The IT Workforce:
A Journey of Continuous Change

Kelli Trosvig

I stepped onto the shuttle bus with my colleagues, not knowing what to expect. We inhaled the recognizable smell of a new vehicle and found our seats as the shuttle doors latched shut. By habit, my eyes glanced forward to the location of the driver's seat as we started moving. But this was no ordinary bus: the driver's seat was empty. Or rather, there was no driver's seat at all. Most of us were taking our first ride on the University of Michigan's autonomous shuttle bus, through the MCity campus, commemorating the occasion with excited conversation (and a few selfies) as we crossed the parking lot at 10 miles per hour. The university will put the shuttle into limited general use on campus this fall, to study not only the standard safety and operating features of the shuttles for our campus, but also how riders interact with these new autonomous vehicles.

The experience inspired me. I believe that we are going to take advantage of driverless cars during my lifetime, allowing more independence and mobility for all of us in the future. Information technology is at the heart of this development, helping with the collection and management of the vast amounts of data gathered for safety and human-vehicle interactions. At MCity, the University of Michigan's test bed for autonomous vehicles, a new evaluation process is based on collecting data from every mile driven, simulating difficult, real-world driving situations, and testing them repeatedly. This work requires truly massive amounts of data, lightning-fast connections to the network, and data collection from multiple endpoints across campus. IT professionals who support this project are working at an accelerating pace to help find solutions to challenges that may not even be defined yet—requiring new skills and new mindsets for the IT workforce.

Changing Expectations

It has been ten years since the introduction of the iPhone, when many of us began to willingly—or, more likely, unknowingly—surrender vast amounts of personnel and work-related data in exchange for convenience and connectedness. Our phones are now connected to most parts of our lives, and campuses have changed as a result. The days of students and faculty fully disconnecting over the term and summer breaks have been replaced with the need to remain connected to, and supported by, their virtual communities when off-campus.

While the academic year still has its cadence, the pace of academic technology has quickened. Expectations of what composes a college or university experience have grown broader and more inclusive, entailing more technology in an ever-connected world. With the new Coalition Application, relationships with prospective students may begin many years before the admission cycle,

and relationships with alumni and supporters have become richer as campuses connect to them through multiple channels on social media. Thomas L. Friedman's latest book, *Thank You for Being Late: An Optimist's Guide to Thriving in the Age of Accelerations,* gives us a framework to examine the forces brought about by the exponentially accelerating technology ecosystem, introduced a decade ago as cloud computing, mobile platforms, and ubiquitous networks.

What does this mean for those of us working in higher education technology?
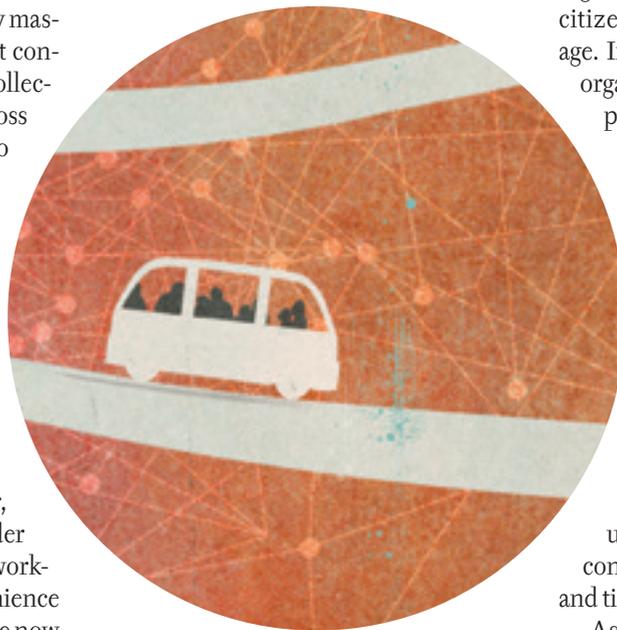
Summer was already the busiest time of the year for catching up on projects from the previous school year and implementing a growing list of new technologies and capabilities for the upcoming fall term. There was never any shortage of work. The need to be always connected has moved campus technology to a high-wire act of mission-critical tasks, with virtually no downtime. Putting out our best effort over the summer is no longer good enough as students and faculty collaborate from across the globe. Our roles in campus technology are becoming more expansive as we help our students and faculty navigate the practice and policy changes brought about by

