

The Drive to Digital Transformation Begins

By Susan Grajek and the 2019–2020 EDUCAUSE IT Issues Panel

Illustrations by Brian Stauffer



2020 Top 10 IT Issues



#1. Information Security

Strategy: Developing a risk-based security strategy that effectively detects, responds to, and prevents security threats and challenges



#6. Student Retention and Completion: Developing the capabilities and systems to incorporate artificial intelligence into student services to provide personalized, timely



#2. Privacy: Safeguarding institutional constituents' privacy rights and maintaining accountability for protecting all types of restricted data



#7. Improved Enrollment: Using technology, data, and analytics to develop an inclusive and financially sustainable enrollment strategy to serve more and new learners by personalizing recruitment, enrollment, and learning experiences



#3. Sustainable Funding: Developing funding models that can maintain quality and accommodate both new needs and the growing use of IT services in an era of increasing budget constraints



#8. Higher Education Affordability: Aligning IT organizations, priorities, and resources with institutional priorities and resources to achieve a sustainable future



#4. Digital Integrations: Ensuring system interoperability, scalability, and extensibility, as well as data integrity, security, standards, and governance, across multiple applications and platforms



#9. Administrative Simplification: Applying user-cen-

tered design, process improvement, and system reengineering to reduce redundant or unnecessary efforts and improve end-user experiences



#5. Student-Centric Higher Educa-tion: Creating a student-services ecosystem to support the entire student life cycle, from prospecting to enrollment, learning, job placement, alumni engagement, and continuing education



#10.The Integrative CIO: Repositioning or reinforcing the role of IT leadership as an integral strategic partner of institutional leadership in supporting institutional missions

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olleges and universities today face numerous and varied challenges. Higher education leaders know that with so much at

stake, perhaps even their own institution's survival, transformational change is needed. Leaders are hoping to serve different types of learners, offer more flexible credentials and learning opportunities, expand research efforts, and develop new partnerships with employers, industries, and local schools and communities. They are, in short, seeking to adapt and even radically alter their business models and the value delivered by their colleges and universities.

Technology has a significant role to play. In the past twenty years, digital technology has advanced rapidly enough to evolve from enabling back-office operations to expanding access to businesses and institutions, delivering new kinds of products and services, adapting offerings to specific needs and interests, and generally providing a competitive advantage to organizations that can use technology innovatively and well. This use of technology is being described as *digital transformation* (aka Dx). Higher education too is embarking on Dx, which EDUCAUSE defines as "a series of deep and coordinated culture, workforce, and technology shifts that enable new educational and operating models and transform an institution's operations, strategic directions, and value proposition."

The EDUCAUSE 2020 Top 10 IT Issues tell a story of how higher education is beginning its digital transformation journey. Colleges and universities are working to unmake old practices and structures that have become inefficient and are preparing to use technology and data to better understand and support students and to become more student-centric. They are working to fund technology and to sustainably manage and secure data and privacy. Higher education institutions are applying data and technology to innovate student outcomes and experiences. Finally, the role of the CIO is undergoing its own transformation in order to advance institutional priorities through the use of technology. Higher education's drive to digital transformation is beginning. These ten issues cluster into four themes:

- **Simplify:** Higher education can no longer operate in growth mode. Institutions must do more with less by simplifying practices and working across the entire institution. At the same time, they need to rearchitect digital resources so that data can inform decisions, supply the fuel for artificial intelligence (AI) to help predict and manage, and make possible new sources of value.
- Sustain: The IT organization can help the institution develop a sustainable approach to technology investments and also use technology to reduce or contain costs. That requires aligning IT investments with institutional priorities and developing a sustainable approach to funding the ongoing technology investments that everyone knows are needed. As the value of data increases, information security risks and privacy concerns multiply. A sustainable strategy to secure data and protect privacy is essential.
- Innovate: Institutional leaders know they need to innovate to achieve a competitive advantage in today's complex marketplace. Whereas simplify is about doing things differently, innovate is about doing different things. Much innovation today is centered on students.
- Figure 1. The 2020 Top 10 IT Issues: Four Themes

■ Drive to Dx: The role of the CIO has never been more significant to the institution. CIOs can help their institutions develop and attain digital transformation objectives if institutional leaders are ready to involve them at the most strategic levels.

Simplify

Two issues compose the *Simplify* theme:

- #4. Digital Integrations: Ensuring system interoperability, scalability, and extensibility, as well as data integrity, security, standards, and governance, across multiple applications and platforms
- **#9. Administrative Simplification:** Applying user-centered design, process improvement, and system reengineering to reduce redundant or unnecessary efforts and improve enduser experiences

Digital transformation represents a third-generation digital revolution. In the first, the mere movement of information from analog to digital format was groundbreaking. Paper books and journals assumed electronic formats, student and financial records moved online, and research data was digitized. The second revolution put



EDUCAUSE Top 10 IT Issues Website:

- An interactive graphic depicting year-to-year trends
- A video summary of the Top 10 IT Issues
- Recommended readings and EDUCAUSE resources for each of the issues
- More subject-matter-specific viewpoints on the Top 10 IT Issues
- The Top 10 IT Issues presentation at the EDUCAUSE 2019 Annual Conference

educause.edu/2020issues

that data into motion by digitalizing processes. Grant proposals could be submitted electronically, prospective students could apply online, and ERPs could help maintain the institution's financial and human resources. Each of the first two revolutions gave administrators and academics new ideas for using and connecting the growing sources of data, but those new ideas and the data were bolted on to the original systems with the elegance and efficiency of a flea market. The result was as difficult to use as it was expensive to maintain. Students and faculty, expecting their institution's applications to function as smoothly as the consumer apps they use, became disappointed and frustrated not just with their institution's systems but with their institution itself.

Today's higher education leaders recognize that they cannot build on existing processes to meet constituents' expectations and to gain more value from data and technology. They need to unmake in order to remake. Remaking has two dimensions. The first focuses on remaking the work of the first digital revolution: the data itself. IT and data professionals are concerned with developing stronger, more intentional data foundations that better inventory, classify, organize, and protect data. The second dimension of remaking is a response to the ad hoc nature of the second digital revolution and aims to make digital processes not only more efficient but also more effective.

Sustain

Sustain is the largest theme, addressing four of the Top 10 IT Issues:

- **#1. Information Security Strategy:** Developing a risk-based security strategy that effectively detects, responds to, and prevents security threats and challenges
- **#2. Privacy:** Safeguarding institutional constituents' privacy rights and maintaining accountability for protecting all types of restricted data
- **#3. Sustainable Funding:** Developing funding models that can maintain quality and accommodate both new needs and the growing use of IT services in an era of increasing budget constraints
- **#8. Higher Education Affordability:** Aligning IT organizations, priorities, and resources with institutional priorities and resources to achieve a sustainable future

Sustainability is a newly popular term, often applied to the environment but extending to other finite resources as well. Sustainability is "the ability to be maintained at a certain rate or level" or "the ability to exist constantly."² The sustainability of higher education was once in no doubt. Though rarely lavish, supplies of funding—from governments, families, donors, and funders—were seemingly secure. Choices certainly had to be made, but the challenge was never existential. Until today. Sustainability has become the new prosperity. All higher education institutions are working harder than ever to do more with less, and some are struggling even to survive.

But to describe sustainability only in terms of colleges and universities misses the larger point, which is how to make higher education affordable to students. A sustainability approach that encompasses students will consider not just the institution's financial health but also students' immediate and long-term financial prosperity.

IT leaders are trying to work with financial leaders to develop new funding models that can respond to both changes in IT sourcing and the growth of initiatives and operations that depend on technology. The growing popularity of cloud-first strategies can reduce the need for campus-based IT expenses, but these strategies come with a funding shift (from capital to operating funds) that institutions are struggling to accommodate. More problems and opportunities can be addressed with technology, but technology solutions generally have shelf lives that are alarmingly brief, from funders' perspectives. A sustainable financial strategy requires focusing on the highest priorities and, increasingly, centralizing technology investments to avoid duplicative spending.

Sustainability also has a new dimension. Data is often described as a new currency,³ meaning that higher education now has two currencies to manage: money and data. Data storage may be cheap, but little else is inexpensive in the process of managing and securing data and using AI and analytics to ethically support students and institutional operations.

