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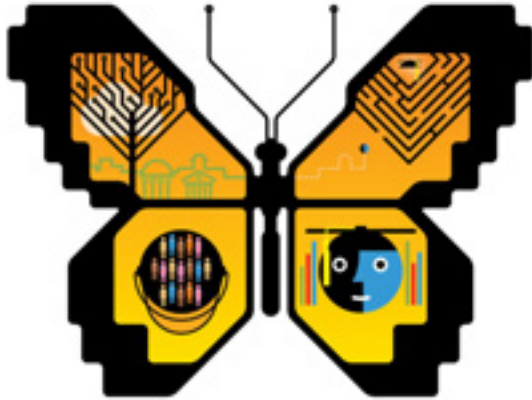
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By Laura Gekeler

https://er.educause.edu/articles/2018/3/innovation-in-the-business-of-higher-education

The Future of EDUCAUSE, Part 3: Reimagined Professional Learning

At my first EDUCAUSE annual conference as CEO, I was invited to the reunion held for participants of our professional learning programs over the years. Nothing could have prepared me for the buzz in the room—the hugs, the photo sharing, the laughter, the memories, and the camaraderie. The experience was a powerful reminder to me that EDUCAUSE serves a learning community that deeply values professional learning. A conversation with any EDUCAUSE Institute graduate or faculty shows how hungry members of our community are for the opportunity to learn what they need to learn for success in their current roles—or what they need to learn for their next position.

In earlier Homepage columns I talked about the future of EDUCAUSE part 1 and part 2, focusing on two of the three EDUCAUSE strategic priorities.[1] Here I'd like to talk about the important work of the third priority: "reimagined professional learning."[2] Over the next few years, one of the association's highest priorities is to provide our members with an expanded and reimagined portfolio of professional learning options, including personal assistance in exploring opportunities for both institutions and individuals.

> The focus on the changing learning needs of IT professionals is essential precisely because the nature of our work and our workplaces will be transformed by advances in technology.

You'll notice I'm referring to *professional learning* and not *professional development*. Historically, EDUCAUSE focused on the *development* of its members, as did most other professional associations. The emphasis here was on the presentation of information and the inculcation of leadership knowledge and management skills in program participants. This is a familiar model and has served our members well, but we are convinced that today's IT professionals need more.

Just as higher education institutions are becoming more learner-centric and more focused on student success, EDUCAUSE too is reorienting to engage members as active partners in determining the content of their learning, when and where their learning occurs, and how they evaluate its effectiveness. We're working with faculty and presenters to develop immersive learning programs that support members in creating their own career-development paths. From our research on the IT workforce, we know that current IT employees do not see a clear or definite path to executive leadership positions and that many higher education IT professionals simply don't know what their next career move entails.[3] In this turbulent environment, IT managers and emerging leaders need programs that improve their interpersonal, communication, and supervision skills and assist them in building high-quality work environments that value and retain employees, all while keeping them connected to the changing needs of their institutions.

The focus on the changing learning needs of IT professionals is essential precisely because the nature of our work and our workplaces will be transformed by advances in technology. Automation, cognitive computing, and digital transformation are just a few of the forces reshaping the nature of work in the twenty-first century. Yet as we invest in new tools and processes to enhance productivity and improve service quality, we must also invest in our people. What IT organizations need now is a set of distinctly human skills: adaptability, creativity, empathy, problem solving, and decision making.

Along with changing our approach, we are also committed to expanding the number of members we serve with EDUCAUSE professional learning opportunities. For 2018, we have increased the number and capacity of EDUCAUSE Institute programs in several ways:

- Offering abridged, specialized versions of our popular leadership and management programs at EDUCAUSE conferences—for example "Strengthen Your Leadership Skills for Infosec Success" at the 2018 Security Professional Conference

Large Active Learning project using round clusters (9 seats per cluster)

In 2015 California State University created a 180 seat Active Learning space on their Dominguez Hills Campus.

The architect determined a triangle-shaped solution would provide increased capacity. The Triangle Cluster was born (pictured below).

The round clusters installed at Rutgers University include a Crestron TT-100 Cable Caddy in each surface for data and HDMI cables.

The Power Core can be used for table top power and wire management.

Computer Comforts, Inc.

(continued from page 4)

- Partnering with Internet2 to deliver our New IT Managers Program at the Internet2 Global Summit in San Diego
- Expanding the space available in the EDUCAUSE Institute Management Program, our most-demanded offering, by welcoming multiple individuals and teams from a single institution for enrollment in the same event

In close collaboration with our remarkable EDUCAUSE Institute faculty, we are also reviewing the scope, content, and intended outcomes of our 2018 programs to better support leaders and managers in creating high-performing and diverse teams, retaining talent, and ensuring a strong IT leadership pipeline. We know that we need more opportunities for director-level staff to engage with experienced senior leaders and build peer networks within and across institutions. Look for new programs for this audience in 2019.

While immersive learning programs within the EDUCAUSE Institute will remain a core part of our education portfolio, we understand that reduced budgets, travel considerations, and time away from campus present barriers to participation. As a result, a good number of our members engage as learners through our online events. To better support this audience, we are launching a new "EDUCAUSE Encore" series featuring presentations of the most popular and thought-provoking conference sessions for those who may have missed the event or who attended in person and now want to share what they experienced with other colleagues on campus. These *live* online events offer participants the chance to ask questions and engage with colleagues and presenters in forums designed to support active engagement with other participants and with program content. For a first look at these new online events, register for #ELI2018 Encore! Achieving Student Success through New Models of Learning (in July) or Encore! Selections from the EDUCAUSE Security Professionals Conference 2018 (in August). I hope you'll consider participating in this new series: join with your teams, share in a common learning experience, and perhaps use the event to promote cross-departmental collaboration and advance a current or upcoming project. We also look forward to hosting an EDUCAUSE Encore event in the weeks following the EDUCAUSE Annual Conference.

We are working hard to ensure that our conferences are exceptional professional learning experiences. Those joining us at the EDUCAUSE Annual Conference in Denver this October will find more physical spaces dedicated to knowledge sharing, will benefit from a dynamic program schedule with more options to choose preferred session formats, and will be able to more easily discover those members and communities of greatest interest.

You can help make next year the best ever in your career by making a plan. If you're an IT leader, consider what your organization spends annually on staff training. EDUCAUSE Core Data Service research indicates that central IT organizations spend $1,119 per FTE on professional development (approximately 1% of total central IT spending).[4] Are you underinvesting? If so, do you have a plan to achieve that higher level of investment? If you're an IT professional, have you taken responsibility for advancing your own professional learning? Have you made the case for investing in yourself?

EDUCAUSE programs, events, and conferences can accelerate individual career development, help retain talented staff, improve management of campus-based projects, and build strong teams across the IT organization. After all, growing as professionals and leaders, sharing what we learn, and inspiring each other are at the heart of the EDUCAUSE community.

Notes

1. John O'Brien, "The Future of EDUCAUSE: Expanded Partnerships and Collaboration," *EDUCAUSE Review* 52, no. 2 (March/April 2017); John O'Brien, "The Future of EDUCAUSE, Part 2: User Experience and Personalization," *EDUCAUSE Review* 52, no. 3 (May/June 2017).
2. The "reimagined professional learning" strategic priority lists four goals: (1) Members will be able to plan for and strategically address the leadership development needs of their teams through EDUCAUSE support and services. (2) Members will rely on EDUCAUSE learning resources to acquire the skills they need to meet the demands of their roles today and into the future. (3) Members will be able to design and manage their professional development over time through learning pathways customized to their experiences and career aspirations. (4) Professional development programming will strengthen the leadership pipeline, including a deliberate focus on diversity and inclusion.
3. Jeffrey Pomerantz and D. Christopher Brooks, *The Higher Education IT Workforce Landscape, 2016,* ECAR research report (Louisville, CO: EDUCAUSE, April 2016).
4. *2016 EDUCAUSE Almanac for Core Data Service,* All Non-Specialized U.S. Institutions (March 2017).

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Making Higher Education Work for Students and America

s higher education worth the investment? Many Americans no longer think so.

A national survey from NBC News and *The Wall Street Journal* in August 2017 found that 47 percent of Americans think a four-year degree is not worth the cost "because people often graduate without specific job skills and with a large amount of debt to pay off." There are also millions of students who don't complete their certificates or degrees (nearly half of those who start don't finish within six years). As a proud American, I'm sad to hear so many of us have lost faith in our higher education system, especially when we know that by 2020, 65 percent of all US jobs will require postsecondary education.[1]

But there's another critical side to this equation: corporate leaders regularly and openly share that their college-graduate employees don't have the skills needed for workplace success. In our rapidly evolving, technology-driven world, employers expect and need employees to be "plug and play." Instead, according to employers, recent graduates don't have sufficient critical-thinking, communication, and decision-making skills. Nor do they have a working understanding of how their new knowledge can be utilized to be effective in their new roles.[2]

That's a three-way disconnect between students, educators, and business leaders—and a big problem for our nation. The question is: How do we fix it?

This crisis didn't happen overnight. The economy and workplaces have shifted radically, yet US higher education looks largely the same as it did fifty years ago. Most colleges and universities were built for students who are 18 to 24 years old, who live on campus, and who attend full-time, directly out of high school, with school attendance being their primary focus.