these new technologies. For example, this past summer the IT organization at the University of Michigan–Ann Arbor participated in the development of a new online course for incoming students in the College of Literature, Science, and Arts: "Digital Wolverines: Global Citizenship and Diversity in a Digital Age." This course addresses topics such as online privacy and security, fake news, trolling, digital wellness, and digital citizenship while providing an opportunity for our incoming students to read about, reflect on, and discuss with other incoming students these issues related to global citizenship and diversity in a digital age. In a relatively short time frame, IT organizations have moved from being peripheral to campus planning to serving as a vital utility (with the reliability and resiliency that entails), to assuming a new role as a strategic differentiator for our campuses. This new role creates additional responsibilities for developing or enabling policy areas such as security, privacy, and digital citizenship. At the same time, all of this acceleration and expansion is happening as colleges and universities are facing resource constraints, limited tuition increases, and tightly managed enrollment targets.

As Friedman's book affirms, the acceleration we already feel is real and is being felt in every part of our higher education institutions. Those of us in campus IT organizations can no longer keep up by working harder or smarter. We can't simply keep doing the same things better or throwing more dollars or staff at problems. Part of this acceleration is brought about by the external forces of technology around us: the iPhone, the automated vehicles, virtual reality, the capabilities of the cloud, and expectations about how the IT organization should mediate with all these disruptors. And part is due to the changing nature of the institutions we serve. College and university missions and portfolios have expanded outside of teaching and

research and now encompass intensive data science and research, management of large health systems and athletic programs, and support for large online learning environments and outreach programs with varied technology needs. All of this work requires more connected and integrated systems, leaders who think differently about how we should deliver and optimize information technology, and a more adaptive workforce.

Building a Learning Organization

Higher education information technology is fortunate to have a workforce that is motivated by mission and is highly focused on improving the user experiences and outcomes of faculty and students. When IT leaders take advantage of these inherent strengths and bolster
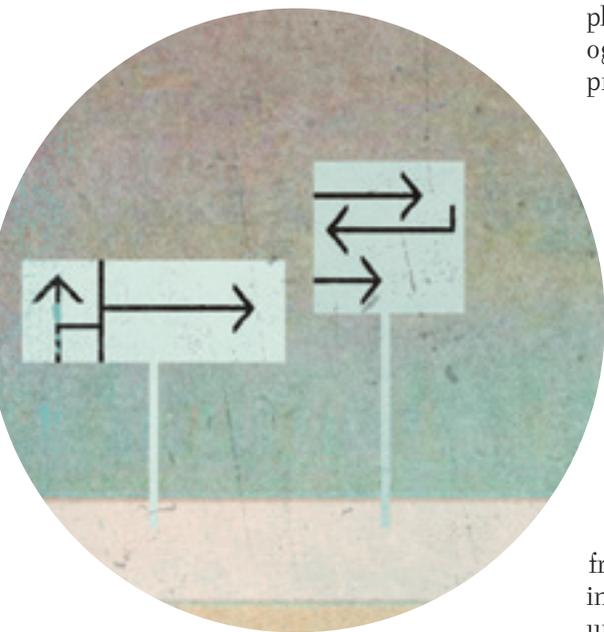
them with strategic investments in training, the organizations are better able to stay at the edge of the technology-adoption curve that campuses increasingly require. While the demand is growing for many current services, it is the demand for the yet-to-be-defined future services that will provide new challenges to the workforce as IT

organizations move from service provider to the evolving roles of service manager, advisor, advocate, and broker. At the University of Michigan, services at the edge of that adoption curve include 5G networks for research data, high-performance computing in the cloud, and security as a service for specific, highly regulated research efforts. These new roles and the services they enable will lead to greater acceleration and the development of additional, not-yet-imagined roles for the IT organization.

