hat technology evolves is a given. Not as well understood is the impact of technological evolution on each of us individually—on you, your skill development, your career, and your relationship with your work community. How is technology evolving, and how is this changing your work? How are people, positions, and processes changing, and what is the role of evolving technology in causing these changes? How are you evolving, and how does this affect your use of technology? What is the “evolving you”—You 3.0?
The “Why” behind Evolving Technology

Technology is now seen by some college presidents and administrators as “operational”—on par with providing electricity—rather than strategic.¹

In The Value of Convenience: A Genealogy of Technical Culture, Thomas Tierney theorizes how our culture has historically imbued technology with the quality of “convenience.”² In the past, technology has been seen as a means to an end. Technologies extend our physical abilities (we travel faster, speak louder, see farther), enabling us to achieve core survival requirements more easily. Technologies are tools: we use them to help us achieve a goal—a goal that we have defined previously. Computer and digital technologies in education were originally thought of in the same way: they made record-keeping easier (both for teachers and for institutions as a whole) and conveyed core information (e.g., course requirements, grades) more readily. As a result of getting basic work done more easily and efficiently, faculty and staff had more time and energy for other activities. In other words, the medium of the convenient technologies changed the content and process of living, shaping and controlling “the scale and form of human association and action.”³

But technology (or the medium) not only affects our interactions. Technology itself has become increasingly more stable, ubiquitous, expected, and invisible. For example, in the past, owning a home computer required understanding how to install and configure an operating system, order a boot sequence, update a bios, and set parameters; it required specialized skill and knowledge. Today, computers are purchased preconfigured, with perhaps a DVD showing how to select a few carefully chosen options. What was once an act of skill is now an act of purchasing; knowledge has been transformed into a commodity. In Technology and the Character of Contemporary Life, Albert Borgmann names this shift from technology as a tool to technology as commodity “the device paradigm” and argues that the evolution of technology into a commodity is the “guiding pattern for the transformation of human existence and the world.”⁴ No longer is our engagement with technology a matter of automating a manual activity or achieving a goal. Today technology has become integrated within those goals and activities themselves.

The “What” behind Evolving Technology

Just before an airplane breaks the sound barrier, sound waves become visible on the wings of the plane. The sudden visibility of sound just as sound ends is an apt instance of that great pattern of being that reveals new and opposite forms just as the earlier forms reach their peak performance.⁵

Two developments demonstrate this shift from technology as a convenient extension to technology as a ubiquitous appendage. These developments have also had, or portend to have, a significant impact on everyone in higher education and particularly on those in the IT profession. First is the explosion of personal and increasingly mobile devices aimed at the individual consumer market, with increasing options for network access. And second is a shift in attention: with the ability to virtualize hardware, software, services, and environments, users are now more concerned with the service...
(the actions and the affordances) than with the technology itself.

IT's All about the Individual
In the 1990s and earlier, one's work environment generally had more sophisticated computing equipment than one's home. Many college/university faculty, staff, and students did not own a personal computer, a laser printer, a cable modem, or a wireless router. These items are now not only commonplace at home but often are viewed as necessary to stay “connected.” Initially, campus IT support was available only for at-work devices. Eventually, the increased availability of home-office equipment led to demands that the campus IT service points expand to include the home office, a level of support that is often done poorly if at all (for good reason).

Three byproducts of the entrance of computing devices into the home are of interest to the IT professional: an increase in the technological literacy of non-IT professionals; improvements in interface design to obviate the need for this greater technological literacy; and finally, an increase in networked, web-based services (and a decrease in client/server applications) to offset the need to configure home computers to access work resources.

Consumer devices have moved not only into our homes but also into our pockets, purses, and backpacks. Most mobile devices today have more computing power than an average desktop workstation had in the 1990s. The increased power of these handheld devices has changed users' expectations regarding service availability and support. As consumers, we expect 24/7/365 access to messaging and to the Internet. Faculty, staff, and students expect similar access to software and service may be preferred. Physical spaces such as computer labs and server rooms thus need to evolve in concert with the technology.

Moving full circle, the growing distance between computing assets and computing services shifts the focus away from the gadget or the tool and back to the person using it—to the individual.

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Evolving Students
The two developments in evolving technology are reflected in the expectations of incoming college/university students, especially the more traditional students (i.e., those coming directly from high school). These students expect their education to be personalized to their individual wants and needs; they expect their education to be easily achieved and focused on the skills they will require in their future profession. In other words, most students are not learning for learning's sake or for getting a degree; instead, they want the skills needed to enter the workforce.

Students hold in their hands devices that allow them to easily and instantly access information. Instead of coming to school to learn things/information, students are now coming to learn what to do with the information. Yet though students may already have some experience in working with complex technologies, that doesn't mean they are experts in finding, processing, and interpreting information.