A sustainability strategy for data requires information security to preserve data confidentiality, integrity, and availability, and it requires privacy to safeguard personal information from access by unauthorized parties and to ensure that students and others have control over their personally identifiable data. Institutions' struggle to protect information security has become a forever war: *Information Security* has placed #1 on the EDUCAUSE Top 10 IT Issues list for the last five years. Privacy is more newly urgent, a reflection of just how valuable and ubiquitous individual information has become.

Innovate

The three issues in the Innovate theme focus on students:

- **#5. Student-Centric Higher Education:** Creating a studentservices ecosystem to support the entire student life cycle, from prospecting to enrollment, learning, job placement, alumni engagement, and continuing education
- **#6. Student Retention and Completion:** Developing the capabilities and systems to incorporate artificial intelligence into student services to provide personalized, timely support
- **#7. Improved Enrollment:** Using technology, data, and analytics to develop an inclusive and financially sustainable enrollment strategy to serve more and new learners by personalizing recruitment, enrollment, and learning experiences

Simplification and sustainability help institutions and constituents work more efficiently and effectively, as well as contain risks. They result in a better version of the present. Innovation, on the other hand, develops a new future for the institution. Done well, innovation enables colleges and universities to serve more and new types of learners, cultivate emerging partnerships, and

Figure 2. Four Challenge Areas for Higher Education



- Engagement
- Outcomes
- Funding
 - Natural disasters
 - - Academic programs

Teaching

Research



- credentials
- Employer-based learning
- Talent
- Global higher education

support expanded and original lines of research.

Innovation is an offer that higher education can't refuse, as institutions increasingly recognize that yesterday is no template for tomorrow. Institutional leaders are working especially hard to change students' experiences and outcomes and to attract more and new types of learners. They are asking technology to make two contributions.

First, institutions are applying AI and analytics to improve students' outcomes and to strengthen enrollment. This is innovation at its most rewarding and most challenging. Analytics, AI, machine learning, and related technologies and techniques are changing rapidly. The learning and investment curves are steep and short-lived. Our ability to use analytics and AI today needs to keep pace with our understanding of how to use them ethically and for maximum benefits.

Second, technology can enrich and expand students' relationships with higher education institutions. Institutional leaders are using technology to provide a consistent, continual, and valuable set of experiences across the student life cycle, supporting a "60year curriculum."4

Drive to Dx

The *Drive to Dx* theme consists of a single issue:

#10. The Integrative CIO: Repositioning or reinforcing the role of IT leadership as an integral strategic partner of institutional leadership in supporting institutional missions

Every journey has a destination, and some navigational help is always handy. This is especially true when traveling off-road or to new destinations. Higher education, like every other industry, is venturing into uncharted territory with digital transformation. The CIO can help navigate by providing guidance on how technology can

realistically contribute to institutional ambitions and by ensuring that the IT organization can effectively execute its work.

Not every institution is ready for an integrative CIO, and not every CIO is ready to be one. One or both circumstances will have to change if institutional leaders want to realize the full value of digital technology.

Major Challenges

The contributions of technology to higher education have expanded and deepened over the years. The great majority of today's CIOs help shape and influence their institution's administrative, academic, and overall strategic directions.5

To acknowledge the growing impact and influence of technology on all higher education missions and activities, EDUCAUSE refactored our Top 10 IT Issues initiative to incorporate the voices of non-IT leaders. We began our work this year by interviewing twenty presidents, provosts, and other senior-level leaders representing the institutions of members on the 2019-2020 EDUCAUSE IT Issues Panel. Asked about their current and near-term priorities, they identified sixteen challenges, which we grouped into four areas (see figure 2). Then we asked the Top 10 IT Issues panelists to consider the contributions that information technology is making to address each challenge. Their ideas, along with last year's Top 10 IT Issues list, formed the slate of issues from which the EDUCAUSE community identified the 2020 Top 10 IT Issues.⁶ The list of leaders we interviewed can be found in the online version of this article.

For higher education to meet these challenges, nothing less than transformative change will do. Dx is the mechanism for such change. The journey will be long and unpredictable. It begins with shoring up existing foundations via simplification and sustainability. It picks up speed with innovation. The integrative CIO will help ensure a smooth ride to the right destination. Thus the drive to digital transformation begins.





Information Security Strategy

Developing a risk-based security strategy that effectively detects, responds to, and prevents security threats and challenges

Tariq Al-idrissi, Janet Heslop, Cathy Hubbs, and Albert Stadler Do you know where your institution's data is? Technology and compliance risks continue to increase with the rapid growth in the rate of phishing and ransomware attacks. Institutional data moves across networks on and off the premises with an unmindful click of a button. And no one can be mindful all the time. Any incident has huge reputational, operational, and legal implications for an institution. To rely on perfect behavior from perfectly informed end-users using perfectly safeguarded systems, devices, and networks is . . . perfectly foolish. And yet we do.

The solution is not to look for the holy grail of protection but, instead, to adopt a risk-mitigation strategy. Cybersecurity is about mitigating operational, legislative, and reputational risk. A formal security program provides opportunities to support institutional strategic goals, prioritize efforts and resources, and avoid costly and embarrassing security incidents.

Obstacles Ahead

Until or unless a higher education institution has been burned by a major breach, institutional leaders can easily consider the issue (a) a technical issue to be "The University of San Francisco has spent a significant amount of money over the last three years on cybersecurity—to guard against the illegal transfer of funds away from the university and the theft of student, parent, employee, and alumni data and to strengthen the development process. We are thinking about all kinds of measures. Every year, some university takes a huge hit to their reputation as well to as their bottom line."

-Paul Fitzgerald, President, University of San Francisco

handled by the IT organization and not discussed at a leadership level and (b) an expense to contain rather than an ongoing investment to strategically manage risk. The expense of good cybersecurity can easily deter institutions that are struggling to make ends meet, and presidents and boards may be unmotivated to find time to discuss an information security strategy until after an incident has occurred.

Not having a strategy for information security also likely means not having clear objectives, executive sponsorship, or identified authority and responsibility for information security. Those gaps generally position information security as a bottom-up change effort administered by the IT organization. This is not the way to go.

Finding the balance between encouraging innovation and open inquiry and implementing proactive security processes and features is particularly challenging for higher education. Security requirements are often among the last considerations when new systems are added, and they tend to be seen as a barrier to innovation. Additional challenges include ensuring that every end-user is trained and is acting on that training by coordinating security across multiple units and responding to the relentless need for new protections and investments.

Hopefully, in 3 to 5 Years . . .

- Our sector will adopt a common framework that works for all kinds of data and requirements in higher education.
- Higher education will collaborate more effectively to centralize the sharing of threat intelligence.
- EDUCAUSE cybersecurity maturity benchmarks will be used and successfully achieved by 90 percent of EDUCAUSE members.

Advice

To get started:

- Attend the annual EDUCAUSE Security Professionals Conference to learn about the latest innovations and strategies and to build a network of colleagues. Team up, and find a mentor to help guide you along the way.
- Get an assessment of your maturity and the threat landscape. Prioritize and agree on top initiatives with executive sponsorship.
- Make sure you have an incident-response plan, including communication escalation for the incident, campus updates, and public updates.

To develop further:

- Don't assume that you're doing well: the best CISOs are always looking over their shoulder.
- Repeat the maturity assessments, and work with leadership to establish the institutional risk appetite.
- Introduce institutional metrics for the cybersecurity program.
- Calculate costs, including the cost of not mitigating by examining similar cases and how much they've cost institutions.

- Acquire back-end tools to ensure that everything is being monitored and evaluated on a timely basis.
- Teach and mentor others, become part of your community, help others achieve what you have achieved, and show them what you have learned along the way.
- Assess your program, and discuss it with a crosssection of your institution's top leadership. Where does optimization make the most sense?



Privacy

Safeguarding institutional constituents' privacy rights and maintaining accountability for protecting all types of restricted data

Tariq Al-idrissi, Janet Heslop, Cathy Hubbs, and Philip Wilhauk

Privacy concerns are front and center, with incidents such as Facebook's ongoing privacy issues⁷ and with legislative actions such as the EU's General Data Protection Regulation (GDPR), California's forthcoming Consumer Protection Act, and discussions of federal privacy law. Higher education institutions need to assess their public and internal policies, processes, and preparedness to respond to a request or to an incident involving privacy violation. Loss of private information can expose institutions to a myriad of litigation risk. Many lawsuits brought forward today are directly due to the loss of private information held by colleges and universities.