I often like to describe technology organizations as a balancing act between reaching for the stars and keeping the planes flying on time. Today's technology organizations need to balance promoting discovery, which involves inquiry and risk-taking, with providing rock-solid, dependable services at scale, which involves a high level of complexity and coordination. Doing both requires thinking innovatively and working with others across campus and outside the institution. The IT organization can thrive in this accelerating environment by becoming an agile learning organization. To do so, leaders need to think differently about how they develop and sustain their workforce, from fostering innovation and supporting learning through structured and unstructured methods, to embracing experimentation and learning with campus and industry peers, to encouraging learning from pilots quickly and without penalty.

Fostering Innovation

Colleges and universities are more diverse and experiential, with faculty and students always connected to their devices and networks. Much of what is happening in higher education is

reflected in IT organizations. IT teams are likewise more diverse, staff and partners are more connected, and the ability to collaborate with other teams is an expectation not an exception. It is important to provide opportunities for IT staff to work through technology challenges with their peers in both safe and supported ways.

The most transformational work that we IT professionals can do is working across interdisciplinary boundaries. When we are able to bring people together from varying backgrounds and help them form teams, the resulting diversity of perspective, thought, and opinion leads to better results. Giving teams safe ways to practice this results in better outcomes when the stakes are higher. The annual "Hacks with Friends" event for the University of Michigan IT community is a great example of a safe, fun environment for practicing and modeling these efforts. Teams from across campus have thirty hours to produce a minimally viable product. This year's winning entry—"TriggerFigureOuter," a migraine trigger-tracking identification tool—brought together groups from central IT, engineering IT, health IT, and dentistry IT organizations.

Other ways to bring people together include communities of practice, regularly scheduled brown-bag meetings, and IT symposiums and poster sessions that provide open forums for staff to gain fresh perspectives from different areas of the institution. Leadership training and mentorship programs also help to develop the soft skills and the cross-organizational communication critical to an IT organization's success.

Providing Ongoing Support for Managers

Managing in technology organizations has become increasingly challenging as teams often work across multiple

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technology platforms and projects. This is all the more difficult because of the rapid acceleration in technology; managers may have only the most basic understanding of what will be needed next. As a learning organization, the IT organization needs leaders who will rethink support for managers and human resource functions and will focus much more on workforce development for the organization, also while helping managers and teams develop professional plans for their groups and individual members. Often this is as simple as finding examples of what is working inside and outside the organization and supporting those cases with policies that encourage experimentation. Some of these will be small opportunities that can be leveraged and expanded into larger opportunities across the organization. For example, at the University of Michigan, we have developed staff rotations from the service center into desktop support, and rotations from desktop support into desktop engineering, allowing the organization to retain valuable staff while providing the staff with opportunities to expand their skill sets.

Early last spring I was having a conversation with a member of my team

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about a vision for workforce development that provides ladders for staff to gain new skills and opportunities and contribute to the organization through job rotations, workforce training plans, and skills-development investment at scale. Not ten minutes later, another team member stopped by my office to share that he was participating in an engineering rotation within his desktop support team to develop new skills. He was excited about the opportunity, and I was both excited for him and happy about what it said about the culture we are creating in our organization. This is the type of thing that makes my day as a leader. It's not always the big developments that are exciting; sometimes it's something small that shows we are heading in the right direction.