But today's student is much more likely to be older, to have attended some college already, and to be completing coursework while also working full-time and raising a family. Traditional models of higher education don't work for these modern students. If we are serious about closing the education gap in the United States, we need to make higher education accessible to this new majority, especially to adult students who are often the first in their families to attend college and who don't have the luxury of forgoing work for school.

Solving this problem matters for students, of course, but it also matters for the nation. The economy needs more workers with postsecondary credentials to fill current and future jobs that will enable the United States to be competitive in the global marketplace.

A new model for higher education can address these challenges by addressing four key factors:

1. *Respond to students' needs with innovative products and services.* Today's education consumers expect choice, transparency, service, and value. Providers need to meet the needs and expectations of students while offering multiple options toward educational attainment. Higher education could learn from the approaches taken by innovators such as Southwest Airlines and Amazon, companies that succeeded by responding to consumers' needs with transformational approaches.

2. *Make higher education affordable.* Lack of time and/or money is the top reason students disengage from higher education. We must find ways to contain costs if we expect students, especially low-income students, to succeed. Many approaches to helping students shorten their time to a certificate or degree can also help lower costs: transparent transfer-credit policies, credits for demonstrated competencies learned in the workplace or military, alternative credentials, and massive open online courses (MOOCs). We need to keep experimenting with these types of nontraditional approaches.

3. *Build stronger bridges to the workplace.* Higher education that's designed to lead directly to work in growing industries brings tangible value to students. When I started in higher education, everyone agreed that course content needed to be changed every five years to stay relevant. The impact of globalization and technology has accelerated that timeline. To keep pace with the changing economy, course updates should now occur every twelve to twenty-four months.

4. *Transparently collect and report data that measures real-world outcomes.* Academic institutions typically measure their success against one another. But if everyone is equally unsuccessful, we're in a race to the bottom. Institutions need to hold themselves to higher standards and create independent benchmarks of student learning in critical-thinking, writing, and real-world outcomes (e.g., alumni salary measurements) that capture return on investment. And colleges and universities need to make this data readily available so that potential students can effectively evaluate institutions and make an informed choice.

By **BECKY TAKEDA-TINKER**

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At a time of massive global change, higher education must evolve in order to continue to be relevant and to serve the needs of students and the companies that seek to hire them. The economic security of millions of Americans and the future of US competitiveness in the global marketplace are at stake. ◼

Notes

1. Carrie Dann, "Americans Split on Whether 4-Year College Degree Is Worth the Cost," *NBC News*, September 6, 2017; Elizabeth Chuck, "Just Over Half of All College Students Actually Graduate, Report Finds," *NBC News*, November 18, 2015; Anthony P. Carnevale, Nicole Smith, and Jeff Strohl, *Recovery: Job Growth and Education Requirements through 2020*, executive summary (Washington, DC: Georgetown Public Policy Institute, Center on Education and the Workforce, 2013), p. 1.
2. Hart Research Associates, *Falling Short? College Learning and Career Success* (Washington, DC: Association of American Colleges and Universities, January 20, 2015).

Becky Takeda-Tinker is President and CEO of Colorado State University–Global Campus and the author of *Impacting the Future of Higher Education: Insight into a New Model That Works for Students, Academic Institutions and America*.

DIGITAL Transformation & Enterprise IT

By Betsy Tippens Reinitz

The term *digital transformation* is becoming a hot buzzword across all industries. A Google search readily yields many articles and websites that describe a profound transformation characterized by the strategic integration of technology and business.

- *The Enterprisers Project:* Digital transformation is "the integration of digital technology into all areas of a business resulting in fundamental changes to how businesses operate and how they deliver value to customers. Beyond that, it's a cultural change that requires organizations to continually challenge the status quo, experiment often, and get comfortable with failure."[1]
- *i-SCOOP:* "Digital transformation is the profound transformation of business and organizational activities, processes, competencies and models to fully leverage the changes and opportunities of a mix of digital technologies and their accelerating impact across society in a strategic and prioritized way, with present and future shifts in mind."[2]
- *Digital Business Global Executive Study and Research Project:* "Maturing digital businesses are focused on integrating digital technologies, such as social, mobile, analytics and cloud, in the service of transforming how their businesses work. Less-mature digital businesses are focused on solving discrete business problems with individual digital technologies."[3]

What does this mean for higher education? More specifically, what effect will digital transformation have on the nature of enterprise IT in higher education?

Enterprise IT is a large, complex, and multifaceted function at colleges and universities. It includes the technology staff, services, and support associated with enterprise-wise systems and services, as well as their strategy, management, budgets, and policy. Enterprise IT also includes most of the systems and services that colleges and universities use to store and manage data and processes, regardless of whether they are hosted on campus, in the cloud, or through shared services. If there is a system with data and it needs to connect to other systems with data, then enterprise IT is probably involved. With an emphasis on core organizational business activities and a function as a data repository
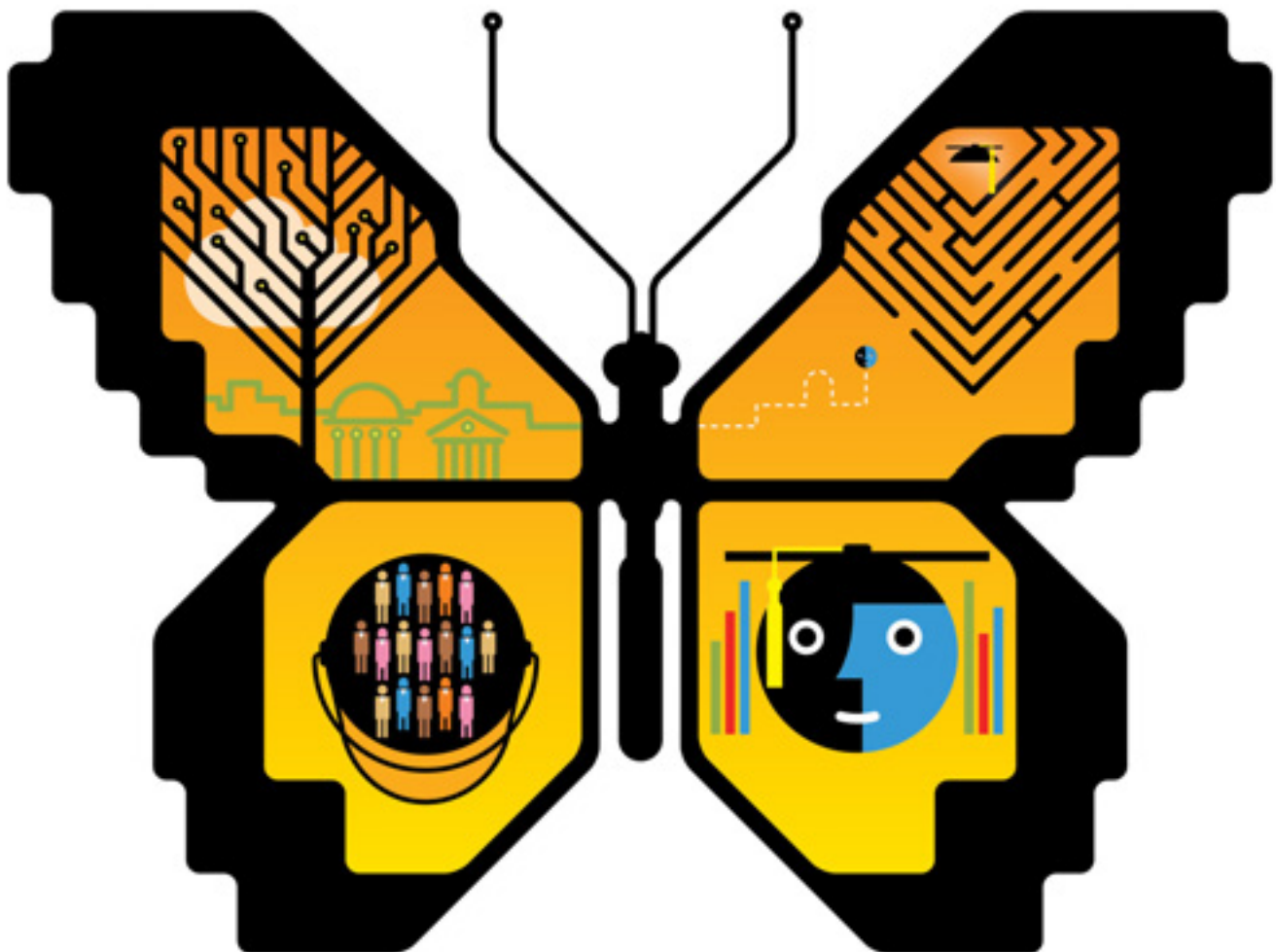
and integrator, enterprise IT is central to the success of higher education.

Management of these core organizational services goes beyond just taking care of the technology. For example, as higher education institutions move services into the cloud, the responsibility for managing those services remains with enterprise IT: contract management, vendor relations, deeper collaborations with functional and business units, and data integration issues. Colleges and universities are reporting increases in the number of roles associated with new service delivery models and decreases in roles associated with locally hosted services.