Privacy is essential to admissions, student support, human subjects research, and many other core activities. At the end of the day, this is a question of trust. Demonstrating trust requires clear-cut privacy guidelines that specify who has access to data, how complete the data inventory is, and where the data is stored. Institutional leaders need to know the trade-off they are willing to make between protecting privacy and providing easy and deep access to data across numerous systems, stakeholders, and compelling use cases.

Obstacles Ahead

Effective security can be both good and bad for privacy. Security platforms, such as closed-circuit cameras, may collect information that is needed for security in an identifiable fashion, but they also increase the possibility of exposing someone's private information. Institutional leaders need to take care when concluding that some privacy rights should be relinquished in the name of security. They also need to pay close attention to the technologies being deployed and the privacy implications and litigation risk if the data they collect and store is lost. It helps to have a clear idea of which privacy standards are guiding the institution.

Institutions often lack good process with data. Few have conducted a comprehensive inventory or have adequately defined the assets that most need protecting. All sorts of contemporary devices—phones, home assistants, wearables, and other IoT (internet of things) technologies—are collecting, creating, and processing personal data in ways that inevitably erode privacy and "I think there's a greater awareness among everyone in society about the trade-offs of giving up information and having a data-rich culture—and of what these trade-offs mean for privacy. And that doesn't end when you come to work."

> — Philip Wilhauk, Director of Teaching and Learning Technologies, University of Kansas Medical Center

are far from well understood. Rapid advances in new data frontiers are exacerbating the challenge.

Unintended consequences of collecting student data may trip up institutions the most. Using ID cards and badges to automatically take class attendance or to track students' participation in events or use of facilities and resources can provide extremely useful data in the support of student success, but the privacy loss that could result from potential misuse or inadvertent disclosure of such information needs to be considered very carefully. Once again, a current inventory of data—including its points of collection, storage information, and users—can help.

People, process, and technology all present major challenges. Staff often lack awareness of privacy rights and requirements, such as when data can or cannot be shared with other institutions or with vendors. Staff also need to question which data they need access to and how much data they have inadvertently retained on individual computers or in shadow systems.

Hopefully, in 3 to 5 Years . . .

- Institutional leaders will recognize that they can ensure security without compromising privacy by developing good processes and practices for collecting, curating, governing, and using the vast amount of information they have.
- Privacy will rise to the same level of awareness and importance in our campus discussions as information security, the usability of systems, and accessibility.

- Institutions will adopt guidelines and agreements that protect individuals' data when it is shared beyond the institution, including with vendors.
- Institutions will move beyond passwords to adopt technologies such as tokens, which better safeguard privacy by limiting access.

Advice

To get started:

- Establish a steering committee of executives (e.g., General Counsel, Compliance, Privacy, Risk, Information Security, Registrar leads) to define privacy standards, decide what is needed, and determine the best approach.
- Know what you have so that you can start. Inventory your data, and classify it according to privacy levels that you set when you defined privacy.
- Start a training awareness program. Just like information security, privacy becomes everybody's job.
- Work with other institutions that have been through the process to estimate timelines, resource requirements, and the kind or type of help that might be needed with the phases and stages of the implementation.

To develop further:

- Understand where the data is going and how it flows into and out of your organization, especially regarding third parties. Require data-sharing agreements to protect privacy.
- Verify that you have the right controls (e.g., least privilege, encryption, tokens) in place.
- Create an executive steering committee that can review and measure the current status, reassess the next steps, and reaffirm the goal.

- Ensure that the training and knowledge base is continual, especially for new hires.
- Establish continuous inventory and monitoring of all data stores.
- Give power back to individuals so that they can control their own data. Question what data you need to collect. Be purposeful and intentional, and destroy what you do not need.

Sustainable Funding

Developing funding models that can maintain quality and accommodate both new needs and the growing use of IT services in an era of increasing budget constraints

Kevin Lipscomb, Madhavi Marasinghe, Ernie Perez, and Beth Schaefer



Although the IT organization is not a profit center, every part of the college or university-from dining services to research-needs information technology. The investment in information technology is an investment in the business of the institution. The funding requirements and cycles of technology have changed, but IT funding models are still based on assumptions that technology upgrades are infrequent and often optional. Today, continually evolving features and security requirements and cloud sourcing have upended IT funding, requiring higher operating budgets and reducing the opportunities to use capital spending. Many institutions were never very good at planning for cyclical technology upgrades (e.g., of networks and desktops), and that has left them with inferior IT services at a time when excellence in technology has become a basis of institutional differentiation. IT, finance, and other institutional leaders need to re-create the IT funding model, consider new funding sources, and identify predictable funding options for innovation.

Obstacles Ahead

Today all of higher education is struggling to make ends meet. Public institutions are trying to meet performance mandates while absorbing steady reductions in state funding. Private institutions that depend primarily on tuition income are trying to avoid operating under deficit budgets as enrollments decline. And we have not identified a funding model for technology other than through operating funding, capital funding, grants, and student technology fees—all sources that are increasingly stressed to meet baseline needs.

Because the value of technology is digital, not physical, that value can be difficult to sell to funders. Donors generally want recognition for major gifts, and we have not yet figured out where to put the sign on an endowed network or student success system. Further, the lifespan of technology is much shorter than that of a building or professorship or scholarship. Presidents, boards, and institutional advancement officers know how to raise funds for those, but not for technology.

Institutional leaders can't develop sustainable funding models if they can't understand the total costs of technology. To do so requires adopting different financial planning and management practices. Technology managers should be included early and often in projects with any type of technology component (from new buildings to new services to new programs) so that they can advise on the most efficient way to meet technology needs and estimate the true ongoing funding requirements. At many institutions, the total IT spend is hidden in individual departments. This can be a source of duplication when these IT costs aren't focused primarily on unique departmental needs. What can't be measured can't be managed.

Finally, institutional leaders need to recognize the difference between budget cuts that increase efficiency and those that generate hidden debt or degraded services that will eventually drive away students, faculty, and grantors. IT leaders need to be able to demonstrate that difference, and institutional leaders need to be willing to see it.

Hopefully, in 3 to 5 Years . . .

- Institutional leaders will understand the value that technology contributes to their business models and missions and will fund it accordingly.
- Institutional leaders will establish more meaningful priorities, more effectively. They will place a few big bets on the future and fund those bets accordingly, rather than satisfice by sprinkling a bit of money across the entire enterprise.
- Society and governments, with the help of articulation and advocacy from higher education, will have placed a contemporary value on the higher education experience and product, leading to increased enrollments and more stable support.

Advice

To get started:

• Set financial baselines and goals for the institution as early as you can.

"I've been in meetings over the years in higher ed where people will say, 'Oh my gosh we just put money into that technology stuff last year, and now you are asking for all that again?' Well yes, because in order for us to keep up, this is what we have to do. You start to worry about where that money is coming from. Because there are lots of other needs."

-Marilyn Sheerer, Provost, University of North Carolina Wilmington

- Make sure that you have a very good relationship with your provost and your chief financial officer (CFO). Prioritize your wish list, and use those relationships to advocate for the top priorities.
- Use the EDUCAUSE Core Data Service to learn from peers.

To develop further:

- Use the EDUCAUSE Core Data Service to benchmark against peers, and present the findings to both the CFO and the provost to show the gaps between where you are and where you should be—that is, the objectives that institutional leaders have set and that require underlying IT investments.
- Advocate relentlessly for a sustainable funding approach, because one of these days financial leaders may just say yes.
- Continue to participate in professional networks, like EDUCAUSE and NACUBO, to share your successes and learn about emerging practices.

- Use sustainable funding to advance an innovation agenda.
- Share your successes internally and with the profession by documenting examples.
- Help advance the entire profession by chairing a working group to develop new resources (e.g., ways to translate industry best practices to higher education).

Digital Integrations

Ensuring system interoperability, scalability, and extensibility, as well as data integrity, security, standards, and governance, across multiple applications and platforms

Beth Schaefer, David Weil, and Philip Wilhauk



We are in the data era, when data is the most valuable commodity of higher education institutions. But data doesn't deliver value on its own; it needs our assistance and intervention. Institutional leaders can't afford to think of their data systems as independent products or services. They need to think of these systems as one interconnected whole. Institutions derive value from data by ensuring that it can flow to where it needs to be in order to inform decisions. Digital integrations are key to empowering institutional leaders to leverage the "Technology assists our internal operations. How well integrated are these systems? The reality is the technology world is moving so fast, but we have systems that don't talk to each other as well or as effectively as they need to."