One of the most important skills to develop in our IT organizations is an ability to take some calculated risks in developing new capabilities, business models, and services. This is best exemplified by piloting services. True pilots of services give us the opportunity to make honest assessments of what we learned, but they also require us to make hard decisions about whether to approve a service for

implementation or to not progress it forward (perhaps because this isn't the right time or the right service for our institution). When pilots are viewed as learning opportunities by organizations, then by definition all pilots are successful, in that they contribute both to a better understanding of the problem and to a solution. It takes discipline to adopt a true pilot mindset, structuring the pilot as a learning opportunity and staying true to an agreed-upon set of criteria for making a go-forward decision. It is easy to fall into the trap of full implementation because of a vocal constituency or because everyone else is going forward. Once a series of pilots has sent services back to be redesigned, determined now is not the right time for this service, or captured lessons learned and decided not to go forward, subsequent pilots more easily become true learning opportunities.

Partnering with Industry

Industry partnerships are becoming increasingly important to higher education institutions as faculty and students begin to address the most challenging research problems. When I moved across the country from Seattle to Detroit, I had to relearn the "Big Three" as Ford, General Motors, and Chrysler—not Microsoft, Amazon, and Google. However, all six are interested in partnering with colleges and universities
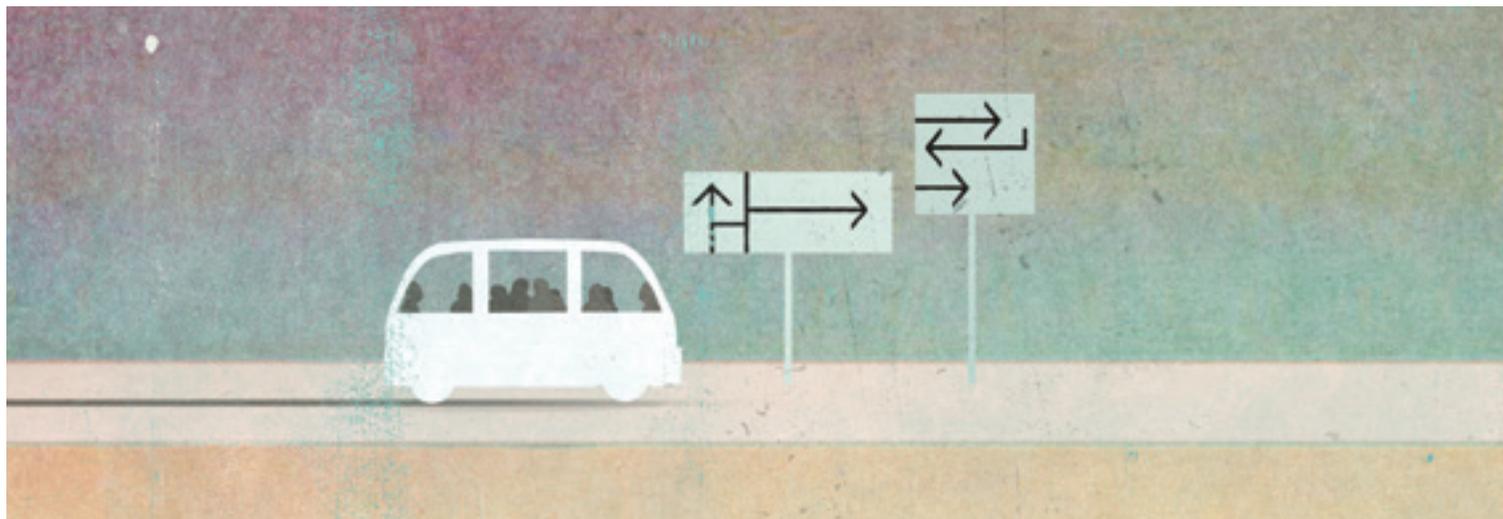
to explore the paradigms of connected transportation and mobility, whether through drones, connected cities, or autonomous vehicles.

Some of the most interesting questions about how we will interact and share information in this connected, mobile world are being asked through these partnerships. Health care and cybersecurity are two other strong areas of collaboration between industry and higher education. The complexity and scale of these multidisciplinary problems require forging broad partnerships and sharing information across both institutions and industries.