These trends are part of a movement toward next-generation enterprise IT, which is characterized by a transition away from siloed transactional enterprise systems and toward the adoption of a larger set of systems, usually from multiple vendors, each providing a different service critical to the institution. The result is a complex ecosystem of applications, architectures, and sourcing strategies. This approach uses a philosophy of closer alignment of institutional and IT strategy and goals to manage that ecosystem, and it requires a shift in IT role from technology provider to service provider. In this evolving environment, enterprise IT becomes mission-centric and client-focused, positioning the institution to integrate digital technology and data into all areas of the institution in a way that increases value across all aspects of the higher education mission.

Pinning down a precise definition for *enterprise IT* is complicated by the fact that what is considered to be enterprise IT may vary depending on the institution. Analytics and learning management systems are two areas that exemplify how enterprise IT services differ contingent on how they are managed at any given college or university. End user support for these services may fall under a different area. For example, if the LMS system (hardware, platform, application) is maintained on-site, management of the resource is likely to be an enterprise

With an emphasis on core organizational business activities and a function as a data repository and integrator, enterprise IT is central to the success of higher education.

IT issue, but management of user support may belong to a different function: a separate unit within the IT organization, or a teaching and learning function outside of the IT organization, or an area at the decentralized level. Similarly, resource management for an analytics system may be an enterprise IT function, but user support for institutional decision-making may be shared across the IT organization, academic areas, business operations, and other functional units. Enterprise IT also includes the resources provided by the central IT organization—resources that enable decentralized areas and functional units to use central network resources to run their own IT shops. These resources may include authentication and access services, contract management, and/or the development of policies and guidelines for the use of enterprise and core IT resources.

One way to envision enterprise IT is to select a lens through which to view it. For example, the EDUCAUSE Enterprise IT Program focuses on five themes: (1) analytics and business intelligence; (2) sourcing strategies; (3) costs and funding; (4) business process management; and (5) technology strategy.

1. *Analytics and business intelligence.* Enterprise systems data should be considered a strategic institutional asset.

Data governance, data management, and data integration are key ingredients in supporting higher education's growing need for reliable information. The expanding enterprise IT ecosystem brings with it an ever-increasing number of disparate data sources that need to be integrated and connected for analytics and business intelligence efforts to be successful. Complicating the picture is the ease with which functional departments may purchase and implement systems without involvement from the IT organization, resulting in the potential for a host of problems including siloed systems, lack of agreement on data definitions, uneven data security efforts, and unreliable information. Despite the possible difficulties, this complex data ecosystem also presents an opportunity for those institutions that can align and integrate these rich data sources in a way that gives institutional leaders a powerful view into everything from student success initiatives to facilities management plans. In addition, as institutions begin to provide hyper-personalized experiences for students, data and analytics will provide the necessary foundation.

2. *Sourcing strategies.* A college or university's sourcing strategy needs to be appropriate to the institution's culture, resources, and expertise in support of the overall institutional strategy. When developing a sourcing strategy in support of the institutional mission, IT leaders should plan for a balance of on-premises services, shared services, and cloud services as appropriate for the institution's current goals and resources, while also preparing for a future in which on-premises solutions are the exception rather than the rule. Resources may need to shift as a strategy is implemented. Vendor management and negotiation skills will be needed for managing the increase in contractual relationships. Skills in enterprise architecture and data integration will

become more important. And budgets and funding may need to change to allow for periodic subscription-like payments instead of the one-time funding that new enterprise systems require. These strategies should also consider the shifting role of the IT organization. With the booming prevalence of cloud services and the increasing availability of niche solutions, the IT organization needs to act as a partner and broker for technology services and solutions—instead of simply as a provider and supporter

of technology. IT leaders should consider the relationship between the mission-focused, client-centric philosophy of enterprise IT and the central IT organization's role in institution-wide sourcing strategies and decisions.

3. *Costs and funding.* Technology is expensive. Enterprise systems can be extremely so. Technology also pervades almost every aspect of higher education, so it's important to be able to understand and communicate about these costs. But the conversation needs to go beyond just the cost of technology. Across the enterprise, institutional leaders are trying to make the best decisions they can

about resources, investments, and progress toward goals. The enterprise IT leader needs to be able to communicate clearly and effectively about *the value* that enterprise technology brings to the institution. The conversation must move beyond "What does it cost?" and ask "What impact does it have on the institution's goals?" The

system migrations characteristic of a move to next-generation enterprise IT present an opportunity for IT leaders to communicate more clearly—with both institutional leaders and colleagues—about the costs of and funding for enterprise IT services by showing the connection to specific institutional goals.

4. *Business process management.* The basic enterprise resource planning (ERP) systems that make up the backbone of enterprise IT do not typically differentiate one college or university from another, and it is important to frame enterprise decision-making with this in mind. Streamlining processes to create efficiencies may result

in resources that can be reallocated to other mission-critical and differentiating functions. We must continue to look at ways to optimize business processes, and we must emphasize the importance of working in partnership across the institution for business process change. Any business process redesign effort needs to be monitored and maintained if it is going to have long-term success. So we must also consider the ongoing change-management practices required to ensure success for business process redesign efforts in the next-generation environment.

5. *Technology strategy.* The IT environment increasingly includes a mix of cloud and on-premises services, all generating and using data that

is critical to daily institutional operations and to long-term decision-making capabilities. Managing this hybrid environment and ensuring that this data is managed and integrated properly are, together, the foundation of next-generation enterprise IT. How can leaders develop an enterprise IT strategy that enables this next-generation approach? They should develop a technology strategy that firmly anchors the work of the IT

organization within the institutional mission and goals, with a highlight on the role of data governance and the need for cross-enterprise communication and collaboration. Doing so requires a deeper understanding of institutional culture and business unit needs than ever before. And because this involves an ever-expanding set of systems and applications, data integration and data governance efforts are critical, along with the ability to be flexible and nimble enough to adapt to disparate data sources as they emerge.

As enterprise IT evolves into its next generation, enterprise IT strategy needs to evolve as well.

Next-generation enterprise IT is characterized by a movement away from modular transactional systems and toward an environment made up of multiple interconnected systems, bringing with it new technology requirements. The IT ecosystem is shifting to one that includes a mix of cloud and on-premises solutions and services, all of which generate data that is critical to the institution, both for short-term decision-making and for long-term planning and prediction. As an institution's need for this critical information increases, data integration, data management, and data governance are increasingly in the forefront of enterprise IT. Developing an enterprise IT strategy that addresses the increasing importance of data while also aligning IT work with the institutional mission and goals is an important step in preparing the college/university for taking advantage of the data-related benefits of next-generation enterprise IT.

This evolution of enterprise IT thinking can be seen as an opportunity for the IT organization to act as a strategic partner within the institution, going beyond the delivery of technologies and services to the integration of technology throughout the institution, adding value in a direct relationship with mission and goals. This work requires that IT staff develop a deeper understanding of busi-

ness unit needs and institutional culture in order to position the enterprise IT strategy to fully support and enable the institution.

The digital transformation ahead will reshape and evolve next-generation enterprise IT. The digital transformation approach uses a philosophy of closer alignment of institutional and IT strategies and goals to manage the sprawling enterprise IT ecosystem consisting of systems from multiple vendors, with some of those systems in the cloud and some on the premises. A hallmark of digital transformation is that it is driven by strategy, not by technology. Cultural shifts are required, and change management becomes more important than ever. The role of the IT organization thus moves beyond that of *technology and service provider* and becomes that of *transforming partner*. A focus on the value that technology brings to institutional strategy and goals results in a symbiotic relationship in which technology not only serves but also shapes strategic ambitions. In this evolving environment, information technology becomes mission-centric and client-focused, positioning the college or university to integrate digital technology into every area of the institution in a way that increases value across all aspects of the higher education mission. ∎

Notes

1. "What Is Digital Transformation?" The Enterprisers Project (website), accessed March 1, 2018.
2. "Digital Transformation: Online Guide to Digital Business Transformation" i-SCOOP (website), accessed March 1, 2018.
3. Gerald C. Kane et al., "Strategy, Not Technology, Drives Digital Transformation: Becoming a Digitally Mature Enterprise," *MIT Sloan Management Review* and Deloitte, research report, July 14, 2015.

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SETTING THE TABLE:
Responsible Use of Student Data in Higher Education

By Martin Kurzweil and Mitchell Stevens

Virtually all college and university instructors now share their teaching duties with providers of digital services. Learning management systems convey assignments, online forums scaffold discussions, AI-based tutors customize lessons, and myriad calling and conference platforms simulate face-to-face interaction across great distances. All of these services leave digital traces of instructional effectiveness, learning, and user preferences—information that may be used to improve student outcomes, build basic science, and sell products. In the wake of the spectacularly rapid rise in computational applications inside and around higher education, today's inheritors of the ancient rituals of human instruction face a promising but largely uncharted future.

Which streams of data about learners are properly and positively integrated with one another, and which are best kept distinct?

Which streams of data about learners are properly and positively integrated with one another, and which are best kept distinct? Should the information be kept forever, or if not, under what conditions should it be erased? Does the information produced through digital platforms impose any obligations on those who have access to it? Who is entitled to make money off these data, and what responsibilities does such business entail? These are among the many questions facing educators and vendors about the ethics and politics of information.

