A great technology that doesn't fit the business need or the community's

technology temperament is a bad technology for the institution.

- Not asking for a seat at the table. When the CIO sits on the president's cabinet, the IT department has to deliver.
- Burying the IT department or casting it as purely operational. This will limit the value the institution can get from information technology and limit the institution's ability to achieve its strategic objectives.

### The Opportunity

Institutions that value the influence of IT leadership on institutional strategy are more likely to attract, engage, and retain top IT talent and maintain a high-performing IT organization. When IT leadership partners effectively with institutional leadership, the institution's uses of technology are more likely to be relevant and successful. Misapplications of technology, hasty investments, and redundant investments will lessen. Technology expenditures will be better understood and more effective. Whether technology is directly associated or less clearly visible, it will have been a major contributor to institutional outcomes.

### Advice

*To get started:*

- Establish and maintain strong relationships and ongoing communications between IT leadership and area heads. Schedule recurring meetings to learn about their work, mission, and challenges. Some area heads will be concerned with the big picture, and others will be more tactical (e.g., tools team members had vs. what they needed). Cultivate a perception of IT leadership as helping academic and administrative areas to succeed.<sup>19</sup>
- Start at the levels that are accessible. Leaders who can't get direct access to the president or board can start one level down. Or two levels. Or wherever they can build relationships, create advocates, and become that trusted advisor.

"IT leaders really are college leaders. They understand the significant roles of each area well enough to translate the business goals to the types of technologies needed to help achieve those goals."

—Victoria Duggan, Chief Compliance Officer, Montgomery College

- 
- Become part of campus social life and the institutional community outside your department. Being an active participant in nonwork campus activities can build exposure and relationships.
  - Be realistic about the environment and the institution. Conservative, risk-averse institutions are unlikely to make major, transformative commitments. Institutions with few resources are constrained by their limitations. Institutions with highly distributed power structures are going to make a lot of strategic decisions at the local level. It's more realistic to consider switching institutions than to hope to change the existing institution.

*To develop further:*

- Manage perceptions of the IT organization and reinforce successes.

Encourage IT staff to share positive stories (e.g., projects, support, or ways you've partnered around the campus). Reinforce the partnership role of the IT organization and give generous credit to non-IT colleagues and leaders.

- Share experiences or ideas from other institutions that have similar programs/goals.
- Without disengaging too much, find separation from ongoing IT operations to dedicate time to leadership and strategy. Appoint deputies with strong operational management skills and proclivities.

*To optimize:*

- Work to be a well-rounded IT leader. This takes effort and self-knowledge. The use of 360 assessments and executive coaching can give leaders

objective information about themselves and can create realistic and focused development plans.

- Assess the IT organization and its reputation, performance, and impact. The assessment should address the IT organization's value and its ability to provide needed services and contribute to strategic priorities. Set performance targets, measure them, create plans to close gaps, and set new aspirational goals. Augment metrics-based assessments with qualitative conversations about the IT organization's value and contributions.
- If your institution is in transition, seek an IT leader who knows the "business" of information technology and the missions and culture of higher education and who can sell the ideas and engage academic leaders.



## Issue #5: Sustainable Funding

*Developing  
IT funding models  
that sustain core services,  
support innovation, and  
facilitate growth*

Ellen F. Falduto, Dwight  
Fischer, Craig A. Fowler, and  
Thomas Glaser

IT funding has always been a challenge as institutions seek to provide just-sufficient funding for IT services and investments. Two complications have deepened the IT funding challenge in recent years. The first is that information technology is now incontrovertibly core to the mission and function of colleges and universities. It is essential to the way we conduct education, research, patient care, community service, and administration today. Limit IT funding, and we risk the essential work of our institutions slowing, deteriorating, or even ceasing entirely.

The second complication is that at most institutions, digital investments and technology refreshes have been funded with capital expenditures. Operating funds are generally more difficult to increase. Yet IT services

and infrastructure are moving outside the institution, generally to the cloud, and cloud funding depends on ongoing expenditures rather than one-time investments.

The shift to ongoing funding of IT services is forcing institutions to explicitly acknowledge their reliance on technology and its strategic value. Can you shift your IT funding paradigm to more sustained resource allocation instead of one-time capital allocations? Only *sustainable* IT funding can support the institution's objectives and long-range strategic plan.

### Who Outside the IT Department Should Care Most about This Issue?

- The board, because the strategic needs of the institution will inevitably require IT investments that are different in kind and scale from the past
- The president and institutional leadership team (CAO, CFO, CIO, and others), to ensure that IT funding is responsibly estimated and allocated to strategic priorities

### The Misconceptions

- Information technology is an expense that needs to be limited rather than an investment in the ongoing and future health and mission of the institution.
- Information technology is the major and most important expense of a new initiative. (Technology doesn't have to be expensive if it is applied at the right time, in the right way. Technology for its own sake does not facilitate

growth. Technology is just one part of the people-process-technology triad of effective IT investments.)

- Institutional funding sources, levels, and allocations are sufficiently understood to support effective cost management. (Ignorance about the actual costs, cost-drivers, and implicit subsidies of IT and other services abounds.)

### The Risks

- Failing to establish an effective IT funding model. Without one, technology will be a chronic impediment to the attainment of institutional priorities and effective campus operations.
- Making each new IT funding decision as a one-off. Decisions will take longer and be more arbitrary, reinforcing higher education's reputation as a place where progress is difficult and slow.
- Insufficiently funding information technology to address security risks, thus generating even higher costs as breaches become more frequent and more severe
- Trying to realign all IT resource allocations at once. This runs the risk of overlooking some fundamental expenses or issues, underfunding critical services, or simply wreaking havoc by changing too much too quickly. If a sweeping change is evitable, scenario planning (i.e., identifying potential future scenarios if certain choices are made or consequences occur and creating corresponding mitigation plans) with all stakeholders can help.

**“Failure to fund information technology adequately is failure to provide a fundamental foundation upon which to thrive in the future.”**

**—Dwight Fischer, Assistant Vice President and CIO, Dalhousie University**

## The Opportunity

Institutions with effective IT funding models gain financial efficacy. Responsible IT funding models ensure that IT services and initiatives are sustainable, right-sized, and predictable. This competency can be translated to other institutional services and investments and provide the institution with the ability to effectively make additional value-enhancing investments should other resources become available. A well-functioning IT funding model enables the institution to stay relatively current with appropriate, needed technologies and allows IT managers to accommodate inevitable ongoing spikes in demand for resources (e.g., an information security breach, a surge in network usage, matriculation, new deployments) without needing sudden new infusions of resources or impeding service quality or continuity.

## Advice

*To get started:*

- Gain agreement that institutional funding needs to be sustainable.
- Don't continue digging a deeper hole.

Use new initiatives as opportunities to reinvent sustainable IT funding of those initiatives.

- If needed, engage a consultant to help assess the institution's digital needs and funding levels and sources to create a strategic funding roadmap that fits the institution's size, mission, strategic priorities, current state, and available funds.
- Alleviate fears and gain buy-in by communicating campus-wide to help all constituents understand the objectives and opportunities in funding information technology sustainably.
- Fear not the creative idea. Discussions of budgeting and financing models can stall when they run up against our institutional or other generally expected policies, procedures, or principles.

*To develop further:*

- Communicate clearly, openly, and often. If an incoming CIO encounters a structural deficit, the new CIO should communicate the impact and meaning to institutional leadership and enlist their understanding and support to make the right decisions to

eliminate the deficit.

- Initiate conversations about IT's value to change the emphasis from spending to investing.
- Make incremental changes, which are much more realistic than trying to change the entire IT funding model at once. Recognize potential opportunities for new funding models and use them. Technology lifecycle replacements can offer the opportunity to rethink both funding sources and technology solutions.
- Position technology in service to new academic, administrative, and facilities initiatives. Be sure the funding model is engineered to support the project objective rather than the technology.
- Adopt an IT funding framework. An ECAR working group has developed a framework that "builds agility into institutional IT services, allowing modest expenditures in new and innovative services for rapid deployment and a pathway for growth into becoming a core service." It creates different funding models for three kinds of services: core, flexible, and experimental.<sup>20</sup>

*To optimize:*

- Use the trust and influence developed in earlier phases of this work to move the conversation to a new and higher level.
- Assess IT investments and services in light of effectiveness in meeting objectives, needs, demand, and costs. Understand the value that each service and investment is actually providing. Find services that can be discontinued so that funding can be allocated to new technology priorities. Some investments deliver on their original objective and additionally generate new, unanticipated demands. For example, faculty who learn how useful basic classroom technology is might start asking for help and support to integrate technology even more deeply into their teaching and courses.





## Issue #6: Data Management and Governance

*Improving the management  
of institutional data  
through data standards,  
integration, protection,  
and governance*

Gerard W. Au, Timothy M.  
Chester, Victoria Duggan,  
and Dwight Fischer

**D**ata abounds throughout our institutions. Colleges and universities have a great desire to apply that data to greater degrees to improve institutional and constituent outcomes, service quality, efficiency, and more. Data has context and has (to date) been created and defined within each narrow context. Because of that, similar and related data currently resides in different offices, formats, standards, and systems. It is optimized for each context and uncoordinated at large. If our data is to be used at an institutional level for, say, student success, an institutional approach is needed.