> --Mark A. Mone, Chancellor, University of Wisconsin--Milwaukee

information they're collecting as a way to make decisions, plan, and help deliver services to students. That holistic approach must be reflected in every step of system implementation and support, including needs assessment, purchasing, data governance, security review, and enterprise architecture.

Obstacles Ahead

The most challenging aspect of digital integrations is the need for the institution and the ecosystem to advance from an ethos of independence to one of interdependence. Within the institution, optimizing at the individual or the departmental level is no longer ideal. Yet the ensuing loss of autonomy involved in becoming interdependent is often unwelcome. It needs to be reframed as a gain: new insights, functionality, and productivity.

Integrations across systems are much easier to achieve when those systems share architectural standards. These standards exist but are still evolving, and multiple standards for educational and other kinds of data may compete.

Institutional leaders need to think about their information and technical architecture. We're still emerging from a period of siloed applications that have been deployed by different departments with no consideration about how systems tie together. Siloed applications don't need much in the way of information or technical architecture, but integrated applications and data require both. Ideally, integrated systems can build strength upon strength, but poorly implemented integrations just multiply the problem. The impact of a security vulnerability or data loss can quickly spread across multiple systems.

Data governance is another potential sticking point. Roles, responsibilities, and policies need to be clear, including data stewardship or ownership, retention, classification, and security and privacy policies and standards.

Hopefully, in 3 to 5 Years . . .

- Standards and tools will continue to evolve to simplify out-of-the-box integrations, reducing the volume of interface development work. The resulting "plug and play" applications and data will enable institutions to more effectively use data and analytics to address recruitment, retention, and other urgent student issues.
- The partnerships between higher education institutions and with vendors will become deeper, and vendors will better recognize that adopting common standards and offering out-of-the-box solutions for major systems are good practices both for higher education and for their bottom line.

Advice

To get started:

- Learn about digital integrations, enterprise architecture, and data and IT governance so that you can recognize what's good and better and best in higher education and what other people are doing.
- Consult all the key stakeholders to learn about the present and ideal states of data integration (e.g., the ways in which data can be used to advance institutional priorities).
- Establish data governance (to get a clear idea of what data you have, where it is, who owns it, who's maintaining it) and IT governance (to ensure you have a good process for understanding what systems are being put in place).

To develop further:

- Become involved with Itana, the community supporting enterprise, business, and technical architects in academia.
- Having established the people and the process pieces, research and invest in tools such as iPaaS (integration Platform as a Service).
- Use the EDUCAUSE Core Data Service to benchmark your IT governance.

- Be aware that data foundations are not something you complete and then let run. Mature governance and architecture are needed for your environment and optimal maturity level.
- Help bridge the gap between industry and institutions. These two parts of the ecosystem need to collaborate, and leading institutions can play a huge role.
- Understand that integration tools are evolving rapidly. Be sure to stay updated, and consider the ROI of changing or upgrading your tools.

Student-Centric Higher Education

Creating a student-services ecosystem to support the entire student life cycle, from prospecting to enrollment, learning, job placement, alumni engagement, and continuing education

Kellie Campbell, Farhat (Meena) J. Lakhavani, Ernie Perez, and Sasi K. Pillay



Perceptions of the value of higher education, once a given, have shifted. Higher education has to adapt in order to restore its reputation as an indisputable public good. A large component of that shift is viewing post-secondary education from the learner's, rather than from the institution's, perspective. To do that, we need to ensure that students can engage with the institution to chart their own progress, request support and services, and further express and meet their needs. We require a student services ecosystem that will give students access to the information and services they need from wherever they are geographically, from whatever device they are using, and at whatever point they are in their relationship with the institution. To provide that, we must work and think and design differently.

Obstacles Ahead

This work requires learning how to transcend individual departments to work holistically. Higher education institutions are not structured that way, and the cultural change that is needed to optimize at the institutional level will be the biggest challenge. Unless senior management is uniformly committed to prioritizing the institution above the silos, the project will falter.

"The student's start-to-finish experience is the breadand-butter of the financial stability of this institution. We are trying to create a new structure and new business processes that address the experience that our students have from the minute they begin to explore the college all the way through graduation and their transition to alumni status."

> —Penny Howard, Executive Vice President for Administration and Finance, SUNY Erie Community College

Failing to take a comprehensive, multidimensional approach to student success and to the data needed to understand and achieve student success can trip institutions up. As institutional leaders focus on supporting students throughout the student life cycle, they need to take an institution-wide approach to student services, processes, systems, and data. This involves retiring as much as is created, since a more holistic approach to student success is likely to be incompatible with existing practices.

Leaders may find themselves struggling to grasp the value and impact of the initiative as they better understand the ongoing commitment it requires. Integrated, personalized, digital student services are not even remotely close to most institutions' offerings today, and leaders may question whether this work is truly core to the institutional business model.

Hopefully, in 3 to 5 Years . . .

- Based on the foundations established when developing student-centric services, institutional leaders will have learned how to work differently, enabling them to reimagine the higher education business model to meet current and emerging generations of learners. As institutions pivot to becoming student-responsive, leaders will begin to see how many of their credentials, or "products," need to be refactored, as well as why and how.
- Institutional leaders will use their experience of learning how to partner within their institutions as a way to deepen consortial and other crossinstitutional partnerships so that the greatest challenges of higher education can be addressed collaboratively.

Institutions will advocate and partner more effectively with industry, and vendors will have learned to value the benefits of operating within a culture of collaboration, rather than one driven primarily by competition.

Advice

To get started:

- Gather the key stakeholders throughout the institution to set a strategic vision, develop a common definition of *student-centric higher education*, and establish and prioritize broad goals for the institution.
- Socialize your platform for change throughout the institution, and adapt based on feedback.
- Find institutions that are far ahead, and use them as role models and mentors. Look beyond your peer group for ideas.

To develop further:

- Learn by doing. Set smart goals, and improve governance and project management as you gain experience with this kind of cross-institutional change initiative.
- Help the entire institution see the progress that has been made and the impact it has had.

- Help others come up to speed.
- Advocate with vendors to collaborate with institutions as a way to avoid a proliferation of point solutions.
- Help undergraduate curriculum leaders identify opportunities and needs, by sharing with them where this field is heading.



Student Retention and Completion

Developing the capabilities and systems to incorporate artificial intelligence into student services to provide personalized, timely support

Opinder Bawa, Sasi K. Pillay, and Tom Scanlon

Student success is institutional success is societal success. Yet institutional levels of retention and completion show a gap between what students hope for and expect and what they often receive. No one wins: The institution wastes its investment in recruiting and enrolling students who don't complete, the well-doc-umented benefits of higher education to the economy and society go unrealized, and most importantly, students' time, treasure, and talent are squandered.

Today we have new tools acting on new insights about the complexity of student success. Whether this is tutoring, additional course materials, better onboarding, or supports for students' mental health, many faculty, advisors, and others are acting early and often to help students stay enrolled and successfully attain meaningful credentials. Student success technologies have gained market share and sophistication rapidly throughout the past decade.

Obstacles Ahead

A comprehensive focus on student success won't be productive without cultural change, from boards to presidents to academic and institutional leaders and on through faculty, student success professionals, and CIOs. A new institution-wide mindset is required to recognize that data about students is institutional data, not departmental data, and that a great deal of data is required. Institutional constituents need to consider student success as a business outcome that can be measured, monitored, and used to hold people accountable. This can be scary stuff for administrators and faculty whose careers, to date, may not have not prepared them for such change.

Institutions that haven't implemented data governance and data architecture will need to do so in order to begin using AI and analytics to deliver personalized, timely student services. Data governance can help stakeholders sort out data roles, responsibilities, and definitions. Data architecture will enable project teams to define data sources, flows, and integrations. Understanding the profile of students who would do well in their institutions is another key factor. The aim is to allow students to be the best judges of what they would like to achieve and where.

Hopefully, in 3 to 5 Years ...