Inherited guidelines give everyone little to go on when answering these questions. US government regulations pertaining to student records were drafted under the assumption that the most enduring traces of instructional exchange were kept on paper. Grades were recorded in letters and translated into metrics by hand. Most evaluation required human eyes and human thinking. Integrating information held by different offices of the same organization was cumbersome and costly. Perhaps most important, instructors were presumed to be singularly sovereign over what took place in "their" classrooms.

None of the above obtains today—except for the Family Rights and Privacy Act of 1974, which serves the digital present about as well as a bicycle serves a kangaroo. Many Americans look to the somewhat more sophisticated rules for data use developed by the European Union as a potential framework for US practice; however, the EU program is built on the premise that users can be the final arbiters of the disposition of "their" data. In a world in which the owners of digital platforms (e.g., Alphabet, Amazon, and Facebook) already have reaped incalculable profits from the production and aggregation of data describing users, in the process amassing more information about people than any government in world history, the presumption of individual data propriety is wishful thinking.

It is time instead for a frank and forward-focused discussion of how to define ethical information practice in academia. This is the context in which we created the Stanford CAROL and Ithaka S+R project on Responsible Use of Student Data in Higher Education. Our goal was simple, but challenging: to articulate first principles that might frame institutional policies on the use of student data in the digital era.[1] In our view, four core premises ought to be at the heart of this inquiry.

First, education is fundamentally a human endeavor. It can be richly supported and enhanced by technologies (algorithms, blackboards, machines, paper), but it cannot be fully accomplished independently of human action. Second, education is only partially a business activity. It is also a civic act: the practice of shaping people, communities, and societies and of transmitting cultural inheritance across generations. Third, retention of the humane and civic character of education cannot be taken for granted. They are fragile, and their preservation requires active, diligent, sustained effort. Fourth, with information and knowledge comes responsibility. Awareness of educational practices that are suboptimal and of available ways to improve those practices *requires* educators—whether or not they are part of businesses—to proactively change what they do. It is in this spirit of responsibility that we survey the current landscape and offer a framework for ambitiously leveraging digital innovations for critical improvement in higher education.

Emerging Uses of Student Data

Higher education institutions are using student data in many innovative ways.[2] Let's start with admissions and enrollment management, an area that has long utilized data-driven practices. Today the steeply diminished costs of computation have coupled with fierce competitive pressures in the postsecondary ecology to make student recruitment and selection a rapidly evolving technology domain. As colleges and universities gain access to more data about students and augment their analytic capacity, they can ever more precisely predict which students will attend and which will succeed. Sophisticated algorithms now inform recruitment campaigns, admissions decisions, and financial aid offers worldwide.

But recruitment is hardly the crest of the campus technology wave. Many institutions now base myriad business decisions on data describing student outcomes. Between 2003 and 2014, Georgia State University (GSU) increased its graduation rate from 32 percent to 54 percent by using data to discover and address problems of retention and completion. For example, after mining historical data to identify courses in which students consistently performed poorly,
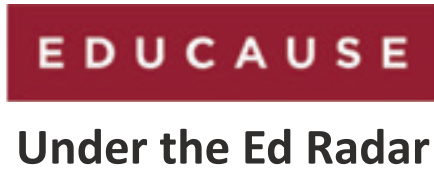
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administrators created a supplemental instruction program with peer advisors for those courses. Further observation showed that although there was improvement in passing rates in many of the courses targeted for supplemental instruction, introductory mathematics courses in algebra, pre-calculus, and statistics remained stumbling blocks. GSU administrators and math faculty responded by redesigning those courses in a flipped format and saw the DFW (drop-fail-withdrawal) rate fall from 43 percent in 2006 to 19 percent in 2014.[3]

Or consider GSU's Panther Retention Grant program, created in 2011. After analysis revealed that hundreds of students in good academic standing and within three semesters of graduating were dropping out, administrators investigated and determined that many of these students were unable to register for courses because of small, unpaid balances on their term bills—a restriction codified in state law. To address this, GSU created a targeted grant program offering an average of $900 to students in those circumstances. Of Panther Retention Grant recipients (who otherwise would not have been able to register), 88 percent graduated or were still enrolled twelve months later, and the tuition revenue from those retained students more than covered the cost of the program.[4]

Predictive analytics also are being put into the hands of instructors, advisors, and students themselves. Early-alert systems aggregate and analyze data from multiple sources (gradebooks, learning management system [LMS] log-files, student information systems) to automatically flag student behavior associated with lower rates of academic success. Advisor-facing systems such as Arizona State University's eAdvisor integrate LMS information about student activity with registration data and student background characteristics. Advisors are notified when a student gets off track, and they are encouraged to intervene. eAdvisor also uses data describing individual academic performance to make registration suggestions to students and advisors.

Systems often called *dashboards* are designed to provide instructors or students with aggregated information that might help them improve performance. Rio Salado College's RioPACE is a well-known example. The tools merge student demographic information and academic history with LMS log-file data to predict students' likelihood of success in a given course. Those predictions are conveyed to instructors, who can run custom analyses on demand and use what they learn to support particular learners. ASU's eAdvisor includes a student-facing dashboard as well. At the University of Michigan, E2Coach, a tool used in introductory STEM courses, automatically sends students personalized course-performance messages based on a continually updated algorithm.

Evidence of the effectiveness of such programs is limited but promising. A randomized study of student coaching supported by predictive analytics found that the service, offered by the company InsideTrack, improved retention rates by 3 to 5 percentage points compared with control groups whose members did not receive the coaching. Two randomized trials currently in the field are seeking to validate these findings at scale.[5]

Other innovations fall under the umbrella of *adaptive courseware*. These systems are digital platforms that collect information on student activity—time spent on task, task performance, and level of engagement, for example—to create "personalized learning paths" for students. Adaptive courseware systems offer dashboards and analytics tools enabling instructors to see where individual students and entire classes are struggling. Some systems include dashboards for students, enabling them to better understand their own progress and roadblocks. Although adaptive courseware is still a relatively new technology, there is some promising anecdotal evidence of its efficacy. Findings from a 2016 study of the Bill & Melinda Gates Foundation's Adaptive Learning Market Acceleration Program suggests that implementation strategies make a difference with adaptive courseware and that the most (perhaps the only) effective outcomes accrue with full-scale course redesign.[6]

Uneven Adoption

While analytics programs are becoming much more common, only a minority of colleges and universities have systematically deployed them. According to a KPMG survey of senior administrators in July 2015, only 41 percent of respondents were using student data for predictive analytics, and just 29 percent reported having the internal capacity to analyze their own student data. Even those who are making efforts feel they are coming up short. The 2016 Campus Computing Survey revealed that less than one-fifth of respondents rated their institutions' data analytics investments as "very effective." In a 2015 Ithaka S+R survey of a representative sample of four-year college faculty, a minority of respondents reported using any form of technology in instruction, although 63 percent said they would like to do so. In the EDUCAUSE Center for Analysis and Research (ECAR) 2017 study of faculty and information technology, between 16 and 28 percent of faculty responded that they did not have access to data-based

> **To achieve adoptions at scale, campuses must sustain a culture that embraces data-driven practices among administrators, instructors, and student-support staff.**

planning and advising services, while between 23 and 34 percent of faculty have access but apparently choose not to use these services.[7]

Incompatible data systems are a significant drag on intramural change. The information needed for sophisticated analytics is typically dispersed and differentially formatted in student information systems, registrar records, and LMS logfiles. Some colleges and universities have the technical, financial, and human resources to merge this data. Many do not.

Even at institutions that have overcome the logistical challenges, innovations frequently remain at the margins. To achieve adoptions at scale, campuses must sustain a culture that embraces data-driven practices among administrators, instructors, and student-support staff. This is no easy task. In the 2015 Ithaka S+R faculty survey, only 35 percent of respondents reported that they would be rewarded or recognized for modifying their pedagogy with technology.[8]

Despite the great promise of digital technologies to scaffold and improve instruction, a very deep political current pushes in the other direction: faculty sovereignty. The long-standing legacy of faculty autonomy over classrooms and curriculum gives those instructors with faculty appointments, particularly tenured ones, a great deal of power and prestige. After decades of decline in the number of tenure-track appointments and simultaneous growth in the ranks of student-services and IT personnel, people with faculty appointments often believe they have good reason to defend the turf remaining to them. In such a context, the latest innovation heralded by the campus technology initiative is easily interpreted by the professoriate as further erosion of the borders marking what was long their own privileged domain.