Data management and governance is

not an IT issue. It requires a broad, top-down approach because all departments need to buy in and agree. All stakeholders (data owners as well as IR, IT, and institutional leaders) must collaboratively develop a common set of data definitions and a common understanding of what data is needed, in what format, and for what purposes. This coordination, or governance, will enable constituents to communicate with confidence about the data (e.g., “the single version of truth”) and the standards (e.g., APLU, IPEDS, CDS) under which it is collected.

Institutions often choose to approach data management from three perspectives: (1) accuracy, (2) usability, and (3) privacy. The IT organization has a role to play in creating and maintaining data warehouses, integrating systems to facilitate data exchange, and maintaining standards for data privacy and security. Data owners and institutional leaders set requirements and standards and help assess and ensure data accuracy.

### Who Outside the IT Department Should Care Most about This Issue?

- Institutional leadership, to recognize the importance of the institution’s data assets and to champion the need to manage data to better meet the institutional mission and goals
- Institutional researchers, to convene conversations and planning around data
- Institutional executives and professionals with strategic data needs

### The Misconceptions

- The IT organization owns all the data and knows what to do with it. (The IT organization cannot govern data or implement analytics without institutional leadership and the active involvement of all stakeholders.)
- The same data elements are defined and used consistently across the institution. (The standards, definitions, and expectations about data can vary from department to department. Data elements and data reports

all have contexts, and those contexts can vary dramatically based on who creates the report: admissions vs. registrar vs. institutional research. A lack of understanding of the context creates confusion in determining “the truth” of the data.)

- The efficacy of application vendors’ analytics solutions is clear, and institutional departments’ investments in analytics solutions are coordinated. (In some cases, individual departments are investing in solutions that will actually impede institutional analytics and decision making. In other cases, institutions are buying solutions without fully understanding the algorithms and data definitions.)

### The Risks

- Ignoring data management and governance. This is the biggest risk, and it will go unnoticed a few years. The postsecondary education environment is very competitive. Institutions that master this now and establish a foundation to leverage data will have an extraordinary advantage. Institutions that don’t do so will be incredibly inefficient with decision making. Decisions will take too long, or leaders will miss opportunities they can’t see because they have only anecdotal evidence. Institutions could receive less performance-based funding.
- Failing to involve all stakeholders, both data owners and data users, in data governance. Too often students are not involved in initiatives that involve their data, their identities, their money, and their outcomes.
- Ignoring data security and privacy. As data is used for increasingly consequential purposes, security and privacy become more important than ever.
- Failing to create explicit data retention and disposal policies. These



“Being good at data management and governance creates bottom-line opportunities.”

—Timothy M. Chester, Vice President for Information Technology,  
University of Georgia

policies are a crucial part of any data governance and management program. Data retention policies state what data must be retained, for what purpose (usually regulatory), and for how long. The complementary disposal policy specifies how data should be destroyed when it reaches the end of its useful life. Following these policies helps an institution minimize legal risk (e.g., data that is improperly retained past its lifecycle could be subject to discovery in a potential lawsuit).

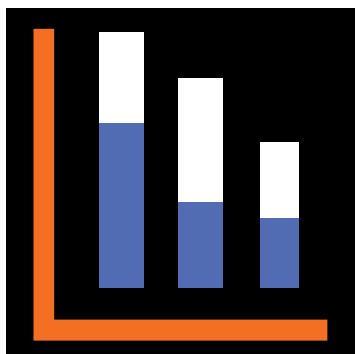
### The Opportunity

Data management and governance provides the foundation for effective use of data, which can be applied to improve student outcomes and experiences (e.g., recruitment and enrollment, completion, student services), business operations (e.g., understanding operational expenses and revenue), and many other areas.

### Advice

*To get started:*

- Help leadership make the case for data governance.<sup>21</sup> IT leaders may need to help institutional leaders



understand the benefits and resource requirements, because they aren't necessarily obvious. But institutional leadership must make the case, because the solution involves the entire institution.

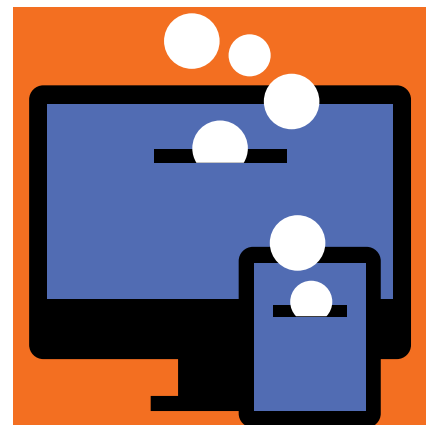
- Establish a data governance group with responsibility to identify institutional data sources and to determine the institution's data needs.
- Recognize that data management is a people problem, not a tools problem. Identify the major producers and owners and the consumers of the data. Work with stakeholders to develop a data governance framework for decision-making rights and data classifications.
- Find the data. Engage data producers and owners in inventorying data systems and data.
- Establish a Chief Data Officer position.<sup>22</sup>

*To develop further:*

- Aim for a definitive source and definition of each data element. Develop a data dictionary with plain-English, concrete, institution-wide definitions and privacy and security classifications (e.g., public, private, restricted, internal, sensitive, highly sensitive) to appropriately safeguard each data element.
- With data standards and data governance established, develop a technical architecture.

*To optimize:*

- Recognize that data governance and management is a process, not a project. It needs ongoing attention and regular review.



## Issue #7: Higher Education Affordability

*Prioritizing IT investments  
and resources in the context  
of increasing demand  
and limited resources*

Ellen F. Falduto, Patricia Patria,  
and Marden Paul

**T**he affordability question is driven by the slow recovery from the economic downturn, radically changing demographics and both the perceptions and the realities about the cost and financing of higher education. Information technology can contribute to affordability in several ways.

Institutions can introduce efficiencies by leveraging capabilities in existing applications to make it easier for people to do things on their own and, as people leave the institution, by not reflexively replacing them one for one.

IT costs can also be examined. Just as higher education leaders are now asking whether every campus needs its own version of Psychology 101 (or Biology or Economics or . . .), they might similarly

“We need to give priority to those investments that help our institutions actually address the questions around affordability.”

—Ellen F. Falduto, Chief Information and Planning Officer,  
the College of Wooster

question why so many institutions (and units within institutions) are building graduate student application systems or grants management systems, or why each individual college and university has numerous email services, local Higher Performance Computing (HPC) clusters, massive big data storage arrays, or site licenses for the same software. Uncoordinated, redundant expenditures supplant other needed investments, such as consistent classroom technology or dedicated information security staff. Planning needs to occur at the institutional or departmental level, but it also needs a place to coalesce and be assessed regionally, nationally, and in some cases, globally, because there isn't enough money to do everything that institutional leaders, faculty, and others want or even need to do. Public systems are making some headway in sharing services, but for the most part, local optimization supersedes collaboration and compromise.

Affordability is not just about reducing costs. Resources are finite everywhere. But at many institutions, such as small privates, resources are particularly limited. These institutions must carefully prioritize investments and initiatives and look to optimally leveraging their IT investments.

Information technology can also contribute to achieving institutional outcomes that can make higher education more affordable. Helping students attain and transfer credentials easily and quickly is a challenge that technology can help solve. Stemming student attrition also both increases annual revenues and reduces the costs of each degree granted.

### Who Outside the IT Department Should Care Most about This Issue?

- The president and senior leaders, because they will need to set institutional strategy around the issue of “affordability” including IT priorities and investment
- Faculty and staff, because they will be the ones who bring ideas to the table, often the ones who implement the ideas, and ultimately the ones who have to live with the changes

### The Misconceptions

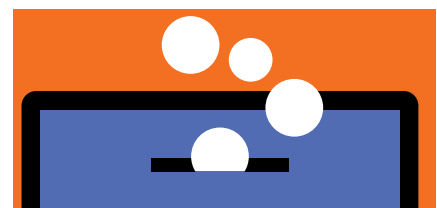
- Initial costs and long-term investment requirements will be minimal. (New solutions are chosen to try to solve problems and reduce cost, but they require the correct infrastructure, expertise, and staffing levels to work properly. Both initial and ongoing costs are often overlooked or underestimated, as is the impact on the workforce as roles and positions are phased out or replaced.)
- Problems can be solved by deploying technologies. (When technology is part of the solution to a business problem, it too often becomes the first action taken, before the problem and requirements are well understood, and the primary goal of the initiative, rather than the initial business objective.)
- Affordability can be addressed with a low-hanging-fruit approach. (Affordability means making tough choices about institutional priorities and aligning resources accordingly. This may entail reallocations that move resources from one area or

program to another—which, among other complications, can generate resentments.)

- Technology budgets can remain flat. (IT costs will continue to increase because information technology is now embedded in pedagogy, research, campus life, and administrative functions. Every technology investment generates downstream costs that need to be funded and offset somewhere else.)

### The Risks

- Moving too quickly to implement initiatives without adequate consultation, dialogue, and reporting. This can destroy trust and curtail savings and leave the institution worse off as departments elect to pursue their own paths rather than work collaboratively.
- Making rash or excessive reductions or consolidations. This can make good services bad and lead to increased work or shadow systems to accommodate the lost functionality. Changing services without adapting business processes is like squeezing a balloon: the work will remain, but it will move elsewhere. The project may prejudice constituents against future efforts, no matter how better managed those efforts may be.
- Being unable to improve affordability. If higher education cannot improve affordability through its own initiatives, it is highly likely that the issue will be addressed through public policy and regulation.
- Ignoring strategic priorities. Doing so will diminish the distinctiveness and quality of the institution. Students won't understand what's special about the institution and why it is worth the investment. They will choose to enroll elsewhere.