Learning from Peers

On the final day of the EDUCAUSE 2016 annual conference in Anaheim, California, I attended one of the last sessions of the day: "Culture Shift: How DevOps Changed the Way We Think about IT," by Adam Mikeal, director of information technology for the College of Architecture at Texas A&M University. Despite the thinning crowds as vendors packed up their exhibits and others caught flights back home, Mikeal's session was at overflow capacity. Higher education leaders recognized the need to learn about the DevOps movement that is

DevOps

DevOps is the sharing of responsibilities between software development, service operation, and quality assurance—creating a close-knit organization. The benefit of the DevOps process and culture is the ability for developers to utilize automated testing, deployment, and system infrastructure changes as part of daily work—commonly known as continuous integration/ continuous delivery (CI/CD)—to deliver projects and systems more quickly and with higher value.

being rapidly and broadly adopted by our industry peers, and how it could be implemented in the college/university environment.

To me, this represented what is best about IT leadership: an eagerness to learn about practices from outside our industry and to share our successes, failures, and challenges. As Mikeal shared his college's initial steps toward implementing a DevOps culture with software development, and how the school moved to more fully embrace automation, I could see leaders across the room beginning to understand the power and potential of this new methodology for their own organizations and campuses. And even more importantly, I saw that they were exercising the mindset of trying something new, perhaps at a smaller scale.

One of the best things about higher education is the collaborative nature of our peers. There is an unmatched camaraderie across the higher education IT profession and a willingness to contribute to each other's successes, share the good along with the real lessons learned, and allow all of us to improve and add value with each iteration. I experienced this as a new leader in higher education nine

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years ago, and I felt it again this year when I joined my new institution, the University of Michigan. Learning and sharing is part of our DNA in higher education.

This past summer, I took a busload of IT leaders from Michigan to Notre Dame to learn about Notre Dame's journey to the cloud for its campus infrastructure. Although there might be an intense rivalry between the two universities' athletic teams, the members of Notre Dame's IT team were immensely collaborative and collegial as they shared as much as could be packed into a day. They answered every question we asked and shared their successes as well as the harder lessons learned overall. The day proved to be incredibly productive for everyone who attended from both institutions.

The University of Michigan team that traveled to Notre Dame represented all parts of our campus—from the business school to medicine to research to the central IT organization. On the bus ride there and back, we rotated seats every thirty minutes to learn more about one another. We purposely chose seatmates from outside our own organizations and

discussed our backgrounds, what we hoped to learn, and what we could apply or consider trying back at Michigan. As in most other aspects of life, the trip to Notre Dame became as much about the journey as the destination, about how we learned together and shared with one another. It's not every day that you can take fifty IT leaders on a one-day, seven-hour, round-trip bus trip and have everyone leave the bus energized and in good spirits, ready to share what they learned with their teams.

A Journey of Continuous Change and Improvement

While a physical bus can fit only so many people, those of us in higher education IT organizations need to make sure to invite everyone on the metaphoric bus. We can do this by making all managers accountable for creating professional development plans for each person in their group and by helping them to understand the implications of business demands or changes for their areas—as well as the importance of communicating these implications to their teams.

The campus technology organization, just like the larger college or university, is ultimately a people business. These organizations are only as good as the skills and culture of their people. The most successful technology organizations and higher education institutions create environments that are supportive and collaborative, and that provide opportunities for cross-training and technical and professional growth for all their staff. They create opportunities for staff to learn from one another as well as from others outside the organization/institution.

People who work in information technology, no matter the industry, are naturally curious individuals who embrace change. As IT leaders, we too must commit to a journey of continuous change and improvement. Some of us are lucky enough to do this work in higher education, where every day we are urged by our faculty and students to push the boundaries, driven sometimes by technology and sometimes by cultural change. It is our responsibility to make sure our teams are prepared and supported as we take this journey together. ■

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