Risky Business

Aside from campus turf skirmishes, educators have substantive reasons to be cautious in their embrace of computational learning technologies. Most important is the fuzzy line between prediction and prescription of academic futures. Advocates of the new learning analytics invariably emphasize the promise of using prior data about learners to target instruction in ways that best serve students' individual futures. Yet only rarely do these same advocates invoke the long and unsavory tradition of academic tracking, which justified the categorical tiering of academic opportunities on the basis of supposedly objective, "scientific" measures of students' abilities. The fact that academic tracking has paralleled and indeed reinforced inequalities of race and social class is an important counterweight to the nearly uniform optimism of those in the edtech (educational technology) sector.[9]

Of course this optimism is essential to the business models of venture-backed startups, which rely on the potential of new platforms and algorithms to substantially improve individual and organizational behavior. Promises of dramatic performance spikes are part of the pitches that new firms make to investors and clients. The fact that major education philanthropies are increasingly funding private-sector players adds to the hype. But the hard truth is that meaningful gains in individual learning and organizational improvement are almost always incremental. The difference in the timetables of doing good business and building good educational practices is real, and the peculiar commingling of Silicon Valley swagger and academic caution is one of the defining features of the global edtech community. Whether this commingling will be for the good or ill of higher education in the

long run is an open question, but in the short term it makes for lots of crossed signals and reciprocal misunderstandings between those on different sides of the business/academia divide.

Another tension is between proprietary and fiduciary control of knowledge and the information that underlies it. Technology firms rely on ownership of their intellectual property and its rising value as user communities grow. Data describing instructors and students is often key to their business proposition, enabling firms to improve algorithms and customize operations competitively. Data may also have commercial value in its own right as a marketing resource or as the basis for commoditized consulting expertise.

Yet colleges and universities inherit a long-standing obligation to hold student credentials information securely and into perpetuity. When the information is covered under government statute, this obligation has the force of law. Additionally, academic research increasingly requires shared access to data to enable verification or disconfirmation of findings for scientific progress. At present, the domains of edtech and learning analytics are without commonly shared routines for adjudicating conflicts of interest in data use for academic, commercial, and scientific purposes.

Finally, transparency of evaluation and the possibility of revisiting academic evaluations are signal ideals of higher education. Colleges and universities have strong traditions of enabling students (and instructors!) to seek reconsideration of evaluations and request independent review. These traditions may be challenged when evaluation is shared with proprietary firms whose systems are computationally opaque, private property, or both. Such barriers to independent review may also make it difficult to determine whether computational systems reproduce bias or historically inequitable academic pathways and outcomes. Careful monitoring and mechanisms for overriding computational decisions can mitigate such risks

but may also undermine the reliability and general efficacy of these systems.

Colleges and universities, and their myriad subunits, have managed these challenges differently, leading to an uneven and highly uncertain ethical and procedural terrain. Coupled with the tech world's famous "bias toward action" is the perennial risk of a data use that will cross poorly articulated and still-in-draft ethical lines. But procedural caution has its own ethical risk: the failure to act in light of accumulating knowledge. This is why every field of professional endeavor maintains an ethical tradition of dual obligation. Do no harm, but do not hesitate to act on awareness of suboptimal practices and outcomes.

Principles of Responsible Use

Rapid movement at the cutting edge of edtech has far outpaced changes in the laws, institutional policies, and ethical frameworks that were crafted to inform responsible use of educational information in the twentieth century. This makes for a jarring recognition, but also an opportunity to revisit and rearticulate guiding ideals of responsible academic practice.

With this opportunity in mind, Stanford CAROL and Ithaka S+R convened colleagues from across higher education at the Asilomar Conference Grounds in Pacific Grove, California, in June 2016. The site was meaningful. In 1975, a group of 140 biologists, lawyers, and physicians met at Asilomar to write voluntary guidelines for ensuring the safety of recombinant DNA technology. An additional precedent for our work was the 1978 meeting at the Belmont Conference Center in Elkridge, Maryland, which produced a document informing ethical research with human subjects.

Through our preparatory work and the robust discussion at the convening, four basic tenets for the use of student data emerged: Shared Understanding;

Transparency; Informed Improvement; and Open Futures.

Shared Understanding. *Instructors, administrators, students, and third-party vendors all contribute to the process of data production. All of these parties deserve to have a shared understanding of the basic purposes and limits of data collection.* Here we recognize the fundamentally plural character of digital data. Although most conversations about data ethics grant primary data ownership to the persons the data describes, we propose instead that all digital data be regarded as *joint ventures*. They require not only the contributions of students and instructors, but also the investment of those who create and maintain digital platforms and who hold that data in trust, whether as nonprofit universities or private firms. In this view, the information describing a particular student's learning interactions belong not just to the student. Rather, the student participates in ownership with the other parties contributing to the production of the information. All those involved in a joint venture of teaching and learning deserve a shared definition of informational use and its limitations.

Transparency. *Clarity of process and evaluation is a hallmark of humane education systems and must be maintained even while those systems grow more complex. Students are entitled to (1) clear representations of the nature and extent of the information that describes them and that is held in trust by their institution and relevant third-party organizations; (2) an explication of how they are being assessed; and (3) the ability to request that assessments be reviewed through a clearly articulated governance process.* Here we recognize the hallmark academic and scientific value of independent review. Sustaining this value brings new challenges in the era of machine learning, when computational systems routinely produce decisions through processes that are opaque even to system creators. We believe that the ideal of academic
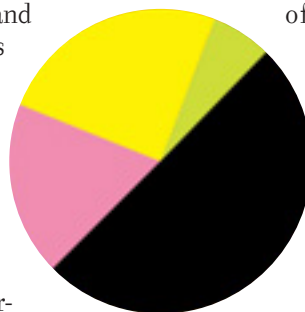
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> **The higher education community has a long tradition of adapting governance to safeguard the autonomy and integrity of the academic enterprise.**

and scientific transparency is absolute and is essential to the legitimacy of any judgment on the basis of empirical evidence. In applications of digital technology to academic activity, transparency should be a design and engineering imperative.

Informed Improvement. *Learning organizations have an obligation to study student data in order to make their own educational environments more effective and to contribute to the growth of general knowledge.* Here we recognize that just as academic tradition obliges transparency, so too does it oblige action in the face of evidence. Instructors and academic administrators have vast stores of information describing instructional processes and outcomes. There is no question that some of that information will reveal bad news: particular instructors who disproportionately reward or discourage certain kinds of students; courses or entire programs that produce few measurable learning gains. Whereas diffusely distributed or nonexistent information may have hidden such news in the past, contemporary data management systems will surface it routinely. The ethic of informed improvement presumes that instructors and administrators will seek to remedy any problematic circumstances revealed by accumulating evidence.

Open Futures. *Education should enable opportunity, not foreclose it. Instructional, advisement, and assessment systems must always be built and used in ways that enable students to demonstrate aptitude, capacity, and achievement beyond their own or others' prior accomplishments.* Here we recognize the promise of digital technology to improve lives through learning, even while we remember that those same technologies can be used to block opportunity. We believe it is essential to create a guiding ethic wherein educators default to an ideal of opportunity creation rather than preemptive prescription. Predictive analytics should enable, not track—and it is precisely because the distinction between those two things is hard to specify that decision making must constantly be guided by the priority of open futures.

Conclusion

We view the four principles from the Asilomar convening as an initial contribution to an ongoing conversation that will include a wide range of stakeholders. People from business must be at the table, because technology firms and the holders of private capital supporting them will play only larger roles in the provision of postsecondary opportunity going forward. But all of us in higher education must set that table. Notwithstanding its reputation for resistance to change, the higher education community has a long tradition of adapting governance to safeguard the autonomy and integrity of the academic enterprise. It is time to incorporate new colleagues into that tradition and enlist their help in defining responsible use of student data in a rapidly changing world. If educators do not do this for themselves, others will. ∎

Notes

1. The project was organized as a peer review. After working with colleagues to generate several white papers mapping the landscape of digital innovations in postsecondary provision, we convened academic and industrial scientists, senior university administrators, government officials, and representatives from major educational philanthropies at the Asilomar Conference Grounds in Pacific Grove, California, to consider an ethical framework for the responsible use of student data in higher education. The corpus of written work from the project to date is assembled at our website; in this article we attempt a more synoptic view.
2. Detailed descriptions of these efforts and others are included in Rayane Alamuddin, Jessie Brown, and Martin Kurzweil, *Student Data in the Digital Era: An Overview of Current Practices* (New York: Ithaka S+R, September 6, 2016).
3. Martin Kurzweil and D. Derek Wu, *Building a Pathway to Student Success at Georgia State University* (New York: Ithaka S+R, April 23, 2015).
4. Jamaal Abdul-Alim, "Retention Grant Keeping Dreams Alive at Georgia State," *Diverse: Issues in Higher Education,* April 14, 2016; "Georgia State Launches Pilot Program to Help Retain Students," *OPBlog: Higher Ed Junction,* University of Washington, May 24, 2013.
5. Co-author Martin Kurzweil is the independent evaluator of one of these trials. For the earlier study, see Eric P. Bettinger and Rachel B. Baker, "The Effects of Student Coaching: An Evaluation of a Randomized Experiment in Student Advising," *Educational Evaluation and Policy Analysis* 36, no. 1 (2014).
6. Louise Yarnall, Barbara Means, and Tallie Wetzel, "Lessons Learned from Early Implementations of Adaptive Courseware," SRI Education (2016).
7. Milford McGuirt, David Gagnon, and Rosemary Meyer, *Embracing Innovation: 2015–2016 Higher Education Industry Outlook Survey* (KPMG, 2015); Kenneth C. Green, *The 2016 Campus Computing Survey* (Encino, CA: Campus Computing Project, November 21, 2016); Christine Wolff-Eisenberg, Alisa B. Rod, and Roger C. Schonfeld, *Ithaka S+R US Faculty Survey 2015* (New York: Ithaka S+R, April 4, 2016); Jeffrey Pomerantz and D. Christopher Brooks, *ECAR Study of Faculty and Information Technology, 2017* (Louisville, CO: EDUCAUSE, October 13, 2017).
8. Wolff-Eisenberg, Rod, and Schonfeld, *Ithaka S+R US Faculty Survey 2015.*
9. Adam Gamoran, "Tracking and Inequality: New Directions for Research and Practice," WCER Working Paper No. 2009-6 (Madison: Wisconsin Center for Education Research, 2009), published in Michael W. Apple, Stephen J. Ball, and Luis Armand Gandin, eds., *The Routledge International Handbook of the Sociology of Education* (New York: Routledge, 2010).