## The Opportunity

Institutions that can effectively prioritize IT investments and resources can improve the institution's bottom line and lower costs for students. Unnecessary IT costs and risks will be greatly reduced. The IT organization's services, service levels, and initiatives will be aligned with institutional needs. IT service provision will be streamlined. Information technology is not inexpensive; when institutions are able to rightsize their IT spending to target their strategic priorities, they can be assured that their IT investment is optimized.

## Advice

*To get started:*

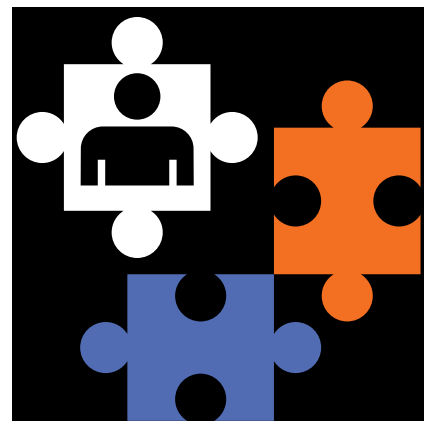
- Start simple. Identify opportunities for the IT organization to align with institutional priorities. Inventory capital needs, and determine the costs and resource requirements.
- Work with the leadership team to iteratively identify, negotiate, and finalize priorities to support the institution's strategy or needs. In those conversations, try to describe the difference in impact between not making an investment and making an effective investment.
- Right-source internal services. Redundant local services may optimize service locally but can cannibalize funding for adequate centralized versions of the same services and impede institutional affordability. Get clarity from leadership on the core services and service levels the community needs, forecast the initial and ongoing costs, build or buy the services, and ensure that institutional leadership is willing to require constituents to use central IT services provided the services meet negotiated service levels. The IT organization should be advised and supported by a representative group of stakeholders who can help establish service level requirements, monitor performance, and reconfirm or renegotiate service levels over time.

*To develop further:*

- Apply continuous improvement to maintain the service management foundations advised in the previous section. Regularly reevaluate the service catalog and each core service. Ensure that stakeholders have a serious voice and impact on service levels and service improvement plans.
- Recognize that cost reductions might be better put toward new critical needs (e.g., data management and analytics) and risks (e.g., data privacy and security) than savings. Prioritize critical areas for the future.

*To optimize:*

- Take an even deeper and harder look at the costs of providing IT services. Engage in service-based costing across the entire IT organization to ensure that all IT costs are allocated to all services.
- Compare internal and external sourcing options for delivering similar service levels at lower costs, and ensure that any estimated cost savings can actually be harvested (e.g., by reducing headcount, eliminating software or hardware costs, closing a data center). Initial estimates of savings often erode to nothing after fully accounting for constraints such as loss of functionality (which must be replaced elsewhere) or inability to reduce headcount (when 3 FTE of effort is distributed among 7 staff with very different skill sets).
- Refocus resources on how to broker external services and how to contract, deploy, and manage them.
- The affordability question is not just an IT question. Understand whether the entire institution is emphasizing affordability. The IT organization often gets asked to partner with other areas that are trying to address affordability issues. Advocate to collaborate on affordability with academics, student development, admissions, grants management, and other areas.



## Issue #8: Sustainable Staffing

*Ensuring adequate  
staffing capacity and  
staff retention  
as budgets shrink  
or remain flat  
and as external  
competition grows*

Kirk Kelly, John P. Landers,  
Stuart D. Lee,  
and William R. Senter

**A**s institutions become more dependent on their IT organizations, IT organizations are more dependent on the expertise and quality of their workforce. New hires need to be great hires, and great staff need to want to stay. Each new hire can change the culture and effectiveness of the IT organizations—and, by extension, the institution—for the better or for the worse.

External competition for IT talent is a major threat. Recruitment and retention of IT staff is proving to be increasingly volatile as the external job market goes through dips and troughs. Businesses are hiring more staff, particularly IT

“Some people consider the cloud to be a panacea that will allow us to massively reduce costs, notably in staff, but what we are now seeing instead is the emergence of core skills needed internally (security, integration, cloud architecture, and so on). These do not come cheap.”

—Stuart D. Lee, Deputy CIO, IT Services, University of Oxford

staff. Higher education cannot generally compete with commercial salaries and benefits, and many institutions no longer provide offsetting intangible advantages like less stressful workloads or feeling embedded in academic life.

Challenges include losing talent, especially younger talent, after just a few years. The loss of institutional knowledge when staff leave compounds the loss of FTE effort. Smaller institutions and those in rural areas are particularly at risk. Talent loss can also occur with *in situ* staff if they cannot continually reskill as the technologies develop at a rapid rate.

IT leaders are struggling to influence institutional leaders—in human resources (HR), finance, and elsewhere—to conceive of and create a more “sticky” organization to retain staff. Solutions include market-competitive salaries, relevant job descriptions, flexible workplaces and work hours, and ongoing rewards and career advancement.

### Who Outside the IT Department Should Care Most about This Issue?

- The HR organization staff, to provide their expertise and advocacy
- CBOs and CFOs, to understand and help make the case for the true costs and benefits of an effective IT workforce
- HR, IT, and finance leaders, to work

together to determine realistic salaries for new hires in strategic or competitive areas

### The Misconceptions

- IT professionals are fungible: staff hired for one role can easily be used for another. (A web developer is not a database administrator is not a data scientist is not a project manager. The IT profession is increasingly differentiated, and not everyone can be retrained for a different role.)
- When a lot of IT professionals are looking for work, it should be easy to find qualified employees. (It is very hard to find the right person.)
- The salary the institution decides it can afford is the salary an IT professional will accept. (Institutions need to be flexible about salaries, job descriptions, and working conditions. Getting the best staff—or even qualified staff—can require negotiation and accommodation.)
- A contractor is always a good solution to special needs or workload spikes. (Contractors are effective in plugging generic gaps, but when institutional knowledge is part of the work, contractors can impede work and alienate constituents.)

### The Risks

- Overpromising and underdelivering. IT leaders and managers have to focus

on the work as well as the workforce, which can distract them from job and workplace improvements. Creating an expectation that employees and staffing matter, but not following through, can be worse than making no commitments at all.

- Massively underresourcing in key areas and depending too heavily on contractors
- Not balancing staff optimization with workforce optimization. Every opportunity or promotion offered to one staff member is evident to all staff members. Sometimes the best solution for an individual will take the organization out of balance or be impossible to scale.
- Trying to lead a 21st-century IT organization with support from a 20th-century HR organization. All parts of the institution need to adapt to new business practices and job markets.
- Keeping on keeping on. Ignoring workforce challenges risks lowering staff engagement and increasing burn-out. People have to live with their work environment on a daily basis. Each day that passes without addressing challenges like overwork, bad management, insufficient training, or lack of advancement increases the likelihood that the best will leave and everyone will be less committed and effective.

### The Opportunity

Institutions with sustainable IT staffing will have IT workforce stability and a more effective, predictable IT organization, which can achieve higher-quality IT services and initiatives. These institutions will be a more attractive workplace for existing and prospective staff, making it easier to attract and retain professionals who are highly talented and have skills sets that are in the highest demand.

### Advice

*To get started:*

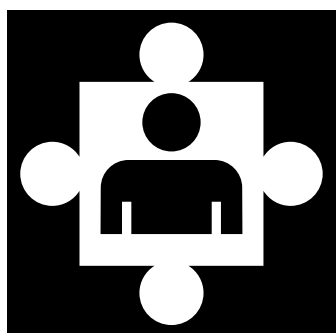
- Be proactive. Ensure that institutional management is aware of hiring and retention risks before they become active problems. Draft a

staffing strategy and communicate the institutional impact of failing. Identify the greatest retention risks (staff or roles), and create plans to respond to retention issues before they happen.

- Solidify the partnership with HR. Educate HR leaders about the problem, help them understand what's needed from them, and continually reinforce the importance and value of their help.
- Review, update, and consider restructuring IT job families and job descriptions to accommodate current and future workforce needs. Identify technical and nontechnical roles and skill sets needed to manage external suppliers as well as run internal IT services.
- Change the focus of the value of the IT organization from technology to talent. Organizations can spend more time and care creating the best environment for servers than for staff.
- Play an active role in hiring. The easiest way to change culture is through hiring, and leaders need to be engaged in that process.

*To develop further:*

- Continually reskill IT staff and instill in them an ability to adapt to a fast-changing sector. No job is for life, and no technology can sustain an entire career.
- Develop a continuous-improvement process to know how engaged staff are and why (or why not). Use the results to make meaningful and lasting changes, or don't bother with a survey. Staff will be watching, and failing to



candidly communicate results and to respond will backfire by reducing engagement.