Indeed, Marc Prensky's metaphor of digital natives and immigrants does not fit. Being a native implies having an unconscious understanding of deep and complex processes within the culture, and this is not the case with incoming students and their technology usage. For the most part, their use of information technologies is still very superficial, with single-layer search and access of data processes and unidirectional communications. Mark David Milliron's martial-arts “belt” metaphor works better to describe the difference between technology users. Although many younger students may quickly learn how to use certain aspects of their phones and computers, it still takes time and energy to learn the complexities that come with being a master technology user at the black-belt level. Generally, students are
the ones who “get” that technology is life. But faculty are often the black-belt users with the wisdom to help students develop more complex and sophisticated thinking skills that will enable them to mine data, manage risks, mind security, and make connections.

Evolving Faculty
Evolving technology has influenced the expression of expertise by faculty in the classroom and in writing. Students and readers have easy access to information: quick Google searches allow them to question and engage faculty. With the large amounts of easily accessible data, faculty are now able to shift their focus away from the content and toward the process of their scholarly fields. Being a scientist is not simply about knowing the various laws and theories that govern nature; it’s also about thinking like a scientist, about approaching problems scientifically. The evolving technology is allowing scholarship to become a more contextualized endeavor. Faculty are teaching students the process of being a psychologist, a sociologist, or a historian, in addition to assessing students’ knowledge of the work of Sigmund Freud, Max Weber, or Frederick Jackson Turner.

The tough ideological shift for many faculty today is the acceptance that technologies no longer simplify processes; instead, working with the technologies has become a process in itself. Faculty, like most people, benefit from learning not only how to use hardware but also how to use the complicated layers of software (even Microsoft Word) in more complex and sophisticated ways. Just as secondary research practices have moved online, so too the teaching continuum has shifted from face-to-face instruction to web/digital-enhanced face-to-face instruction to completely online instruction. There is little space remaining for those faculty who can’t perform sophisticated search strategies within library databases, who refuse to use the computer station at the front of the classroom, or who do not provide some online course component for their students, whether this be through a learning management system, a blogging tool, a web page, or electronic reserves.

Neither faculty nor students can develop their technology skills by themselves. They need help both from academic/support services staff and from IT staff.

Evolving Academic/Support Services Staff and Evolving IT Staff
A recent Computerworld article stated: “Futurists and IT experts say that the most sought-after IT-related skills will be those that involve the ability to mine overwhelming amounts of data, protect systems from security threats, manage the risks of growing complexity in new systems, and communicate how technology can increase productivity.”

The amount of data collected at higher education institutions has been growing exponentially for more than ten years. Part of that growth has resulted from the need for redundancy as data has become central to institutional decisions. There is also a growing amount of data being collected about institutional programs, research, customer satisfaction, and external ratings. Staff from a variety of academic and support services will need to become savvier at managing, manipulating, and interpreting this data. Being able to steer the collection of data longitudinally, to determine how to utilize the data, and to analyze and present data for decision support will be key.

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this common understanding in order to help one another assess risk and get work done.

For the IT staff member, the rapid evolution of technology in the consumer market will require a deeper knowledge of data mining, risk analysis, and ITIL processes to successfully bring services to the higher education community. To enable the productivity of students, faculty, and academic/support service staff across the institution, IT staff will also need to better understand specific business processes. The IT worker who understands how the institution’s business processes work and the chain of processes that must occur for a service to be delivered will have a head start in being able to generate risk scenarios and how to test that a new technology will not break that chain. This does not take away from the need for appropriately trained technologists; however, these technologists will not fit the traditional role of technologists as “super-geeks.” The role of technologists will be one of understanding outside complex architectures and how those can be aligned with internal needs. A good analogy here is the electrician who understands both the local and regional electrical grids and how those connect up and down to the individual city block, building, or office needs.

A recent Gartner report provides insight for IT professionals who are looking for a rubric to measure current skill sets and a roadmap to evolve long-term learning opportunities in order to remain relevant and in demand for the higher education IT enterprise. The Gartner model divides the IT professional into three categories: the Vision and Creativity Expert, the Business Expert, and the Technology Expert. In the future, the business and technology experts will need to work in concert to realize enterprise computing solutions. The vision and creativity experts will
need to continually communicate with end-users to explain new opportunities and benefits while also engaging users in a dialogue about infrastructure dependencies.¹¹

In reviewing this shift in skill sets for all staff, we see an emerging theme: the need for clear and concise verbal and written communication as well as an understanding of technology architectures and alignment strategies for leveraging current and future computing utilities. As teams are put together to formulate solutions to institutional problems, the relationships among those team members will increase in importance. Successful staff will need to expand their skill sets with IT-related knowledge and skills. Similarly, the technologist will continue to play a valuable role in the future, but the person with only technical skills will find fewer career choices. IT workers must expand their skill sets with softer skills. Synthesis, the ability to combine constituent elements into a unified entity, will be a skill with increasing value as systems become more complex and as integration between systems increases. Just as faculty are facing expectations to move from the “sage on the stage” to the “guide on the side,” so the IT staff member must move from the “geek on the peak” to the “nerd in the herd.”