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HOW TO PLUG THE LEAKY BUCKET: Retention Strategies for Maintaining a Diverse Workforce

By Melissa Woo,
Keith W. "Mac" McIntosh,
and Deborah L. Stanley-McAulay

"There's a pure and simple business case for diversity:
Companies that are more diverse are more successful."

—Mindy Grossman, CEO of Weight Watchers

"Strength lies in differences, not similarities."

—Stephen R. Covey, author

ata from the EDUCAUSE Center for Analysis and Research (ECAR) shows that the higher education IT workforce is not particularly diverse. Nonwhite workers make up 15 percent of all positions in higher education information technology but 34 percent of positions in the US labor force total. Women are also underrepresented in the higher education IT workforce when compared with the number in the overall US labor force.[1]

Underrepresented groups pose an opportunity for addressing challenges in higher education IT staffing. Concerns regarding IT staffing have been identified for the past few years as a "Top 10 IT Issue" by the EDUCAUSE community.[2] Closing the gap between the percentage of non-white workers, women, and other underrepresented groups in the higher education IT workforce and the percentage in the US labor force would help alleviate the higher education staffing challenges. But to close this gap, colleges and universities need more effective approaches to not only recruitment[3] but also *retention* of diverse employee populations. Moving forward to recruit a diverse workforce without having an effective retention strategy is like trying to fill a leaky bucket.

Improving Organizational Performance through Diversity

Why is diversity in the workforce so important? One reason is that diversity correlates with improved organizational performance.

- A McKinsey & Company analysis of 366 companies demonstrated that those companies in the top quartile of racial/ethnic diversity were 30 percent more likely to have financial returns above their national industry median. Those in the top quartile for gender diversity were 15 percent more likely. Companies in the bottom quartile for both gender and ethnicity/race lagged behind companies in the other three quartiles. Further, this research suggests that diversity beyond gender and ethnicity/race is likely to bring some level of competitive advantage for organizations that can retain diverse talent.[4]
- A study done by the Peterson Institute for International Economics involving nearly 22,000 global, publicly traded companies in 91 countries demonstrated that companies having at least 30 percent women in leadership or C-level positions add 6 percent to their net profit.[5]
- A 2015 study from Bersin by Deloitte found that diversity and inclusion cor-

related with the highest positive impact on business performance in its Talent Management Maturity Model. High-performing businesses were demonstrated to have 2.3 times higher cash flow per employee, were 1.8 times more likely to be change-ready, and were 1.7 times more likely to be innovation leaders in their market.[6]
- A study carried out at Ford Motor Company demonstrated a clear positive relationship between the diversity of team composition and performance of complex tasks.[7]

Facing the Challenges

Over the past few years, criticisms have been leveled against key technology companies for their pervasive "bro" culture and discriminatory attitudes that result in the inability to retain and recruit employees of diverse backgrounds. The "pipeline" issue is often cited as a barrier to the recruitment of diverse talent in high-tech industries.[8] Yet though the ability to recruit employees of diverse backgrounds will have some effect on the ability to maintain a favorable environment for retention of a diverse workforce, other factors are at play.

A special report from the U.S. Equal Employment Opportunity Commission notes that compared with private industry overall, the high-tech sector employed a larger share of whites, Asian Americans, and men and a smaller share of African Americans, Hispanics, and women. The report states that the lack of diversity in

the workforce pipeline is only one of the factors that affects diversity in the high-tech workforce and notes, for example, that whereas about 9 percent of graduates from the top US computer science programs are from underrepresented ethnic/racial groups only 5 percent of the employees of large tech firms are from these groups.[9]

The report also notes that over half of highly qualified women working in science, engineering, and technology companies quit their jobs. The loss of women employees is attributed to the following:

- Inhospitable work cultures
- Isolation
- Conflict between women's preferred work rhythms and the "firefighting" work style generally rewarded
- Long hours and travel schedules conflicting with women's heavy household management workload
- Women's lack of advancement in the professions and corporate ladders

Challenges around the retention of a diverse workforce are not limited to the United States. A 2017 report from a United Kingdom organization found that women, older workers, workers with disabilities, and ethnic minorities were underrepresented in the IT field.[10] Further, IT professionals from underrepresented groups are less likely to find work as existing staff—that is, are most likely to be in nonpermanent employment—than others in IT positions. The lack of IT professionals

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Table 1. Retention Techniques

Retention Theme	Retention Activity	Employee Benefit
• Create learning and development opportunities within and outside the team and organization	• Place staff member on a cross-functional team • Encourage staff member to attend learning and developmental opportunities off-campus	• Gains visibility • Is able to network across other functional areas • Gains insight into other units and organizations • Gains broader knowledge of the college/university • Learns best-practice techniques • Is encouraged to innovate
• Create leadership opportunities	• Have staff member lead or co-lead a meeting or project • Have staff member conduct a teach-back session	• Moves from being an individual contributor to being experienced as a leader • Sees a shift in power dynamics • Is able to practice leadership skills • Learns planning and organizational skills
• Create shadowing opportunities	• Support/encourage staff to explore alternative roles and/or careers	• Gains a deeper understanding of other fields • Builds knowledge about other roles • Develops linkages between body of work and career
• Create safe spaces by modeling behavior	• Demonstrate, encourage, and practice open and honest discussions	• Becomes part of an environment that welcomes honesty • Observes honesty practiced by the leader and other team members, which encourages engagement • Shares observations assuming good intent and focuses on improving the workplace culture and climate • Shares analysis and solution(s)
• Promote work/life balance	• Discuss work/life balance techniques, strategies, supports, and policies • Demonstrate work/life balance techniques • Offer/encourage work/life balance	• Is able to bring his/her best self to the workplace • Is made to feel like a valued and respected member of the team • Is seen as a whole person by other colleagues

from diverse backgrounds in permanent positions promotes isolation and can discourage others from remaining in their positions.

Similar challenges exist in the higher education IT workforce. The ECAR workforce study data noted above demonstrates the lack of diversity in higher education information technology. Although the percentage of nonwhites rose from 2010 to 2015 in the higher education IT workforce, a significant gap remains. In addition, gender diversity could be improved. According to the data, women make up 40 percent of the IT staff but only 30 percent of the managers and 27 percent of the CIOs. By comparison, the U.S. Department of Labor statistics show that 47 percent of the workforce overall consisted of women in 2014.[11]

To increase the diversity of the higher education IT workforce in order to improve organizational performance, as well as address IT staffing challenges, we need to retain employees of diverse backgrounds. How can colleges and universities create workplaces that nurture

diversity, equity, and inclusion (DEI) so as to achieve these results?

There are many, many tactics and efforts that a leader can implement as part of a retention strategy. A few are listed in Table 1. These techniques, used separately or together, can help make an employee feel like an insider versus an outsider and can contribute to leaders' commitment to retention within a team and/or organization.

Developing the DEI Environment

Creating an inclusive workplace involves everyone within the organization, division, department, or office. However, special and overt attention from leaders is absolutely critical to setting the tone for the environment. Leaders should communicate early and often about ensuring that the workplace is inclusive. There are numerous ways to positively develop and maintain an inclusive workplace in which every person on a team or in the organization can thrive, especially those who are in leadership roles. The process starts with fostering an inclusive mindset, followed

by articulating—verbally and in writing—inclusion as an important core value.

Courageous Conversations
When conversations or actions negatively impact someone or a group of people, the behavior needs to be identified and called out. This can be done subtly or overtly. One such behavior is the tendency to overlook or dismiss the contribution from a team member; this happens when the team member presents an idea, only to have someone in the dominant group restate the idea and take credit for it. This is a prime opportunity to remind the group where the idea originated. Another example would be when someone says something offensive toward someone else or about a group. Silence, especially from leaders, condones the behavior or action. There are a couple of ways to handle this situation. Ask the person—publicly or privately, depending on the situation and comfort level—to refrain from using the offensive language or to stop the behavior. Or say: "Pardon me, I am not sure I heard you correctly. Could you repeat what you just said so that I can be

sure I heard you correctly?" This typically causes people to pause, think, and rephrase what they said.

The workshop "Ouch! That Stereotype Hurts: Communicating Respectfully in a Diverse World," by International Training and Development, offers a formal set of tools that can equip individuals to call out behaviors. The six Ouch workshop techniques help train individuals to speak up against stereotypes that can negatively impact DEI efforts:

1. *Assume Good Intent and Explain Impact:* "I know that you mean well, but that hurts."
2. *Ask a Question:* "What do you mean?"
3. *Interrupt and Redirect:* "Let's not go there."
4. *Broaden to Universal Human Behavior:* "I think that applies to everyone."
5. *Make It Individual:* "Are you speaking of someone in particular?"
6. *Say:* "Ouch!"