- Consider whether the entire workforce is reflecting and reinforcing the expected culture. Culture is difficult to change and uphold. Leaders should continually specify behaviors and actions that support organizational values and give managers and professionals timely feedback.
- Don't let a crisis go to waste. Regulations can provide an opportunity to improve working conditions and job descriptions. Retirements and resignations can offer the latitude to restructure jobs and the organization.
- Ensure that the workforce is diverse. For example, it is not uncommon for IT departments to have a staff base with 75 percent over the age of thirty, so imaginative use of graduate recruitment, internships, and apprenticeships is needed.<sup>23</sup>

*To optimize:*

- Constantly reskill IT leaders to ensure succession planning and to create digital leaders who understand the business, the emerging technologies, and the current internal capabilities in order to identify opportunities.
- Invest in managers. Supervisors have the most impact on staff engagement and retention. Good managers will have high-performing, happy, and long-term staff. Bad managers run through talent and damage the entire organization. Caring about the management team means that the management team will care about their direct employees.
- Look beyond higher education to learn more about high-performing organizations and exemplary IT workforce management in other industries.
- Share successes with peers and the entire field. Teaching is the best way to learn.
- Encourage resource management so that you know who you have, what skills they have, and what they are available to work on.



## Issue #9: Next-Gen Enterprise IT

*Developing and  
implementing enterprise  
IT applications,  
architectures,  
and sourcing strategies to  
achieve agility,  
scalability,  
cost-effectiveness, and  
effective analytics*

Gerard W. Au and Kirk Kelly

**B**uildings should outlive alumni; technology shouldn't. Today's higher education enterprise systems are often older than today's college students. About four in ten ERPs were part of a technology baby boom influenced by Y2K remediation. Another 20 percent or so are even older. Enterprise applications based on design principles from the 1980s and 1990s are commonplace.<sup>24</sup> Those systems are not keeping pace with institutions' and constituents' demands—for data, data integration, and mobile access. Because those solutions don't offer modern interfaces and processes,

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institutions are bolting on many, many other solutions to fill the gaps and meet needs. And because those solutions were highly customized to support higher education's idiosyncratic ways of working, they have created an ongoing maintenance drag on IT staff and budgets—along with dread over the prospect of replacing them. Every year, their shortcomings become more apparent. In particular, the gaps and overcustomization of student systems are hindering institutions.

IT leaders are examining core enterprise applications, including ERPs (traditionally, suites of financial, HR, and student information systems) and LMSs, for their ability to meet current and future needs. Although the needs and problems are clear, the solutions are not necessarily obvious or easy.

### Who Outside the IT Department Should Care Most about This Issue?

- The academic community, because student success efforts depend on (1) student systems that are easy to use and full-featured and (2) data from core enterprise systems

### The Misconceptions

- The size of the challenge is easily managed. (Changing core enterprise applications, or even taking current systems back to baseline or moving them to the cloud, will be disruptive, time-consuming, and expensive.)
- The IT environment is not overly complex. (Adding new “bolt-on” solutions and integrating applications is not like assembling Lego bricks. Cloud architecture adds additional complications, because it also entails interfaces with network topography.)

### The Risks

- Participating in a cultural pushback to the perception that standardizations are “changing higher education operations into a business,” when the

aspiration is to help higher education find efficiency.

- Overemphasizing privacy and security and losing the opportunity to use personal information to improve student experiences, productivity, and outcomes. Privacy and security are important, but so is student success. A balance must be achieved.
- Moving institutional data to the cloud. Original core ERP solutions used to be the source of most institutional data. But business intelligence initiatives weren't mature enough to support effective analytics algorithms and interfaces. Although today's analytics and initiatives are mature enough, institutional data has dispersed, including to the cloud. Institutions are struggling to get data back from the cloud.
- Moving forward in a changing marketplace. Big ERP vendors are trying to modernize, new vendors are entering the market, and institutions' choices are based as much on solution provider roadmaps as on existing products. The outcomes and best choices are still uncertain. This uncertainty and flux introduces enormous risk related to functionality, cost, and timelines.
- Standing still. Not doing anything puts an institution further behind. Institutions need to act, and they need to recognize that modernizing the enterprise application architecture, experience, and portfolio will likely take years.



### The Opportunity

An institution that can develop a next-gen enterprise IT environment will be able to boil some administrative costs out of the institution with a standard system that works well. Newer systems offer the opportunity to reengineer and simplify work, rather than reengineer systems and keep the work unchanged. The savings can be applied to systems that make it easy for students to succeed and that emulate today's commercial digital interfaces, which use AI (artificial intelligence) to advise and guide consumers.

### Advice

*To get started:*

- Ensure shared leadership between IT and business areas and make  
*(continued on page 48)*

“We spend a lot of time modifying, and I would move heaven and earth to get back to baseline. We don't need to distinguish ourselves because of our HR system.”

—Kirk Kelly, Associate Vice President and CIO, Portland State University

# Enterprise IT Perspectives on the 2017 Top 10 IT

Betsy Tippens Reinitz

**E**ach year, members of the EDUCAUSE Enterprise IT Program<sup>1</sup> Advisory Committee share their thoughts about the Top 10 IT Issues. This year's list includes one issue so central to the enterprise IT community that committee members chose to focus solely on it:

*Issue #9: Next-Gen Enterprise IT: Developing and implementing enterprise IT applications, architectures, and sourcing strategies to achieve agility, scalability, cost-effectiveness, and effective analytics*

What is *next-gen enterprise IT*, and how might it play out differently among various types and sizes of institutions? Four committee members share their thoughts and offer advice on how to approach this issue:

- **John Barden**, Deputy CIO, University of Rochester
- **William E Morse Jr.**, Vice President and Chief Information Officer, Pomona College
- **Michael Quiner**, Chief Information Officer, Linn-Benton Community College
- **Mitchel Rogers**, Director, Financial Systems Solutions, Harvard University

## What does *next-gen enterprise IT* mean to you?

**Quiner:** In the classic Christmas movie *Miracle on 34th Street*, Kris Kringle, working as the Macy's department store Santa, starts telling shoppers about the alternative stores and shops where they can find items that are not available at Macy's. This is an example of the philosophy and structure of the next-gen enterprise IT. The new baseline for enterprise IT is to anticipate the needs of the institution and look outside the services and systems traditionally found in the IT department. It is about more than collaboration, although that is a big component. The new model requires networking throughout the institution and the higher education ecosystem to collect data and resources. The new goal of enterprise IT is to make the college's "Christmas list" a reality by looking beyond what our campus already has on our IT shelves and by becoming a broker instead of a single-service provider.

**Barden:** Next-gen enterprise IT represents the outcome of the consumerization of information technology and the expanding footprint of technology-enabled processes. In this dynamic environment, there is an increasing need for the IT department to be a strong partner in stitching together comprehensive solutions from a variety of solution and service providers that are responsive to institutional goals.

**Rogers:** I see it as optimizing administrative and technical resources in a way that allows the maximum allocation of

money and people to the institution's mission. Spend less money and time on technology and more money and time on teaching and research. Next-gen enterprise IT also highlights the importance of raising the bar on IT staff business competencies and providing more integrated training for administrative staff on core competencies such as business process and data management.

**Morse:** Administrative systems no longer simply provide transactional services limited in scope and ability. New technologies are enabling colleges and universities to greatly expand their offerings while at the same time providing incredibly important information in the form of analytics. Today's modern systems make it possible to integrate a myriad of "micro best-of-breed" solutions that cover practically every possible function of a modern institution in very tailored ways. Everything—from personality matching of roommates to specific applications to help enable student success—is now possible. And because these solutions are almost always located in the cloud, they can be deployed without overly burdening IT staff. Further, through data-integration efforts, the resulting analytics generated by these applications can then be funneled back into predictive analysis for student success. It is a different world, one that requires a rethinking of what the traditional college/university administrative support unit should do and be. However, the rewards can be amazing!

## How does this issue play out in different types or sizes of institutions?

**Rogers:** Harvard is admittedly less resource-constrained than most institutions (though more resource-constrained than commonly thought, I would guess). Also, Harvard is even more decentralized than most, which can make it challenging to fund enterprise-wide initiatives. But if a strategy that supports the mission of the institution can be demonstrated and communicated, it's possible to gain traction for institution-level enterprise investments, especially if a case can be made for cost reduction or containment so that more funds can be applied to the missions of teaching and research.

**Quiner:** Community colleges have the strengths of extremely variegated student populations and close ties to regional communities, including businesses. One of their weaknesses is that their IT resources and budgets are severely restricted. Community colleges can look to make their enterprise IT more sustainable by taking a page from the private schools that know how to energize and capitalize on their alumni base. Looking at the relationships, we have to make up for lack of resources.

**Morse:** The services needed by administrative systems are, at core, the same regardless of the size or type of institution. In the past, larger institutions with larger budgets have been

able to buy and support far more complex systems and, thus, make their offerings far richer. However, with systems moving to the cloud using the software-as-a-service model, I suspect a great leveling of the playing field. After all, functionality will be more standard, and any institution using the service will have the same access to that functionality. The differences, then, will be in the richness of the variety of third-party solutions used in addition to the core system and in the capability of the analytics tools. I believe every institution should invest in these services from a strategic perspective so that, in the end, the differences will not be as great as they once were.

### Where do you start?

**Morse:** Administrative systems are today at an inflection point. The move to software-as-a-service is inevitable as institutions standardize core operational processes. However, with this change comes great opportunity, particularly with analytics and an expanded scope of functionality. All institutions should be looking at what is coming with administrative systems and should be starting to think about how those systems can be made a strategic asset to their institution.