- Higher education will achieve better success rates and completion rates across the board.
- Student success will become less of a struggle due to earlier interventions with students at risk.
- Institutions will be more effective at admitting the students who can achieve affordable credentials. Institutions will be focusing on different types of students and on developing student portfolios that will enable a differentiation of offerings.
- Higher education institutions will work with others whether community colleges, high schools, or even elementary schools—earlier in the pipeline to help students develop the behavioral habits to achieve the prerequisite skills for postsecondary success.

Advice

To get started:

- Find the right starting point for your role at your institution. This is not an issue the CIO can lead individually, but the IT organization does have an important role to play. Outline that role. Depending on your relationships with institutional leaders and on your personal comfort level and expertise, you might also advocate directly for benefits and risks to the institution. Be careful not to stray beyond your circle of influence.
- Identify exemplars who are using AI to provide personalized, timely support.
- Use EDUCAUSE data showing the benefits of personalization on student success.

"Retention, from the university's point of view, is persistence from the student's point of view. Student access was the marching order of the 1960s, 1970s, and 1980s. Today's problem is success—to get them through. We have far too many students who start and don't finish nationwide. That is the real challenge."

—Alan D. Marble, President, Missouri Southern State University

To develop further:

- If you haven't already, establish a vision and milestones for how AI can be used for retention and completion.
- Develop the case for AI and analytics as an institutional competitive advantage. Link information technology and AI contributions to institutional KPIs for retention and completion to help identify the value-add of these investments.
- Promote progress with your institutional and external peers to help advance this practice.

- Learn about cutting-edge uses of AI and analytics in other industries, and translate those to your institution.
- Consider how to extend the use of data and AI into additional areas, such as admissions, enrollment, the first-year experience, and individual academic programs.
- Cultivate potential partnerships—with vendors and other institutions—that could make additional investments more affordable.

Improved Enrollment

Using technology, data, and analytics to develop an inclusive and financially sustainable enrollment strategy to serve more and new learners by personalizing recruitment, enrollment, and learning experiences

Ed Aractingi and Albert Stadler



Six in ten first-time, full-time undergraduate students who enrolled in four-year institutions in 2011 attained a bachelor's degree within six years. Obviously, this leaves four of those ten falling short, and those aren't great odds. There are many reasons for higher education's enrollment problem, including its poor record of completion. As institutional leaders realize their responsibility for student success, they are finally giving thought to which types of students thrive at their type of institution. Persistence-the probability that students who enroll will continue and won't switch to another institution or drop out-drives completion, and completion constitutes the most basic definition of student success. Institutions want high rates of student success, so they want high rates of persistence and retention, which naturally leads back to an institution's enrollment strategy. Retaining students is a lot less expensive than recruiting them, and knowing which students are most likely to succeed can streamline recruitment and reduce the total cost for institutions and students alike.

This is where technology comes in. Institutions are using data to develop algorithms to help them identify which students are more likely to thrive, as well as the root causes when students leave or fail to graduate. In the former case, algorithms help institutions target potential candidates more effectively. In the latter, institutions learn how to adjust their offerings to better serve a larger number of aspiring graduates. This is not about recruiting the smartest (or richest) students; it's about optimizing the fit between the institution and the student. These days, all analytics roads lead to the IT organization, which can help the institution understand the type and level of investment required to improve enrollments and which can provide the technical leadership for any approved analytics initiative.

"Right-sizing and rightsourcing the institution is quided by a bold and inclusive enrollment strategy to meet the needs of students today and tomorrow. I think technology will play a major role. I would like to think if our enrollment strategy is expansive and inclusive, it will stretch us in how we define what a residential undergraduate experience is going to truly be in America going forward."

- Shirley Collado, President, Ithaca College

Obstacles Ahead

Institutions can lose their way if they focus on recruitment or enrollments. The goal is to find students who can succeed at the institution, rather than to increase the number of students who matriculate. Data can help guide institutional leaders by clarifying which students will thrive at their institution, enabling enrollees to graduate and become successful citizens and loyal alumni.

Although higher education's superpower is its willingness and ability to collaborate, this may be a problem when one institution's solutions don't translate easily to those of another institution. Improving enrollment involves defining and optimizing the fit between the student and the institution. The formula will differ for each institution and for different types of students within an institutional pool. That requires not just special knowledge but also special nuance and skills for working within a particular institution and with the particular prospective learners. The shelf-life of today's successful practices will be limited, and institutions will need to find innovative strategies to address new students and changing circumstances. The challenge may only increase as demographics change and as competition from alternative educational programs and credential providers expands, potentially reducing the unique value of a college/university degree.

Hopefully, in 3 to 5 Years ...

• The importance of simple completion metrics will recede and give way to quality measures that capture the contribution that postsecondary education makes to people's ability to thrive in life, however they define thriving.

Advice

To get started:

- Do your research by learning from all prospective students, both those who have enrolled and those who were accepted but did not enroll. Learn why they made their choices.
- Find the niche that will attract learners to your institution and only your institution. Try not to be everything for everyone.
- Learn how customer acquisition/retention industries outside higher education use technology and AI to personalize their services. Find higher education institutions that are far ahead and use them as role models and mentors. Look beyond your peer group for ideas.

To develop further:

- Start measuring results to identify trends, problems, and successes. Take action based on what you learn.
- Be patient, and take a long-term view. These efforts have a gestation period of a year (for quick wins) or several years (when culture change is needed).
- Allow time for innovations to take hold. Don't try one thing, drop it and move on to something new each year.

- Find the small things you need to improve. If there are groups of learners you should be attracting but are not, learn why not.
- Share back to the profession. Abstract your learnings so that others can adapt and adopt them.
- Continue to keep abreast of cutting-edge practices and technologies to ensure that your accomplishments don't become stagnant.



Higher Education Affordability

Aligning IT organizations, priorities, and resources with institutional priorities and resources to achieve a sustainable future

Ed Aractingi, Helen Chu, Ernie Perez, and David Weil Higher education has an affordability problem. With US student debt in excess of \$1.5 trillion, it's not surprising that people ages 18 to 29 years old ranked an affordable education above all other issues in the 2018 midterm elections.⁸ Although technology introduces new expenses, it can also help to reduce costs overall and make possible new solutions to improve affordability.

Affordability not only entails providing access to people who cannot afford to go to college but also extends to supporting students' academic success and reducing their financial stress. Many colleges and universities are investing in online learning to provide degrees at scale for students who can't afford higher education in any other way. Libraries and IT organizations can supply open educational resources, electronic materials, and educational platforms to reduce barriers to postsecondary education.

But the contributions of technology go beyond the classroom. With increasing numbers of students reporting food and housing insecurities,⁹ IT leaders are aligning their priorities to help their institutions address affordability in a comprehensive way. They are introducing solutions to enable meal-sharing, are offering technology loans for tablet devices and internet services (as well as the more traditional laptop loaner programs), and are implementing software to help match students to available scholarships. IT organizations are becoming partners in addressing the need for higher education affordability.

Obstacles Ahead

If institutional leaders try to address this issue on too manyfronts at once, they risk diluting the effectiveness of everything they take on. Focus and coordination across the institution are key to avoiding duplicative or counterproductive efforts that waste time and resources.

Finding a balance between containing/reducing

costs and offering students value for the investment they're making is challenging institutions the most. Simple, drastic choices, like across-the-board cuts, are likely to backfire by reducing value. A more nuanced approach is needed, and that requires leadership that is able to develop a strong vision and effect the required changes in institutional culture. Some areas will need new investments, and others will have run their course. Only leaders with clear and compelling visions can make the case for the structural changes and difficult choices that institutional leaders need to make. The vision needs to translate to the changes and outcomes required of institutional units, of which the IT organization is no exception.

Hopefully, in 3 to 5 Years ...

- Other parts of the higher education ecosystem will share accountability for affordability as a societal good:
 - Publishers, to work collaboratively with institutions to reduce the costs of scholarly and educational materials
 - Vendors, to provide meaningfully discounted technologies and other services to the higher education industry and to creatively partner with institutions to otherwise help lower the cost of attendance, such as by providing educational opportunities in concert with institutions
 - State and the federal governments, to provide funding to make public institutions affordable regardless of a student's income
- Institutional leaders will look to their IT organizations to provide leadership in reducing cost and adding value.

Advice

To get started:

- Talk to students, and listen to what they say they need and how you can help.
- Learn from what other institutions are doing to use

"If you had asked me three or four years ago about the major concerns and initiatives around the university, I would have spoken more explicitly to budget issues. Now I am looking at budget issues through the lens of moving the needle on student success."