Evolving IT Leaders
IT leaders, especially, must adopt a business perspective when examining IT processes. In fact, the long-standing Society for Information Management (http://www.simnet.org/) has rebranded its position with the slogan “Delivering Business Value Through IT Leadership.” The CIO has become “as much a business leader as a technology leader.”¹² Although some argue that the first job of the CIO is to “keep the network connected, the e-mail flowing, the course
management systems available, and administrative systems operating—with decreasing budgets; doing this job well could also cause IT leaders to become “victims of their own success.” The problem arises when the technology operates effectively and becomes a part of the operations of the university and not a part of the strategic growth.

What does this mean for today’s IT leader in higher education? Is it time to uncouple operations from strategy, technology from business? Julia King in her Computer World article “IT Careers 2020: Cloudy Days Ahead,” talks about the “two-tiered” IT organization of the year 2020: the first tier of “deeply technical professionals with multiple certifications in virtualization, networking and security technologies” and the “second tier of IT professionals: super-IT-savvy business experts who reside in the business.” She notes: “Going forward, CIOs and IT employment experts predict that this bifurcation of IT roles will vastly accelerate, with most professionals falling into one of two major categories: technical specialists and business specialists.”

On the other hand, J. W. Weiss and S. M. Adams argue that technology leaders need a breadth and depth both of business knowledge and skill and of technology knowledge and skill (see Table 1). They discuss the technology leader’s skills on a continuum from basic to expert (depth) and from technologist to change agent to business expert (breadth). Perhaps the point is simply that good technology leadership should look like good leadership. The abilities of a good IT leader should include skills such as change management, organizational leadership, relationship building, financial acumen, accountability, and risk management, as well as interpersonal and intrapersonal soft skills such as effective communication and persuasiveness. All of these skills would be found in any MBA program. In addition, this business perspective should also include an understanding of competition: both for the institution and for the services it

Table 1. IT Leader (CIO) Career Profiles: Breadth and Depth of Competencies Needed

| DEVELOPMENTAL AREAS OF COMPETENCY (BREADTH) |
| TECHNOLOGIST | CHANGE AGENT | BUSINESS EXPERT |
| e.g., understanding existing systems and technology | e.g., understanding sources of conflict and resistance to change | e.g., understanding business practices, processes, and approaches |
| e.g., applying procedures, tools, and methods; designing and developing applications | e.g., focusing on results; building relationships and teamwork | e.g., managing projects; planning, prioritizing and administering work |
| e.g., designing technical architecture; integrating systems | e.g., leading, inspiring and building trust; principled negotiating | e.g., leading cross-functional IT and business teams |

provides. Fueled by personal, consumer-oriented experiences with cloud services such as Gmail, Facebook, and iTunes, students, faculty, and staff come to the table with high expectations for institutional services. IT leaders not only must keep the existing technology running and meeting the increasing demands of the tech-savvy customer but also must be forward-thinking in continuing to keep the institution competitive. College and university leaders are not interested in the “cool” factor of a technology as much as they are interested in what the technology does to contribute to the strategic plan or to solve long-standing problems.

Balancing technology with the business of technology becomes the challenge for the evolving technology leader. The rapid developments in technology, the changing demands, and the lack of concrete information about technology two to three years out all require IT leaders to become, themselves, a continually evolving technology: You 3.0.

**Conclusion**

*Our intelligence tends to produce technological and social change at a rate faster than our institutions and emotions can cope with. . . . We therefore find ourselves continually trying to accommodate new realities within inappropriate existing institutions, and trying to think about those new realities in traditional but sometimes dangerously irrelevant terms.***

We believe that everyone in higher education will become an IT worker and that IT workers will be managing a growing number of technologically mediated services. These shifts in both practice and technology have changed the skill sets deemed essential for many in higher education, creating significant opportunities for developing a “You 3.0 plan.” The challenge today is to continually evolve both business and IT skills. Those who work in the traditional IT fields need to further develop their verbal and written communication skills, marketing skills, and relationship-building skills. Students, faculty, and staff outside of technology need to gain a solid understanding of how technology works and of related IT issues.

We believe that in the future, it will be less important to have skills in or experience with particular technologies and more important to be able to evolve with technology to contribute in a meaningful way to the institution and its mission. Technology must be presented as a solution to a problem or as a vision to move the college or university forward in accordance with the institutional strategic plan. The focus will no longer be on the technology, in itself. The focus will be on the relationship between the evolving technology and the user—that is, on You 3.0.
Notes
14. Young, “College 2.0.”
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