As with any other initiative, the first step is to talk with key stakeholders about what these various support systems could be. What are the outcomes we want? What resources do we want to make available to our community? What are we missing today? The answers to those questions will enable an institution to develop an architecture to achieve those outcomes and goals. For example, if a desired outcome is analytics or predictive analysis, then the resources needed and the way systems are integrated must be carefully architected. If the goal is to be able to manage a variety of outside tools to enhance the core administrative system, then further deliberate consideration is required.

Modern systems also mean that IT departments need to rethink what is needed for administrative system support. With the core systems moving to the cloud, critical team skills now include application integration, data architecture, and analytics. In addition, to manage the ever-increasing scope of potential opportunities, IT departments would be wise to deploy project management and structured engagement with key stakeholders so that they are aware of the needs and desires of various units and can manage the project portfolio. Finally, security and contract awareness are must-have skills in this new world of administrative systems.

**Rogers:** Start with alignment with regard to enterprise IT strategy, demonstrating how it supports the core institutional

mission. Next, focus on three to five critical topic areas such as procurement, people, space, administrative and institutional data, and business process optimization.

**Barden:** This is very much an evolution, since most of these trends have been developing for a number of years. IT organizations that have not already done so should look carefully at their IT governance models, sourcing strategies, and internal readiness to support an increasing pace of change and heightened systems dependency.

### What other advice would you give about this issue?

**Rogers:** Always support and tie back to the institutional mission. Abandon anything that does not support that mission.

**Barden:** Focus on the institutional goals, and recognize the potential opportunity in advancing collaboration. Be active and transparent in helping your individual team members understand and prepare for the role changes inherent in these shifts.

**“The new baseline for enterprise IT is to anticipate the needs of the institution and look outside the services and systems traditionally found in the IT department. It is about more than collaboration, although that is a big component.”**

**Morse:** Pay attention to it! These changes are coming. Every vendor is moving in this direction, and every institution should be looking at what these opportunities will bring. This does mean we are in for a period of disruption from both a services and an IT support model point of view. However, in the end, administrative systems will become a far more important strategic asset to institutions—and so will the IT organizations that support those systems.

### Note

1. The EDUCAUSE Enterprise IT Program (<http://www.educause.edu/enterprise-it-program>) helps to make campus enterprise IT more informed, efficient, and strategic.

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**Betsy Tippens Reinitz** is  
Director of Enterprise IT  
Programs for EDUCAUSE.

(continued from page 45)

the IT organization a key partner throughout the process. Whether you select a new solution or move to the cloud, all implementations entail significant business process change. Help stakeholders understand the risks and costs entailed in customizations so that they will support the project when they get pushback from staff whose work will change.

- Avoid application and system modifications: They create a permanent burden and an ongoing risk.
- Know your own data, including the needed flows and integrations.
- Know the total cost of running applications on-premise so that it can be compared to the cost of cloud-based solutions. Be clear about both the total cost of ownership and the actual savings that a move to the cloud will deliver. The ECAR total cost of ownership (TCO) framework is a useful tool.<sup>25</sup>

To develop further:

- Concentrate on improving the student experience and on achieving institutional strategic priorities.
- Carefully think through the technical impact of moving to the cloud, to avoid underestimating the effort and costs.



- Find collaborators. The majority of higher education institutions are facing this challenge. This might be an ideal time to consider collaborations that could save time and money and even generate better solutions.

To optimize:

- Share your story as a leading innovator to help advance the field. Higher education is still in the thick of this journey, and it's not clear institutions have reached this stage yet.



## Issue #10: Digital Transformation of Learning

*Collaborating with faculty and academic leadership to apply technology to teaching and learning in ways that reflect innovations in pedagogy and the institutional mission*

Rebecca Frost Davis, Deborah Keyek-Franssen, Eric Sakai, David Starrett, and Aimee Whiteside

**O**ur world has been transformed by technology. The emerging digital ecosystem makes creation and publication easy, is characterized by networks that are largely social, and is providing ready access to data driven by algorithms that personalize information for users and that inform human judgment. What would higher education look like if we were building it from scratch in the context of digital culture?

The digital transformation of learning is moving beyond using online replacements for traditional face-to-face teaching toward applying existing and emergent

tools for extraordinary results.<sup>26</sup> Colleges and universities are at a particularly good point in time to improve teaching and learning across the board—from face-to-face to hybrid to online—because the new technologies are making us ask questions about the best ways for students to learn.

Personalized learning “provides a unique, highly focused learning path for each student.” It uses “IT systems and tools to tailor learning experiences based on student strengths, weaknesses, and pace of learning. Technologies including analytics, adaptive learning, digital courseware, and others underlie personalized learning, which builds a ‘profile’ of each student and makes continual adjustments to learning paths based on student performance. It also provides information to help instructors better target their teaching to individual students.”<sup>27</sup> According to Michael Feldstein and Phil Hill, personalized learning applies technology to three processes: content (moving content delivery out of the classroom and allowing students to set their pace of learning); tutoring (allowing interactive feedback to both students and faculty); and contact time (enabling faculty to observe students’ work and coach them more).<sup>28</sup>

The digital transformation of learning begins with faculty: helping them understand the ways students benefit from technology-enhanced teaching; and partnering innovative faculty members with IT staff, educational technology staff, teaching and learning centers, and other key units to create and then share and apply success stories.

### Who Outside the IT Department Should Care Most about This Issue?

- Faculty, because they may have to rethink how they teach and design courses/curricula
- The chief academic officer, to lead the academic community and advocate for appropriate resource allocation
- Department chairs, curriculum directors, and the curriculum committee, to help think through curricular implications and changes

“I recently attended a campus technology session and learned about a tool called Hypothes.is. Afterwards, I immediately redesigned one of my own lessons. As a result, the students were engaged in a meaningful, interactive digital activity that reinforced key concepts and learning outcomes in a fun, memorable way.”

—Aimee Whiteside, Assistant Professor, the University of Tampa

- Teaching and learning center (or related faculty development) staff, to provide the expertise and support needed

### The Misconceptions

- The digital transformation of learning can be achieved at a course level with a few innovative instructors and is optional for others. (Transformative initiatives will entail integrating technology into the curriculum through repeated assignments, building to signature work where students integrate and apply their learning to complex problems.)
- Teaching and learning will proceed the same as always, just with some technology added. (New and scalable technologies are not simply porting the institution into a new technology environment; they are transforming the curriculum and the institution itself.)
- Technology provides a different, but not really better, way of teaching and learning. (Evidence of the impact of technology on teaching and learning can be difficult to demonstrate unless the faculty member has the time and expertise to conduct a comparative study. Yet research demonstrates a multitude of benefits.<sup>29</sup> Ultimately, faculty members need to know that their institutional leadership is willing to invest in them, so that they can invest in innovative student learning.)

- The IT organization is trying to foist doo-dads on faculty and students simply for technology’s sake.

### The Risks

- Not getting sufficient buy-in upfront and failing to maintain ongoing communication with all stakeholders. Faculty, in particular, need extensive outreach to accept and influence the initiative, because it will fail without their active support.
- Underscoping the initiative. If it is scoped as online content delivery only, for example, or in some other way as an adjunct to the “real” teaching and learning activities, the investment will fail and will impede true digital transformation.
- Failing to realize the unintended consequences for higher education. There is no doubt that transforming the core mission of higher education will change things in unpredictable ways. Some concerns today are very dark, including concerns about needing far fewer faculty, curtailing faculty autonomy, and promoting alternative credentials that will render colleges and universities less important and numerous. Higher education is changing, and that is partly due to technology. Some faculty, institutions, students, and innovators will benefit enormously, while others will not.

- Not changing. A few, particularly elite, institutions may be able to afford to selectively integrate technology into their existing teaching and learning programs. For the majority of colleges and universities, failing to act is a risk. The risks include lower student digital literacy and the loss of innovative faculty and uninspired or undersupported students to other institutions, which could ultimately lower the institution’s reputation and enrollment. Technology can facilitate active learning, and we know active learning benefits students. It’s been said that if research comparing active learning with traditional lectures were a drug trial, it “may have been stopped for benefit—meaning that enrolling patients in the control condition might be discontinued because the treatment being tested was clearly more beneficial.”<sup>30</sup>
- Failing to keep pace. The world is changing and is adopting technologies. Higher education needs to keep up, or alternatives will marginalize higher education.

### The Opportunity

Institutions that excel will become role models for transformative learning and will be more attractive to prospective students and faculty. Faculty and student engagement and retention will increase. Students and faculty will be more engaged and intrinsically motivated. Their pride in and identification with the institution will increase, which could also create more dedicated alumni. Improving technology-enhanced pedagogy should increase students’ digital competence and improve their ability to further integrate technology into their postgraduate lives. More students will achieve credentials, but just as important, they will be attaining the right learning outcomes. Students may be more likely to return to higher education for postgraduate degrees and certificates because they both enjoy and value their higher education experiences more.