—Matthew Cahn, Interim Vice Provost, Academic Affairs, California State University, Northridge

technology to lower students' costs, such as OERs, device checkouts, and technology-supported food pantries.

- Implement an open educational resources program.
- Consult with your peers to learn if you're getting competitive bids on contracts.

To develop further:

- Use IT governance and vendor management (in collaboration with procurement) to review and manage the portfolio and cost of applications on campus. Eliminate duplication, and explore partnerships to further reduce costs.
- Look closely at institutional data to identify barriers and opportunities that offer the biggest ROI for increasing students' academic success and reducing their costs.

- Realize that affordability is a long-term and difficult issue that will take ongoing effort, so don't expect fast, dramatic improvements.
- Understand that the skills you need to optimize might not be the skills your workforce has. Identify where you need to invest in training or talent.
- Recruit students to suggest and work on affordability-related projects. Ask them to advise on and help improve existing projects.

Administrative Simplification

Applying user-centered design, process improvement, and system reengineering to reduce redundant or unnecessary efforts and improve end-user experiences

Mara Hancock, Cathy Hubbs, Kristy Rhea, and Albert Stadler





Today's administrative services and applications have all the elegance of a Rube Goldberg machine. They were generally designed to conform to the convenience and habits of back-office staff, and as new systems, functions, and requirements were integrated, the user experience receded further and further into the background. Those days are gone, but the systems and services live on.

IT organizations have been learning how to place the end user at the center of the requirements-gathering experience and how to design and test new solutions to ensure the users get what they need and enjoy from the experience. IT staff have also gained skills for process simplification and improvement and can work with business units to engineer complexity out of systems and processes. They can help vendors and business units meet in the middle to clarify and negotiate requirements and features. They can also institute enterprise architecture standards to ensure that end users' experiences are consistent across a suite of applications and that the processes and data underneath the applications integrate to serve business unit and institutional goals.

Administrative simplification isn't just good for constituents; it's good for business. In higher education today we have fewer resources to do more with. Rather than cut value, administrative simplification offers an opportunity to reduce redundancy, engineer unnecessary code and steps out of systems and processes, and improve the quality of service.

Obstacles Ahead

Change a Rube Goldberg machine at your own peril; that little part you remove could turn out to be a lynchpin. Or you could be focused on the wrong part of the device entirely. Such is the difficulty with administrative simplification. The obstacles include getting lost in the weeds, not getting far enough into the weeds, and being unable to imagine a more efficient way to do the work.

Change management is the biggest challenge. Institutions that are adept at change management will have the easiest time with administrative simplification. Staff will resist losing what they've grown accustomed to and adept at. They will argue eloquently against the foolishness of the changes, and those with informal or formal influence will be formidable detractors. Involving staff from the beginning, helping them see the need for change, and including them in designing and testing changes can help soften resistance. Change management activities should begin early and continue through initial periods of deployment. Introducing continuous-improvement activities into the project can help staff see that the initially redesigned service is not cast in stone but, rather, is something they can adjust as needed over time, based on key performance indicators that include cost-effectiveness and user satisfaction.

Institutions must recognize that administrative simplifications will take years. Leaders need to establish and clarify the scope of each simplification project so that it doesn't metastasize into an expensive endeavor whose purpose has lost its way. Process-improvement efforts that start in one department can easily lead to other departments, where the root cause may (or may not) actually lie. The project team members must understand whether they've taken a massive detour or found the real problem. And institutional sponsors must have good sense and good relationships in order to negotiate a change in focus with their colleagues.

Understanding that today's workflows are flawed is one thing; imagining a more ideal state is another. Many of us lack the ability to figure out how to work differently. New ways of working need to be cocreated by cross-functional teams and end users.

Hopefully, in 3 to 5 Years ...

- Institutions' administrative services will become as easy to use as consumer apps.
- Institutions will be directing more of their efforts toward students' needs—from student mental health to retention, to recruitment, to debt avoidance, and to job placement.

"We are improving processes, structures, and technology to make people's ability to do their job easier so they can focus more of their time on substantive matters and less on process or technology navigation."

—Seth Grossman, Chief of Staff and Counselor to the President, American University

• Staff throughout the institution will view themselves as a community of interdependent colleagues focused on what's best for students and the institution.

Advice

To get started:

- Complete an inventory to see what you're using and why. Expect this to require some digging.
- Find your champions, and organize them to address the topic. Talk with peers at some trusted organizations that are ahead of you, and possibly include them in the group.
- Organize the work in a way that clarifies who participates, how decisions get made, and who has decision rights.

To develop further:

- Make sure you have developed partnerships across the institution. Communicate the rationale, objectives, and progress to the campus community.
- Check on how you're measuring success. And if you aren't doing so already, establish some ways that you're going to measure that progress.

- Get an internal or external assessment to understand where you stand and what optimization looks like now.
- Build a culture of continuous improvement, so that you can continue to optimize. Institute mechanisms for continuous feedback.

The Integrative CIO

Repositioning or reinforcing the role of IT leadership as an integral strategic partner of institutional leadership in supporting institutional missions

Mara Hancock, Farhat (Meena) J. Lakhavani, Sasi K. Pillay, and David Weil

IT services are used by all aspects of the higher education institution. CIOs' range of access provides them with insights into operational and strategic initiatives, strengths, and pain points across the entire institution. This allows the CIO to make connections and develop strategies that can link together aspects of the institution in ways that other senior administrators may not see. It also allows the CIO to provide technology-based solutions that can directly support and advance the institutional mission.



The concept of the integrative CIO builds on this broad range of knowledge and contributions and leverages it for the good of the institution. Many of the serious and complex issues facing higher education will require holistic solutions that leverage multiple aspects of an institution, often cutting across academic and nonacademic units. The integrative CIO brings in-depth knowledge of the institution, an understanding of technology solutions, a foundation in business process reengineering and project management, experience with numerous vendor partnerships, and many other skills and knowledge sets.

Obstacles Ahead

The dualism of IT contributions, and therefore of the CIO's responsibilities, can mislead the institution about the role of the CIO and can also cause mismatches in people who take on this role. IT organizations serve two functions at the institution: they manage and deliver operational excellence through technology infrastructure and services, and they enable transformational capacities that help translate innovation into new business value. Far too many institutional leaders today persist in believing that their IT leaders are responsible for only the former. Indeed, not many CIOs are ready to confidently deliver the latter. At this time, 29 percent of CIOs report to the president, chancellor, or CEO, and 58 percent sit on the cabinetboth of which are strongly associated with more CIO involvement in institutional strategy.¹⁰

The biggest challenge for the integrative CIO is changing the trajectory of IT value from infrastructure management to innovation management. This requires a change of mindset, a change of CIO competencies and experience, and a change in IT funding. "Moving forward, CIOs have to be viewed as business partners: they need to understand the challenges of a large organization and then how to bring about significant change to advance the mission of teaching, research, and outreach."

—Sasi K. Pillay, Vice President and CIO, Washington State University

Institutional leaders need to learn more about running enterprises and about the important role of innovation, especially today. That kind of business knowledge can highlight the strategic importance of the technology function, beyond its standard operational importance.

CIOs themselves need to stop admiring the problem and start delivering the solution by developing the personal competencies and experience required. They also need to advocate for the value of the new role. Without trust that the CIO is working for the good of the entire institution, that advocacy can backfire and be interpreted as callous personal or departmental boosterism. CIOs can succeed in this new role if they have already built good relationships, are viewed as advocates for others, and have shown a willingness to give up some things for the greater good.

Finally, funds become tighter as more priorities compete. The view and work of the IT organization can devolve to reducing costs and keeping the lights on. Sometimes an institution has to spend money (in technology) to save money (in other areas). Institutions that are well-managed with CIOs who have a lot of social capital can do what others cannot.

Hopefully, in 3 to 5 Years ...

- CIOs will understand the incredible privilege they have to be at the intersection of so many aspects of the campus and will have gained the transformation skills and strategic mindset necessary to provide solutions to propel institutions and higher education forward.
- Institutional leaders will recognize the broad experiences and perspectives that CIOs bring to the table, even for discussions that don't directly

involve information technology (or have a solution that includes an IT component).