Creating environments in which all feel welcome and included, and have the ability to succeed, should be the norm or goal for everyone. This will require leaders to communicate and model their expectations—coupled with providing supervisors and staff the training and education to know and understand why and how to create and maintain an inclusive workplace.

Community, Awareness, and Training

One professional development approach that goes a long way toward creating an inclusive work environment is to provide training and raise awareness of unconscious bias. We all have biases, conscious and unconscious. Biases aren't necessarily a bad thing. Biases become negative and thwart efforts for an inclusive workplace when they create an environment that is not welcoming. Positive biases can be harmful as well, especially when they prevent us from seeing how our bias may negatively impact someone else.

We need to become aware of unconscious biases, which have formed over our lifetime through our experiences, exposure, and contacts (or lack thereof) with people. As one of the authors' supervisors used to say: "You can't fix what you won't face." Becoming aware of one's biases is step one. Knowing one's biases helps with the next step: understand the impact these biases have on one's behavior, attitude, and language. Becoming aware of our own biases and their impact allows us to control them.

Providing unconscious bias training for all staff, beginning with institutional leaders, will help individuals become aware of their biases that negatively impact DEI efforts. Diversity, cultural proficiency, and business culture training should be provided, as well as training on how to call out behaviors (e.g., the "Ouch" workshop previously mentioned). Training should be offered on an ongoing basis, with particular attention paid to training newly onboarded employees.

Affinity groups, also known as Employee Resource Groups (ERGs) or employee networks or colleague networks, are an excellent way to maximize new employees' knowledge about the institution yet minimize overwhelming them with information. Yale University leverages affinity groups to support new hires and increase retention in several ways:

- *Engagement & Networking.* Affinity groups engage new hires at new hire luncheons, meet-and-greet events, guided tours of the university, and

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To retain a highly engaged, diverse workforce, organizational leaders should consider launching a mentoring program paying particular attention to protégés from underrepresented groups.

networking events directed toward new hires. These events are opportunities to learn about Yale, the affinity groups, and the ways in which an employee can become an active staff member. There are leadership opportunities available, as well as positions on the steering committee of each affinity group.

- *Learning & Development (L&D).* These L&D opportunities are made available at no cost to new hires. Most workshops are hosted during lunchtime and address an array of subjects, from skill development (e.g., Microsoft Word, Microsoft Powerpoint, web design, and public speaking) to behavioral training on topics such as leadership, unconscious bias, work-life balance, career coaching, and stress reduction techniques. These workshops not only help employees feel more like a part of the organization but also develop their capabilities, making them a more valuable team member and colleague.

- *Community Citizenship & University Ambassador.* Each affinity group has community partners supported via programming, leadership, and/or advocacy. These partnerships offer new hires an opportunity to learn both about Yale and about the New Haven community and to strengthen town-gown relationships. Programs include "Read Aloud" events at local elementary schools, STEM and STEAM initiatives at the local Boys & Girls Club, the AIDS Walkathon New Haven, New Haven Pride Parade, and many more.

- *Retention.* Employee engagement leads to retention. Many affinity group leaders have leveraged their volunteer experience to grow their careers, whether through a promotional opportunity, a career change, a board membership opportunity, or a university committee membership. Affinity groups are a fun and rewarding way to jumpstart organizational involvement and affiliation. Participation broadens one's organizational identity beyond employee to include volunteer, leader, and diversity champion.

Although the approaches listed above focus specifically on engaging and retaining new hires, successful retention strategies encapsulate aspects of each of the areas. It is not too late to create learning and developmental opportunities for existing staff in an effort to engage and retain. Staff in most organizations are expecting these types of supports and more from their employer and see them as part of the employee value proposition.

Mentoring

If done well, mentoring programs can be an excellent way to advance an organization, grow and retain talent, leverage leaders, and create a learning culture. Mentoring is critical to the retention of employees from underrepresented backgrounds,[12] and it benefits both protégé and mentor. In their analysis, Rajashi Ghosh and Thomas G. Reio wrote: "Compared to colleagues who did not mentor, individuals who served as mentors within their workplace reported greater job satisfaction and commitment to the organization. In addition, higher quality relationships were associated with even greater benefits."[13]

Since there are many mentoring models, an organization must determine the model that best fits its need. For example, the *Situational Mentoring* model is typically time-bound, is associated with building a skillset, and is done very quickly with a great degree of support and supervision.

Formal Mentoring or Traditional Mentoring matches a mentor and a protégé in a one-on-one relationship, over a period of time (typically up to twelve months), with meetings lasting approximately an hour. Meeting agendas and areas of development are decided by the protégé. This model is most successful when there is positive chemistry between the mentor and the protégé. Another model is *Group Mentoring,* in which the mentor is matched to many protégés, and the discussions often center around a shared topic. The drawback to this approach is protégés are not afforded a one-on-one relationship opportunity. However, the Group Mentoring model maximizes information sharing. For organizations that have many locations or operate in multiple time zones, *Virtual Mentoring*—using technology as the primary means of communication—may be an option. Finally, *Reverse Mentoring,* in which senior executives are mentored by younger employees to educate one another on new ways of thinking, is gaining ground in some organizations.

To retain a highly engaged, diverse workforce, organizational leaders should consider launching a mentoring program paying particular attention to protégés from underrepresented groups. Positive trends from the implementation of mentoring programs will emerge, and employee retention will increase because employees will believe that the organization has placed a higher value on their learning and development.
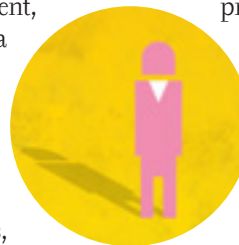
Partnering with Human Resources

The components of DEI—diversity, equity, and inclusion—are discrete yet dependent parts of a collective whole that ensures a workplace where all employees can be their best or fullest selves. DEI is about ensuring that human capital is employed effectively and efficiently. Therefore, IT leaders should partner proactively with the human resources (HR) department to be sure the campus is providing the best environment for employees to thrive. In addition to helping build individual

and institutional capacity within sections, offices, departments, divisions, and schools, the HR department also contributes to setting the culture.

At Yale University, for example, the Office of Diversity & Inclusion works directly with the Employee Relations department to execute DEI goals and objectives. Human Resource Generalists (HRGs) serve as the central point of contact to each of the departments at Yale. The HRGs are experienced as a partner and communicate the goals, timelines, and deliverables. They serve as the liaison between a central unit and their departmental clients. This relationship has been very successful in achieving goals, including those that are non-diversity-related. On occasion, the HRGs coordinate departmental visits from the Subject Matter Experts (SMEs) and their client groups. Having a single point of contact to serve as the liaison is invaluable. HRGs have a sense of the climate, culture, and leader temperament and together can help to resolve, educate, and achieve positive outcomes.

Many IT and HR managers still believe the myth that IT professionals, including the CIO, must have a computer science or related degree or must have a background in information technology. To cultivate and retain a diverse workforce, the IT and HR departments must partner to dispel these myths. Support for inclusion of employees who don't have a computer science degree comes from an unlikely place: Google. Even though Google was originally founded by computer scientists who believed that only technologists can understand technology, data from Google itself has demonstrated

Personal Experience: **Debbie**

In my current role as Chief Diversity Officer, I am fortunate to be able to work with and oversee a diverse team. The diversity dimensions include (but are not limited to) generation, race, thinking styles, job classification, year of service, ethnicity, background, community, gender, educational levels, and community involvement. You name it, the team composition possesses the diversity. However, I realize that having a diverse team is not enough to retain staff. It is important for me to find, create, and/or cultivate ways of embracing and capitalizing on the team's diversity in a manner that is respectful and inclusive and that optimizes the organization, the team, and the individual. I often tell my staff: "I will guarantee you that the resume you used to get this job will not be the resume you use to get your next position." This statement is my commitment to the individual development of each of my staff members.

otherwise. In 2013, Google launched "Project Oxygen" in which it analyzed data from the HR records of its managers. The project found that among the eight most important skills in Google's best managers, STEM expertise was in last place. The top skills were being a good coach, critical thinker, and problem solver, communicating and listening well, possessing insights into others, having empathy toward and being supportive of one's colleagues, and being able to make connections across complex ideas.[14]

Nontechnical backgrounds are also represented in the current higher education IT leadership and management ranks. According to the 2016 CHECS (Center for Higher Education Chief Information Officer Studies) CIO survey, only about one-third of the surveyed CIOs majored in a technology-related field. On the other hand, 26 percent of the CIOs had a business degree and 10 percent an education degree.[15] Data from the ECAR workforce study also demonstrates the diversity of backgrounds of IT professionals. Previous positions of higher education IT managers range across areas such as academic computing, IT operations, and desktop support. Additionally, 12 percent of respondents indicated "other circumstances," likely a nontraditional IT background.[16]

HR and IT managers must recognize that IT professionals can come from nontechnical backgrounds. If an IT organization has traditionally hired from computer science and IT backgrounds, it's likely that position descriptions, frameworks for evaluation, and manager/staff mindsets will need to change in order for the organization to be inclusive of nontechnical employees. If managers do not take nontraditional attributes into account, promotional opportunities and other means of professional growth may sabotage retention efforts. Finally, HR departments may also have access to resources that will help inform IT strategies for retaining a diverse workforce. For example, the College and University Professional Association for Human Resources (CUPA-HR) has developed a body of web resources to assist campuses with addressing diversity (http://www.cupahr.org/knowledge-center/diversity-resources/). Campus HR professionals who are CUPA-HR members have access to the CUPA-HR Diversity Toolkit, which includes tools, model policies from higher education institutions, readings, and e-learning courses.