# Teaching, Learning, and IT Issues:

Veronica Diaz and Malcolm Brown

## Advice

*To get started:*

- Ensure that this is an active and major priority for the Chief Academic Officer. Without engaged leadership, this initiative's impact and success will be limited.
- Build consensus and competence around this goal. Involve all relevant stakeholders (faculty teaching excellence center, academic support services, student support services, library, business office, registrar), because they will have the credibility and the capability to envision opportunities and identify requirements and risks.
- Inventory and identify the learning ecosystem and consider how it might be made available universally. This goes beyond the traditional classroom, whether it is face-to-face or online and beyond the traditional learning management system.
- Focus on faculty buy-in. Find prospective exemplars and advocates among the faculty, such as early adopters or excellent teachers. Offer them the ability to join a fellowship program, and support their ideas with time, training, and professional development. Encourage faculty engagement by finding incentives that fit the faculty rewards system. Peer mentoring—opportunities for faculty to work with colleagues one-on-one—is an effective approach for promoting and supporting technology innovations.

*To develop further:*

- Don't lose sight of the goal. Even with a sense of urgency, digital transformation of learning entails changing the very heart of academic culture. That takes time.
- If you haven't already done so, don't forget to include students as stakeholders and strategic partners. They have great ideas, know what works for them, and can help influence the faculty.
- Formalize faculty involvement through a teaching and learning

As this year's EDUCAUSE Top 10 IT Issues list makes clear, student success has become a strategic focal point for many higher education institutions. The concept of student success is itself multidimensional: it includes success not only in academic coursework but also in degree planning, constructing next-generation digital learning environments and resources, and supporting a range of what the National Survey of Student Engagement (NSSE) calls high-impact practices. Increasing student success requires institutional attention to all of these areas. Although challenging, improvements made in these areas, if done in tandem, can result in academic transformation: innovation and change that is multidimensional and strategic and that addresses campus culture.

The results of the Key Issues surveys from the EDUCAUSE Learning Initiative (ELI)<sup>1</sup> over the past two years clearly indicate that the teaching and learning community is focused on this idea of *academic transformation*: it was the #2 issue in 2015 and the #1 issue in 2016.<sup>2</sup> Below we will identify some of the important intersections between the EDUCAUSE Top 10 IT Issues and the ELI Key Issues for 2016. This side-by-side comparison makes it clear that with these concepts of student success and academic transformation, the IT community and the teaching and learning community share a common agenda.

The EDUCAUSE Top 10 IT Issue #2 (*Student Success and Completion*) closely aligns with several of the ELI Key Issues. Through the 2016 Key Issues survey, teaching and learning community members identified several building blocks supporting student success: assessment of learning (Key Issue #3), adaptive learning (Key Issue #12), learning analytics (Key Issue #5), and academic transformation (Key Issue #1). Taken together, these are all necessary components that speak to the increased collaboration needed across campus

units and stakeholders to make progress on student success. At many institutions, campus organizations are working to develop and deploy a student success technology ecosystem that creates shared ownership for educational progress by providing students, faculty, and staff with holistic information and services that contribute to the completion of a degree or other credential. As an example, Integrated Planning and Advising for Student Success (iPASS) initiatives are designed to coordinate the efforts to monitor, understand, and act on these factors to promote higher rates of student achievement and success. This illustrates the point that in order to make progress on these particularly challenging issues, we must establish cross-organizational collaborations, involving key stakeholders who support learners all along their experience.

Many of the ELI Key Issues intersect squarely with the EDUCAUSE Top 10 IT Issue #3 (*Data-Informed Decision Making*) and Issue #6 (*Data Management and Governance*). While data-informed decision making and the related data governance issues are becoming more common in all facets of higher education, perhaps the most important intersection is with the ELI Key Issue #3 (assessment of learning). The importance of learning assessment to student success is intuitively clear. One domain where this is becoming evident is instructional design. As applications begin to deliver near-real-time learning data back to the instructor and the instructional designer, they both are increasingly enabled to introduce improvements in the course design, even as the course unfolds. Both ELI Key Issue #5 (learning analytics) and #10 (next-gen digital learning environments and services) provide further points of intersection. For example, on the management side, new open standards for learning data (e.g., the Caliper Analytics standard from IMS Global) provide a kind of Esperanto for learning data, enabling all learning

# Priorities and Intersections

applications to contribute to an institutional learning record “store,” which in turn provides the basis for richer and more thorough analyses. For this idea to succeed, all technologies associated with these services are highly dependent on effective data practices.

*Strategic Leadership*—repositioning or reinforcing the role of IT leadership as a strategic partner with institutional leadership—is #4 on the EDUCAUSE Top 10 IT Issues list. The teaching and learning community identified several Key Issues that support institutional strategic leadership but point as well to several organizational units beyond the IT department. Academic transformation (Key Issue #1) describes a reorientation around learner success through new course models (online and blended learning, Key Issue #4), learning space design (Key Issue #6), and assessment of learning (Key Issue #3). As we’ve stressed, many factors are involved in leading academic transformation, including a focus on stakeholder-centered design, relevance of credentials, and the strategic use of technology. Teaching and learning is central to academic transformation. Faculty development (Key Issue #2) supports faculty as they explore new modes of instructional delivery and experiment with technology-enabled enhancements. Faculty development programs are becoming more adept at demonstrating return on investments and offering recognition to faculty, sometimes in the form of digital credentials, as they expand their ability to create successful learning engagements enabled by the strategic use and development of technology.

*Digital Transformation of Learning* (EDUCAUSE Top 10 IT Issue #10) strongly echoes ELI Key Issue #1, academic transformation. This common use of the term *transformation* makes explicit just how aligned the results of these two surveys are. We’ve already sketched out points at which the ELI Key Issues intersect with the EDUCAUSE Top 10 IT Issues on the theme of transformation. Additional examples include accessibil-

ity and universal design for learning (Key Issue #7), which moves away from the more piecemeal approach of focusing on accessible content and aspires to create learning designs that work for all. Similarly, the goal of the next-gen digital learning environments and services (Key Issues #10) is to replace sole reliance on the LMS and instead introduce a component-based architecture for learning technology, enabled by adherence to open standards.

**An institution must be pursuing innovation in all of these individual dimensions so that, when orchestrated together, they result in transformation that is strategic and institutional in scope and impact.**

As important as each of these issues are, not one of them can, by itself, accomplish true academic transformation. An institution must be pursuing innovation in all of these individual dimensions so that, when orchestrated together, they result in transformation that is strategic and institutional in scope and impact. Such transformation also entails cultural change, requiring both IT and academic leaders to work together to realize these institutional aspirations. This is why EDUCAUSE has collaborated with teaching and learning leaders to establish a community of practice—Leading Academic Transformation—for campus leaders engaged in such transformative work on the academic side.

Clearly, the most significant teaching and learning innovations necessitate cross-organizational collaborations, cohort-based leadership, and institutional community building. This evolution of the academy, along with the evolution of the profession (Key Issue #15), has the potential to transform our cultures, from the classroom to senior leadership. The interests and mission of the IT organization and of the teaching and learning community converge, since making progress on core organizational

challenges will require the integration of an ever-wider range of resources and skills. These points of contact between the key teaching and learning issues and the top IT issues can provide the basis for strategic and tactical discussions between the IT organization and a cohort of campus organizations supporting teaching and learning. Each serves to illuminate the other, providing a better sense of direction as we move forward in support of student success.

## Notes

1. ELI (<http://www.educause.edu/eli>) is a community of higher education institutions and organizations committed to the advancement of learning through the innovative application of technology. The program has three pillars: learners, learning principles and practices, and learning technologies.
2. Since 2011, ELI has surveyed the higher education teaching and learning community to identify its key issues. The community is wide in scope: we solicit input from all those participating in the support of the teaching and learning mission, including professionals from the IT organization, the center for teaching and learning, the library, and the dean’s and provost’s offices.

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technologists group of faculty who are adopting and advocating.

To optimize:

- Review support, incentives, and disincentives (implicit as well as explicit) for faculty, and adjust them to help create a campus culture of innovation and to cultivate a love of teaching and learning for faculty and students alike.
- Ensure that processes are in place to constantly monitor and adapt to the changing ecosystem.
- If it isn't in place already, define and institute metrics to measure progress and success. Create processes to monitor the metrics, publicize them to stakeholders, and act on them.
- Share expertise and experiences online and at meetings and events to connect with other innovators and to help the entire sector grow.

## Conclusions

The EDUCAUSE community selected the Top 10 IT Issues from a slate of 18 issues identified by the IT Issues Panel members. The following is the list of 8 issues that did not make the overall Top 10, in order of priority:

- *Next-Gen IT Workforce*: Creating an adaptive IT organizational structure, staff roles, and staff-development strategy to support innovation and accommodate ongoing changes in higher education, IT service delivery, technology, analytics, and so forth
- *Change Leadership*: Partnering with institutional stakeholders to address the velocity of change while minimizing change fatigue across the institution
- *Faculty Adoption of Technology*: Promoting faculty adoption of technology in teaching through training, advice, incentives, and other support
- *IT Partnerships*: Developing partnerships for sharing IT services, platforms, and resources across a campus or with multiple institutions

- *Identity Management*: Adopting system-wide identity management systems
- *IT Service Management*: Adopting an IT service management (ITSM) approach to improve the IT organization's efficiency and effectiveness
- *Online Education*: Providing scalable and well-resourced services, facilities, and staff to support online education
- *Digital Transformation of Scholarship and Research*: Providing scalable and well-supported services, resources, and staff to accommodate advances in digital scholarship and research

In addition to the overall Top 10 list, the EDUCAUSE Top 10 IT Issues website publishes Top 10 lists for three institutional subgroups:

1. *Carnegie classification*: Associates; Bachelors; Private Masters; Public Masters; Private Doctoral; Public Doctoral; and non-U.S.
2. *Institutional size*: less than 2,000 FTEs; 2,000–3,999; 4,000–7,999; 8,000–14,999; and 15,000+
3. *Institutional approach to technology adoption*: early; mainstream; and late adopter

Of the 8 issues that did not make the overall list, 5 appeared on the Top 10 lists for various types of institutions: *Next-Gen IT Workforce*; *Change Leadership*; *Faculty Adoption of Technology*; *Identity Management*; and *Online Education*.