- Innovation will become a common capability of higher education institutions, rather than being limited to just a few institutions that are willing to leverage the uncommon CIO who can contribute strategically.
- Institutional leaders will extend their successes beyond their institutions to collaborate as crossfunctional teams at the national level or at the international level.

Advice

To get started:

- Consider having the CIO sit on the president's cabinet, so that the rest of the institutional leaders will see the CIO as a peer and colleague.
- Be sure the CIO is brought into some discussions that aren't focused strictly on technology, and listen to what the CIO can contribute.
- Find ways for the CIO to serve on institution-wide efforts. Identify projects in which the CIO can partner with other institutional executives.
- Learn from integrative CIOs and from other industries where that role is long-established.
- Look into coaching or mentoring to develop integrative CIOs.

To develop further:

- Continue to find ways to bring the CIO into broader discussions, such as those about the institutional budget committee, facilities planning, and academic committees.
- Take advantage of leadership programs, like the Leading Change Institute, which can help prepare CIOs to take a "chin-up" approach to looking at their institutions and developing strategic partnerships and solutions.
- Develop IT staff to provide the same sort of leadership across the different levels of the institution, so that the IT organization, and not just the CIO, is a strategic partner.

- Become an educator and promoter, and help develop other leaders in the profession.
- Look outside the higher education industry. Learn how to assess and communicate IT contributions to institutional outcomes.
- Initiate or contribute to collaborative institutional projects related to student retention and student success and other pressing priorities.

Reflections and Conclusion

Changes from Last Year

The 2020 Top 10 list consists of six issues from 2019 and four new issues. *Information Security Strategy, Privacy, Sustainable Funding, Digital Integrations, Higher Education Affordability,* and *The Integrative CIO* were all on last year's list. All except *The Integrative CIO* moved up in ranking. The consistency of the list in any given few years is not at all surprising. The list is made up of major issues, and most major issues take years to address.

More interesting are the four new issues, all of which connect directly to institutional priorities: *Student-Centric Higher Education, Student Retention and Completion, Improved Enrollment*, and *Administrative Simplification*. Information technology has a great deal to contribute to these challenges, and it is exciting to see IT priorities continue to converge with institutional priorities.

Difficulty

The Top 10 list is ordered by importance. We also asked panelists to view each issue from another dimension: difficulty. We used the *Horizon Report* difficulty ratings¹¹ and asked panelists to pick one of these three options:

- 1. We understand and know how to solve the issue, even though the solutions are hard.
- 2. We understand the issue, but the solutions are elusive.
- 3. The issue is complex to even define, much less address.

Of course, every issue on the Top 10 list is difficult to solve (see figure 3). Even when the issue is well understood, significant barriers exist to addressing it. The least-difficult issues are *Information Security Strategy*, *Student Retention and Completion*, and *The Integrative CIO*. Hardest by far is *Higher Education Affordability*. Money is always the toughest nut to crack.

Emerging Technologies and Major Trends

EDUCAUSE research examines the impact of emerging technologies and major trends on higher education. Each year we ask CIOs which emerging technologies they plan to focus the most attention on and which trends are having the greatest influence on the institution's IT strategy. In 2020, several emerging technologies and major trends are reinforcing higher education's drive to digital transformation through the three Top 10 themes of simplification, sustainability, and innovation (see table 1). A forthcoming EDUCAUSE report will provide more information about these emerging technologies and major trends, as well as 42 additional trends and 76 additional technologies.

And what do CIOs think about digital transformation itself? Almost half (48%) report that Dx is exerting a major influence on institutional IT strategy.

Standards and Silos

As the panelists discussed the issues, they often mentioned standards. They advocated for working across the higher education



Figure 3. Difficulty of Finding a Solution

Top 10 Theme	Emerging Technologies	Major Trends
Simplify	Use of APIs	Institution-wide data management and
	Blended data centers	integrations
	Mobile apps for enterprise applications	
Sustain	Security analytics	Enterprise risk management
	E-signature technologies (e.g., DocuSign, Adobe Sign, and SignNow)	Privacy
		Growing complexity of security threats
Innovate	Incorporation of mobile devices in teaching and learning	Data-informed decision-making
	Open educational resources (OER)	Student success focus/imperatives
	Technologies for improving analysis of student data	
	Integrated student success planning and advising systems	
	Predictive analytics for student success (institutional level)	
	CRM covering the full student life cycle	
	Technologies for planning and mapping students' educa- tional plans	

Table 1. Emerging Technologies and Major Trends



ecosystem to define and adopt standards related to privacy, data, and outcomes as a way to simplify initiatives, help make credits and credentials portable and transferable, meet and attest to privacy practices, and improve the quality and relevance of data. The ability of higher education to use standards is still very low. Often higher education lacks standards, or they exist but adoption is low, with multiple, competing standards.

The panelists also talked about silos. Should institutional operations be centralized or distributed? Medium and large institutions particularly struggle with this dilemma. Centralization is more efficient in many ways, but local needs and innovation thrive best when control and funds are distributed across areas of the institution. The pendulum today is swinging toward greater centralization. Many priorities must be undertaken at the institutional level if they are to be affordable and have widespread success. Investments in analytics, customer relationship management, and information security are too expensive and complex to warrant multiple departmental initiatives. In addition, institutional leaders care about student success overall, not just about the success of nursing or English or engineering majors. Data about students and spending swirls around the institution. Local data management and governance leads to a lack of institutional data management and governance. Every individual at the institution has a role to play in student success, data management, privacy, and information security, but those roles need to roll up and contribute to a holistic effort.

Ethical Sustainability

Digital ethics may be this year's missing issue, the shadow cast by so many of the others. Like other industries, higher education is relying on gathering and using increasing amounts of data. For higher *Continued on page* 60

"Dear Vendor Partner"

Requirements, wish list, or wishful thinking? We asked the IT Issues panelists to tell us how industry might help address each of the 2020 Top 10 IT Issues. Some of their answers will be familiar, several are new, and all could, the panelists believed, help higher education considerably.

Issue	Industry Contribution
1. Information Security Strategy	Help with assessments, share knowledge of other industries, and facilitate bi-directional communications.
	 Directly help institutions protect themselves against attack, in exchange for public recognition.
	Offer bigger educational discounts.
2. Privacy	Recognize that privacy is good for business. Keeping information private will attract more customers and users.
	Adopt higher education standards of privacy, such as sharing data and information about who is using their solutions, as the cost of doing business with higher education.
3. Sustainable Funding	Fund research, with both monetary and in-kind support.
	Work with companies to co-create new credential programs for their current workforces and for the institutions' future graduates.
	Acknowledge and set prices with the recognition that nonprofits can't necessarily make back what they spend.
	Help technologists who don't always understand finance, and finance leaders who don't always understand technology, develop feasible funding models.
4. Digital Integrations	Elevate finding the right solution above completing the sale. Help higher education customers better articulate their integration requirements up front, and demonstrate whether and how those requirements can be met by the off-the-shelf version of a product.
	Help develop and then adopt a common, portable set of open data standards.
5. Student-Centric Higher Education	Co-create products that can optimize the student experience; improve existing products to better meet students' expectations.
	Help develop and then adopt a common, portable set of open data standards.
	Share best practices in data governance from other industries.
	Meet the three Ps: Powerful Products at the right Price.
6. Student Retention and Completion	 Develop early-warning mechanisms as a standard feature to enable institutions to identify students who need extra help or interventions. Share the algorithm with the institution so that faculty and staff know the basis of the warnings and can explain it to students, parents, and other stakeholders.
	Agree to payment based on results. Student retention and student completion are measurable, and so is the impact of new solutions on those metrics.
	Help develop and then adopt a common, portable set of open data standards.
7. Improved Enrollment	Show how other institutions have successfully used an industry product for recruitment and enrollment in ways that don't violate trust (e.g., limiting the tactics shared to institutions that don't draw from the same markets).
	Provide marketing insights from other industries, and suggest how they could be translated to a college or university.
	Participate in, and even initiate, innovation councils that include industry experts, faculty, and institutional staff to develop new technology-enabled enrollment strategies.