## International Differences

Student success appeared on each group's Top 10 list except that of non-U.S. institutions. The forces driving student success initiatives are particular to the United States. Although students' higher education expenses are increasing in other countries as well, more than 40 countries do not charge tuition at all. And student debt in the United States is higher than in other countries. That is due to decreased support and subsidies for higher education in both private and public institutions, raising the costs for students and parents. The U.S. graduation rate ranking among OECD member

countries has slipped as well. Although 39 percent of American students graduated in 2012, compared with only 33 percent in 1995, the graduation rates in other countries have grown faster. The U.S. graduation rate rank dropped from 1 to 19 (of 28 countries) in the same time frame.<sup>31</sup>

Although non-U.S. institutions did not rank student success among their top IT issues, they rated the other academic IT issues higher than U.S. institutions. Non-U.S. institutions rated *Digital Transformation of Learning*, *Online Education*, *Faculty Adoption of Technology*, and *Digital Transformation of Scholarship and Research* at least 0.5 points higher (on a 10-point scale) than did U.S. institutions. Particularly noteworthy, they rated *Digital Transformation of Scholarship and Research*—at the bottom of the U.S. list of all 18 issues—1.3 points higher.

Limited resources is a global challenge. The issues that U.S. and non-U.S. institutions rated most similarly were *Sustainable Funding* (issue #5), *Higher Education Affordability* (issue #7), and *Next-Gen IT Workforce* (issue #11).

## IT Staff or the IT Organization?

Of the 18 IT issues selected by the EDUCAUSE IT Issues Panel, 2 pertain to the IT workforce: *Sustainable Staffing* (issue #8) and *Next-Gen IT Workforce* (issue #11).

*Sustainable Staffing* concerns the challenges of sufficient staff levels, and *Next-Gen IT Workforce* emphasizes the organizational structure and roles needed to address today's challenges. Some types of institutions (doctorals and institutions that tend to be early adopters of technology) were more concerned with optimizing the IT organization, so *the Next-Gen IT Workforce* issue appeared in their group's Top 10 list. Late adopters, the smallest institutions (less than 2,000 FTEs), and medium-sized institutions (4,000–7,999 FTEs) prioritized attaining sufficient staffing levels (*Sustainable Staffing*) over optimizing the IT organization. Neither IT workforce issue appeared on the Top 10 list for the largest institutions

(15,000+ FTEs). Size can be a buffer and lessen the impact of the loss of an IT professional. Larger IT organizations also have more leeway for structuring the organization and for creating specialized roles than do smaller organizations, where staff must play multiple roles.

An institution's approach to technology adoption might mitigate the effect of institutional size. Early, mainstream, and late adopters are found among all types and sizes of institutions. So although most small institutions are more focused on *Sustainable Staffing* than on the *Next-Gen IT Workforce*, perhaps the early adopters among them have been able to achieve sufficient staffing levels through more institutional support or a more exciting workplace for IT staff.

### Road Bump Ahead for Student Success?

Today's student success initiatives are largely powered by analytics. The use of analytics and algorithms to trigger actions and decisions is still emergent in our ecosystem. The promise is great, and the number of success stories is increasing. Moving from anecdote and intuition to data is a powerful change and could help reduce bias, inconsistency, and uncertainty as well as ensure that attention is paid to all students and learners in the ways and at the times they need.

Yet there is evidence that we are slipping into the so-called Trough of Disillusionment.<sup>32</sup> It turns out that analytics

is hard, time-consuming, and expensive. Institutions are facing trade-offs between highly flexible and comprehensive solutions that require significant time and expertise and dedicated solutions that are easier to implement but have narrow benefits. Some institutions find themselves caught in what feels like an analytics arms war, in which they continue to invest in more tools but still don't have the answers and outcomes they need. Data integrations require considerable effort and stakeholder negotiations. This can be a surprise to those who had never thought that getting all the right data in one place would be so difficult. Will this generation of analytics implementations come to resemble the turn-of-the-century ERPs, from which we learned a great deal at great cost?

Even more concerning is research showing how biased algorithms can be, in subtle and profound ways.<sup>33</sup> Colleges and universities are adopting analytics tools with proprietary and hidden algorithms. As those algorithms begin to be put to consequential use—to advise students and others on majors or courses or their likelihood of success—possibilities arise of Type I (false positive) and Type II (false negative) errors that could worsen outcomes for some students. Even if many more students benefit from an algorithm, that won't lessen the impact for those who are on the wrong side of the algorithm, and publicity tends to emphasize the edge cases. If institutions

are applying algorithms they don't fully understand, their exposure to these risks could go undetected until the damage has been done.

### We're All in This Together . . .

For each of the Top 10 IT Issues, panelists were asked: "Who outside the IT department should care most?" Their consistent initial response was, "Everyone needs to care!" And indeed, most of the 2017 Top 10 IT Issues involve numerous constituents. Panelists found it relatively easy to identify the most important stakeholders but harder to determine who was *not* affected by each issue.

The IT function could be described as a microcosm of the entire institution, touching all areas, all constituents, all concerns. Yet the IT department can achieve very little on its own. Whether as co-designers, funders, partners, or contributors of data and good security practices, all members of the institution can affect the IT organization's successes and failures. EDUCAUSE members understand and have embraced this connection.

The distinction between the priorities of the IT organization and those of the institution is blurring, and panelists were very conscious of that. Frequently they remarked: "This is not an IT issue . . . yet it's one of the Top 10 IT issues." Over the years, the EDUCAUSE Top 10 IT Issues have become centered more on the institution's priorities and needs and less on the requirements for running the IT organization. Consider the Association of Governing Boards top strategic issues for college and university boards in 2016–2017.<sup>34</sup> The EDUCAUSE Top 10 IT Issues can translate to or support each of the AGB strategic issues (see table 1). IT strategy and institutional strategy are tightly coupled.

### . . . Yet It's Not One-Size-Fits-All

Every college and university is considering or addressing the same kinds of technologies (e.g., cloud, analytics, and

**TABLE 1. Mapping of EDUCAUSE and AGB Top Issues**

EDUCAUSE Top 10 IT Issues	AGB Top Strategic Issues for Boards
Information Security	Campus Safety
Student Success and Completion Data Management and Governance	Student Success and Completion
Higher Education Affordability Sustainable Funding	The Value Proposition
Digital Transformation of Learning Strategic Leadership	The Academic Workplace The Changing Environment for Higher Education
Next-Gen Enterprise IT	The Partnership Imperative
Data-Informed Decision Making	The Business Model
Sustainable Staffing	Diversity and Inclusivity

**TABLE 2. The Top 10 IT Issues and Student Success**

IT Issue	What Does the Future Look Like If We Get This Right?
1. Information Security	Constituents will be able to use their information assets unimpaired to fulfill the missions of the institution.
2. Student Success and Completion	We're helping more students achieve the dream of graduation, which hopefully translates into success in their careers.
3. Data-Informed Decision Making	Our campuses will be efficient, and we will have more student success. All of this will be better for our institutions and for society. Higher education suffers from a bad public image about college completion, so effectively using our data could help combat this.
4. Strategic Leadership	Higher education has major challenges: affordability, effectiveness, even relevance. If IT leadership is contributing positively and continuously to institutional strategy, higher education's ability to address those challenges will improve. Ultimately, higher education will be helping prepare the next generation affordably, which will make a positive impact everywhere.
5. Sustainable Funding	IT and institutional leadership will be able to engage in other discussions about using information technology to improve value, competitiveness, and innovation rather than continuing to talk about sustainable funding.
6. Data Management and Governance	We might be able to bring the cost curve down for higher education if we're able to apply data effectively to taking better advantage of the resources that we have. At the end of the day, this has to be about reducing the cost and burden that we put on our students, and if we get this issue right, we have a better chance of doing that.
7. Higher Education Affordability	Institutions will be able to continually make investments, innovate, improve service, and lower costs for students.
8. Sustainable Staffing	Institutions will be able to do more with less.
9. Next-Gen Enterprise IT	Higher education will have modernized its enterprise application infrastructure, offering students and faculty a platform to manage their entire lifecycle—from prospects to graduates to alumni, from grant application to funding to publication. Campus experiences like residential life and parking will be similarly improved. Interactions with the institution will be easier and, advised by analytics, more fruitful. End users will have access to more and better data, which will facilitate better decision making. Enterprise IT sounds geeky and dull, but it can and should contribute to student success.
10. Digital Transformation of Learning	Designing education to improve critical thinking analytical skills in terms of today's digital learning culture will better prepare students for their personal, professional, and civic lives. At the same time, higher education will be modeling the competencies students need and the world they are entering. More students will achieve credentials, but just as important, they will be attaining the right learning outcomes.