Issue	Industry Contribution
8. Higher Education Affordability	Take up the challenge of helping institutions reduce the cost of attendance for their students by providing solutions that can (1) lower the expenses of providing services, (2) create new opportunities for increased institutional revenues, and/or (3) disrupt existing business models to result in substantially reduced costs for students.
	Help customers make the best uses of your products and services to deepen the value they deliver. Transform the relationship from vendor-customer transaction to partnership relationship in more than just a change of terminology. Identify each other's objectives, third rails, and the common ground. Look for ways to add value and deepen the partnership. Price is important, but it should be one component of the relationship.
	Determine the primary institutional customer, and work with that unit to optimize institutional affordability, rather than working with multiple individual departments to optimize profits.
	Demonstrate exactly how the product or service will directly achieve institutional objectives, such as reducing the cost of attaining a degree.
	Mentor institutions in the kinds of changes they are struggling to make, such as change management and innovation at scale.
	Reach out to IT and library leadership to partner at an institutional level instead of going directly to faculty.
9. Administrative Simplification	Provide repositories of information, best practices, workflows, and codes. Adapt the repositories to different regions or institutional types because each has its own nuances.
	Continue and expand user groups and customer councils to help customers directly influence product development and also learn from one another.
	Work with multiple institutions, and leverage the similarities. Help institutional leaders understand implementation models and best practices that have the function or outcome your solution supports.
	Adapt to today's solution architectures by building open solutions that support data flows and integrations.
10. The Integrative CIO	Provide educational opportunities to talk about the big picture and how industry solutions, or a combination of solutions, can help address institutional issues. Offer opportunities for CIOs and non- CIOs to gather so as to share experiences and approaches.
	Partner with institutions on product development. Many products weren't designed for higher education and need to be adapted. Institutions can help shape a product to make it more valuable and work better for many different types of institutions.
	Help higher education learn about and adopt promising emergent practices, such as more flexible organizational designs or new development methods.

Collaborating to Make Progress Faster and Better

Panelist Kellie Campbell predicts: "Partnerships, collaborations, and consortia are going to be absolutely fundamental to how higher ed survives." Higher education has always been open and collaborative, and this is no time to stop. Some panelists worry about that, including Sasi Pillay: "As the future looks more and more competitive, I'm hoping we will not give up the collegial collaborative spirit that we have in place right now."

Issue	Collaboration Ideas
1. Information Security Strategy	Partner with peers at other universities and colleges in your region. Start with regular information sharing, and then establish some very specific objectives for the group, like sharing staff expertise, holding joint education programs, conducting and reviewing maturity assessments together, and establishing a sharing agreement for reciprocal threat intelligence feeds.
	Participate in the EDUCAUSE Higher Education Information Security Council (HEISC) to showcase and share successes and approaches.
2. Privacy	Collaborate with nearby institutions. Start with regular information sharing and then establish some very specific objectives for the group, like sharing best practices and policies, conducting reciprocal benchmarking, and jointly defining standards of privacy.
3. Sustainable Funding	Partner with similar institutions to share commodity enterprise solutions.
	Approach institutions with centers of excellence in niche areas, like research computing, to become a partner-customer of those services.
	Publish and share your experiences with the EDUCAUSE community.
	Create or join an EDUCAUSE Community Group (CG) to develop a national or international network on this issue.
4. Digital Integrations	Share experiences, and develop and adhere to shared standards.
	Gather a group of institutions, jointly develop standards, and approach solution providers with a consolidated, shared set of integrations requirements.
5. Student-Centric Higher Education	Use EDUCAUSE as a sounding board. Attend EDUCAUSE community conferences or the annual conference to start the conversation and to move it forward.
	Be clear about the most-effective things that can be done as a group and the things that can be done only locally. The practices that are most difficult to adopt will be those that clash with your culture. If you're trying to change the culture to fit emerging practices, get advice from colleagues on how to do that.
6. Student Retention and Completion	Share expertise and technologies with a group of like-minded peers. If shared services is a step too far, even adopting the same solution as your colleagues will enable you to learn from one another and share staff expertise.
	Get advice from colleagues on how to change the culture to fit emerging practices.
	Share your algorithms and data elements for colleagues to tweak based on their populations and objectives.
7. Improved Enrollment	Partner to make credits transferable and transcripts portable among institutions. Find programs your institution doesn't offer, and vice versa. Share students by collaboratively offering degree programs that build on strengths of multiple institutions. Technology can help—for example, by using blockchain to make transcripts and credentials portable or federated identity management to facilitate cross-institutional authorization.

Issue	Collaboration Ideas
8. Higher Education Affordability	Use consortia that focus on different areas (e.g., Midwestern Higher Education Compact, OpenOregon, NERCOMP, HESS) to get advice when you're buying or researching an acquisition and negotiating contracts.
	Collaborate with like-minded peers to help the vendor community recognize and respond to the fiscal limitations and business models of higher education.
	Use EDUCAUSE Community Groups (CGs), events, and publications to learn from others and to share your successes.
	Explore shared services agreements with other institutions to be able to reduce the resources required for certain commodity solutions.
9. Administrative Simplification	Move beyond "snowflake syndrome," in which every difference is immutable. Find institutions that are a similar size, with similar cultures, using similar tool sets, and share business processes.
	Find implementation partners who are willing to work across institutions and help you leverage one another, rather than reinventing the wheel each time.
	Help colleagues be successful by being open and honest during reference calls about vendors and consultants.
10. The Integrative CIO	■ Find your peers, and develop enduring relationships with them, whether via EDUCAUSE or other consortia and conclaves such as the Association of Independent Colleges of Art and Design (AICAD), the Big Ten Academic Alliance, the Northwest Academic Computing Consortium (NWACC), and the Research University CIO Conclave (RUCC). Use them to develop CIO skills, new perspectives, and a broad understanding of the issues facing higher education today.
	Enroll in an EDUCAUSE Institute Program.
	Attend a conference or leadership program from a different professional organization to broaden your understanding of the complexities of your institution.



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education, the data is on students, and the goal is to achieve the outcomes that both students and institutions intend. The more we know about students, the better able we are either to help them or, if we aren't careful, to mislead or even harm them. Even assuming that everyone involved in analytics and AI student success initiatives has the noblest of motives, realistic concerns remain.

Data is inert. Humans are the ones who decide what to do with data, and humans in higher education are still learning how to do that. We have spent years looking at institutional performance dashboards with glazed eyes; suddenly, we have specific signals about specific students, and we need to overcome our inertia while thinking carefully about which signals to look for and what actions to take.

Data doesn't make decisions. Humans are the ones who create algorithms or design machine learning, deep learning, and other AI applications. Humans are the ones who program nudges and determine consequences. Examples of the implicit biases that have been unconsciously programmed into algorithms and AI are widespread.¹² Addressing AI bias with algorithmic governance and hygiene, greater accountability, more discussion within and across professional communities, and other methods will be a difficult, ongoing, and utterly necessary struggle.¹³

Leaders at each higher education institution will have to decide if, when, and how to use analytics and AI. The promise is immense, but we must move carefully and operate transparently. One or two missteps will drown out hundreds of successes. We must remember that, notwithstanding slippage in public confidence,¹⁴ higher education remains a trusted industry. Higher education is held to higher standards than other industries. The outrage over the covert collection and misuse of student data by some college admissions offices should be a wake-up call to institutions with initiatives relying on ambitious data collection.¹⁵ Solution providers are playing a major and growing role in the student success space. Conversations and accountability must be extended as institutions rely on solution providers to support increasingly consequential outcomes.

Dither or Drive

The road to digital transformation is not well marked. According to Gartner, many organizations feel they are not moving forward confidently and have not committed to digital investments deeply enough to attain significant results. They are stuck in "digital dithering." Gartner advises organizations to take multiple threeto-four-year journeys to digital transformation—journeys with different objectives that build on one another.¹⁶

The road to digital transformation is full of potholes and other hazards, and it is most definitely not a straight line. But as Mikhail Gorbachev, former president of the Soviet Union, said: "If you don't move forward, sooner or later you begin to move backward."¹⁷ The college and university leaders we interviewed know this, and they are committed to moving forward with bold actions to keep their institutions healthy and their students successful. Higher education CIOs are looking ahead as well. According to EDUCAUSE data, 75 percent of CIO respondents predict that digital transformation will be more important in two years.¹⁸

The road to digital transformation is sure to be uncomfortable and unpredictable. But unlike most other industries, higher education has an inherent advantage: it is highly collaborative. If you don't want to venture on the road to digital transformation by yourself, you can join a caravan of like-minded peers at institutions supported by systems, consortia, and/or professional associations like EDUCAUSE.

Dither or drive? It's time to get moving. ■



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