NOTE: Student Success connections are in bolded text.



information security) and the same general applications of technology (e.g., education, student success, and efficiency). Yet their approaches vary. Small private colleges do not have the same resources and scale to apply to a cloud or analytics strategy as do larger public universities. Liberal arts colleges have their own philosophy about the use of technology in teaching and learning. Public institutions are accountable to state and county governments and often have the opportunity (and sometimes imperative) to share services. Doctoral institutions have numerous stakeholders and often highly distributed IT functions. Institutions with an aggressive approach to

technology adoption will be more willing to take more risks, invest more heavily in technology, and innovate early. General recommendations, resources, and role models are broadly helpful as a starting point, but every IT issue on the Top 10 list plays out differently at each institution, depending on resources, priorities, mission, and culture. Each institution needs to find its own communities to learn from and grow with. Although the large community of EDUCAUSE may at first seem too broad and too general to be relevant, a second, deeper look rewards any institution with opportunities to find peers and exemplars and to achieve a more pertinent cut of the data.

## Building the Future

During our interviews with the members of the EDUCAUSE IT Issues Panel, they consistently highlighted student success as their endgame. For each issue, we asked: “What does the future look like if we get this right?” The panelists spontaneously made a direct connection to student success or, for three issues, an indirect connection via value, affordability, and security (see table 2).

EDUCAUSE members understand their challenge: use information technology to address their institutions’ most pressing priorities. Student success is the most universally important of those priorities. The 2017 Top 10 IT Issues list

identifies the four focus areas for higher education information technology:

- Develop the IT foundations
- Develop the data foundations
- Ensure effective leadership
- Enable successful students

The 2017 Top 10 IT Issues are not just about today. Higher education information technology is very clearly building foundations for student success to last into the future.

### Acknowledgments

This article embodies what is special about EDUCAUSE: members coming together to create new knowledge and insights, supported by EDUCAUSE staff. We are deeply grateful to the EDUCAUSE IT Issues Panel members who shared their thoughts and experiences throughout the year, participated in the interviews that were the basis of each issue description, and then reviewed the article in its entirety. Over 300 members took the time to respond to the IT Issues survey. Without their support, there would be no “Top 10,” and we encourage all eligible readers to participate in future EDUCAUSE surveys.

EDUCAUSE staff collaborate to create this article. Teddy Diggs is a meticulous and simply excellent editor, who improves every article she touches. Pam Arway and others on our data team ensure that the EDUCAUSE research and data in this article are accurate. Most of all, Joanna Lyn Grama not only oversees the IT Issues logistics, she makes crucial substantive contributions and, quite simply, makes this work easy and fun.

### Notes

1. Once a year, members of the EDUCAUSE IT Issues Panel select a slate of 15–20 topics they believe will be the most important IT-related issues facing higher education institutions. EDUCAUSE members receive a survey with those issues and are asked to prioritize them. The 10 issues with the highest-priority scores become the Top 10 IT Issues. This methodology also enables EDUCAUSE to determine the Top 10 IT Issues among various types of institutions. For 2017, of the 10,256 EDUCAUSE member representatives who received an e-mail invitation to complete the survey, 318 (3%) responded.
2. Richard Sluder, “5 Strategies to Implement Successful University-Wide Student Success Initiatives,” *Transforming Higher Ed* (an *EDUCAUSE Review* blog), February 1, 2016.
3. We are defining *student persistence* here as “the percentage of students who return to college at any institution for their second year.”
4. Celeste Schwartz, “Improved Planning and Advising Help Students Succeed,” *Transforming Higher Ed* (an *EDUCAUSE Review* blog), March 16, 2016.
5. Laura Jensen, “Turning Data into Actionable Information at Colorado State University, Part 1,” *Transforming Higher Ed* (an *EDUCAUSE Review* blog), March 28, 2016, and “Turning Data into Actionable Information at Colorado State University, Part 2,” *Transforming Higher Ed* (an *EDUCAUSE Review* blog), March 31, 2016.
6. The EDUCAUSE Core Data Service (CDS) data suggests that significantly more of central IT spending is allocated to administrative areas than to education or research. The 2015 data shows an average of 9 percent of the central IT budget was allocated to educational technology services. This underestimates educational technology spending, which is also contained within more general areas such as IT support and enterprise infrastructure. In contrast, information systems, arguably predominantly dedicated to “administrative” services, accounted for an average 17 percent of the central IT budget. Research computing accounts for less than 1 percent of the average central IT budget.
7. Jeffrey Pomerantz and D. Christopher Brooks, *The Higher Education IT Workforce Landscape*, 2016, research report (Louisville, CO: ECAR, April 2016).
8. Gregory Dobbin, “Building a Common Technology Vision,” *EDUCAUSE Review*, July 25, 2016.
9. EDUCAUSE 2015 Core Data Service (CDS) survey, *CDS Almanac*, February 2016.
10. Kurt Potter, Sanil Solanki, and Ken McGee, “Run, Grow and Transform the Business IT Spending: Approaches to Categorization and Interpretation,” Gartner research, June 27, 2016.
11. Ana Borray, personal communication, October 11, 2016.
12. D. Christopher Brooks, *ECAR Study of Undergraduate Students and Information Technology*, 2016, research report (Louisville, CO: ECAR, October 2016). See also D. Christopher Brooks, *ECAR Study of Faculty and Information Technology*, 2015, research report (Louisville, CO: ECAR, October 2015).
13. See Aimee L. Whiteside, Linda Jorn, Ann Hill Duin, and Steve Fitzgerald, “Using the PAIR-up Model to Evaluate Active Learning Spaces,” *EDUCAUSE Review*, March 26, 2009; Aimee Whiteside, D. Christopher Brooks, and J. Walker, “Making the Case for Space: Three Years of Empirical Research on Learning Environments,” *EDUCAUSE Review*, September 22, 2010; Aimee Whiteside and Steve Fitzgerald, “Designing Spaces for Active Learning,” *Implications* 7, no. 1.
14. Of the 86 technologies that were candidates for the 2017 Top 10 Emergent Technologies, 18 (21%) pertained to teaching and learning; of those, these 6 (33%) made the Top 10 list.
15. Private conversation with the author.
16. Brian Haugabrook, “Planting the Seeds of Analytics,” *EDUCAUSE Review*, September 19, 2016.
17. Eden Dahlstrom, “Moving the Red Queen Forward: Maturing Analytics Capabilities in Higher Education,” *EDUCAUSE Review* 51, no. 5 (September/October 2016).
18. “Technology in Higher Education: Defining the Strategic Leader,” Jisc and EDUCAUSE research report, March 2015.
19. Dobbin, “Building a Common Technology Vision.”
20. Param Bedi et al., *Aligning IT Funding Models to the Pace of Technology Change: Enabling Financial Flexibility for Core, Flexible, and Transformativ Services*, ECAR working group paper (Louisville, CO: ECAR, December 14, 2015).
21. Douglas Blair et al., *The Compelling Case for Data Governance*, ECAR working group paper (Louisville, CO: ECAR, March 17, 2015).
22. Michael Kelly, “The Chief Data Officer in Higher Education,” *EDUCAUSE Review*, June 8, 2015.
23. Pomerantz and Brooks, *The Higher Education IT Workforce Landscape*, 2016.
24. The ECAR 2015 Enterprise Application Market reports use data from the EDUCAUSE Core Data Service (CDS) to better understand how higher education institutions approach various information systems.
25. Teri Abbo et al., *TCO for Cloud Services: A Framework*, research bulletin (Louisville, CO: ECAR, April 24, 2015).
26. Susan Grajek, *Digital Capabilities in Higher Education, 2015: E-Learning*, research report (Louisville, CO: ECAR, 2016).
27. EDUCAUSE Learning Initiative (ELI), “7 Things You Should Know About Personalized Learning,” September 2015, abstract.
28. Michael Feldstein and Phil Hill, “Personalized Learning: What It Really Is and Why It Really Matters,” *EDUCAUSE Review* 51, no. 2 (March/April 2016).
29. Charles Dziuban, Patsy Moskal, and Joel Hartman, *Adapting to Learn, Learning to Adapt*, research bulletin (Louisville, CO: ECAR, September 2016). See also the ELI Seeking Evidence of Impact (SEI) Program, which collects evidence about effective teaching and learning practices to help faculty and administration make decisions about adopting and investing in best practices.
30. Scott Freeman et al., “Active Learning Increases Student Performance in Science, Engineering, and Mathematics,” *PNAS* 111, no. 23 (June 10, 2014).
31. Liz Weston, “OECD: The US Has Fallen behind Other Countries in College Completion,” *Business Insider*, September 9, 2014.
32. Gartner describes the Trough of Disillusionment: “Interest wanes as experiments and implementations fail to deliver. Producers of the technology shake out or fail. Investments continue only if the surviving providers improve their products to the satisfaction of early adopters.” (Gartner Hype Cycle)
33. Cathy O’Neil, *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy* (New York: Crown, 2016); Kevin C. Desouza and Kendra L. Smith, “Predictive Analytics: Nudging, Shoving, and Smacking Behaviors in Higher Education,” *EDUCAUSE Review* 51, no. 5 (September/October 2016).
34. Association of Governing Boards of Universities and Colleges, *Top Strategic Issues for Boards, 2016–2017* (AGB Press, 2016).



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