Communicating the DEI Message

Even the best DEI strategic plan is not likely to succeed without a strong communications plan.[17] Goals for the communications plan should include making the business case for DEI and how it improves organizational performance, incorporating the DEI message into talent recruitment and retention campaigns, providing employees with information about resources that can enhance their careers and increase engagement, and using the DEI message as a differentiator to enhance the campus brand.

Eight steps are necessary for developing a strong DEI communications plan:

1. Create the message outlining the strategic plan and its goals, the business case for DEI, and the opportunities and challenges.
2. Communicate the commitment to the strategic plan and its goals by the most senior leader at the institution, ideally the president, chancellor, or campus CEO.
3. Utilize many different communications channels to communicate the strategic plan, its goals, and its value.
4. Set clear expectations of how members of the organization will be involved in the strategic plan.
5. Provide several communications channels for questions and comments.
6. Repeat the message on a planned, regular basis.
7. Measure and communicate progress on the strategic plan, incorporating stories of successful groups and people as part of the message.

> **f managers do not take nontraditional attributes into account, promotional opportunities and other means of professional growth may sabotage retention efforts.**

8. Incorporate the DEI message as a foundational element into all functions as relevant (e.g., embed DEI into existing HR benefits information and student-facing information; utilize social media to share DEI successes, using hashtags strategically; and/or ensure that the campus main web page highlights DEI successes).

An effective means of communicating DEI is through allies who represent the majority decision makers—for example, male allies leading the conversations about gender equity. What is a male ally? A research report from Bentley University states: "Male allies are men who associate with, cooperate with, and support women." The report quotes a consultant, Chuck Shelton: "Allies listen, co-create opportunity, and build a personal brand for accountability and trust." The report further highlights ways in which men have been, and continue to be, allies by privately and/or publicly advocating for DEI, meeting with women in the workplace to discuss DEI, and identifying cases of inequality or lack of diversity and working to fix them.[18]

Men who want to be male allies will need to have a supportive environment in which to do so. Many don't know how to be allies to women in the workplace, and some admit to feeling uncomfortable. The Bentley University report notes a number of suggestions for creating an environment that develops and supports male allies. The organization or institution must identify and clarify men's motivations for wanting to be allies and must help them understand how being allies will be relevant to their jobs. It should also recognize that there are barriers for men who want to be allies and should address those barriers.

Implementing an initiative is a key means for developing and supporting male allies. The Bentley University research report provides the following advice:

■ Ensure that men feel included in the conversation about equity.

Figure 1. DEI Stages of Development

Step 1: Get Started	Step 2: Build Momentum	Step 3: Establish Practice	Step 4: Expand the Leading Edge
• Diversity seen as gender and race • Case for change and vision established • Building leader awareness and commitment • Initial data/statistics gathering and needs assessment • Emerging infrastructure • Targeted recruitment • Homogeneous (visible differences) leadership teams	• Diversity viewed more broadly • Case for change refined • Diversity linked to college/university goals • Goals set; broader measures emerge • Leader education • Infrastructure in place • Early alignment of key HR systems • Emerging accountability systems • Internal communications • Visibly diverse leadership teams • Need/opportunity assessment of diverse customers and clients	• Leaders viewed as champions and role models • Integrated, routine planning and monitoring of progress • Accountability systems in place • Leaders understand, apply, and articulate the organizational value and connections • Systemic integration of HR processes • Full implementaton of plans • Internal and external communication strategies • Effective utilization of resources	• Diversity and inclusion connected to employment brand • Full integration into operations and culture • Breakthrough, world-class systems • External and internal recognition as a best-practice organization • Diversity owned by all • Inclusive environment and equitable systems • Recognized as best-in-class by all stakeholders

Source: Unknown

- Recognize and identify male privilege in the workplace.
- Appeal to a sense of fair play.
- Provide personal stories about the struggles that women have at work.
- Share examples of what other campuses and senior university/college leaders are doing to advance equity.
- Communicate the benefits of equity.

In addition, organizations should consider getting involved in the UN Women's HeForShe initiative. For example, Stony Brook University President Samuel Stanley is a HeForShe IMPACT 10x10x10 champion. The thirty IMPACT champions are committed to taking common action toward gender equality within their sectors.[19]

Implementing initiatives is certainly a start, but organizations will also need to ensure that efforts toward cultivating and supporting male allies are sustainable. To do so, organizations must ensure that managers are trained and that people are held accountable for their behavior. Another positive step in sustaining the initiative is to actively recruit male mentors and sponsors for women.

Measuring DEI Retention Outcomes

The success of an organization's DEI efforts must begin with a roadmap. Figure 1 outlines four steps, or stages of development, to be applied to specific goals.

We can illustrate these stages through a sample DEI goal: *Increase minority and gender representation by 4% within the managerial ranks of the organization.*

Step 1: Get Started. At this level, the organization is taking measurements, establishing key priorities, and determining the initial data set needed to support the goal.

Step 2: Build Momentum. At this stage, goals are monitored for progress and/or obstacles. Data is reviewed with a degree of frequency, preferably monthly. The initial data set will serve as a baseline, and all data trends are reported.

Step 3: Establish Practice. At this step, communication about progress toward goals is shared with stakeholders, creating engagement. The goals and data sets are aligned. All data has been validated, any modifications have been made, and regular monitoring is showing progress.

Step 4: Expand the Leading Edge. To reach this stage takes commitment, drive, failures, successes, and dedicated leadership. In this phase, leaders welcome and seek data. All leaders are aware of the metrics and are using the data to build business cases and to share successes throughout the organization. The result is greater collaboration and innovation. This is the phase of total-ownership; data collection and monitoring is no longer a chore but is, rather, a tool for organizational success. Often, more ambitious and integrated goals are established, and the levels of integration and ownership expand. Interdependencies are identified, and linkages are made between the initial goal and other institutional goals.

For example, the original goal was as follows: *Increase minority and gender representation by 4% within the managerial ranks of the organization.* Listed below are additional, expanded goals:

- Increase minority and gender representation by 6% within the managerial ranks of the organization.
- Increase minority representation at the senior-most level of the organization by 4%.

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Table 2. DEI Action Steps

Get Started	Build Momentum	Establish Practice
1. List current staff sorted by gender, race, and managerial classification. 2. List open managerial positions. 3. Compile turnover metrics. 4. Compile talent-planning documentation, and list high-potential minorities.	1. As the baseline data is beginning to be compared to the progress of goals, ask the following questions: • Are we progressing toward the goal? • Are there internal/external obstacles that may slow down progress? • Are there opportunities we are missing, and/or are there stakeholders who can help accelerate the goal? • How frequently are communications shared with senior leadership? • Do we have the right set of data?	1. Communicate progress to each department represented. 2. Communicate progress university-wide. 3. Expand the list of stakeholders to include the unit leaders for the areas of interdependency. 4. Create messages promoting interdependency of outcomes and shared data.

- Ensure that 100% of high-potential staff have an individual-development plan.
- Ensure that 100% of senior leaders have a fully vetted succession plan.
- Increase by 3% the cultural assessment scores for questions that are key drivers to retention.

Conclusion

To meet DEI retention goals, campuses will need to implement several approaches. Senior leaders must communicate their support for retention efforts frequently and through multiple channels. Appropriate training must be provided for all employees in areas such as cultural proficiency and unconscious bias. Affinity groups and mentoring opportunities must be implemented to help retain employees from diverse backgrounds.

Increasing the retention of IT employees from diverse backgrounds will require effort. Doing so is the equivalent of plugging, and then filling, the leaky bucket. But the benefits to a campus will be much greater than the investment. ∎

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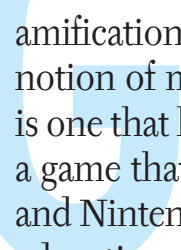
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GAMEFUL DESIGN: A Potential Game Changer

By Kevin Bell

G amification (both the term and the concept) has become a double-edged sword. The notion of making a game out of an educational experience, lesson, content, or activity is one that has been chased for centuries. But the idea of turning a learning activity into a game that will rival those from game companies such as Electronic Arts (EA), Rovio, and Nintendo is something that is simply not going to happen. As a result, a number of educational technology (edtech) companies either are leaning away from the *gamification* term entirely or are switching to other modalities that are more like adaptive scenarios than full games. Games (or even more basic simulations) are very difficult to get right and are extremely expensive to build. Even in the professional game-development world, for every successful *World of Warcraft (WoW)*, *Halo*, or *Angry Birds*, there are tens of thousands of failed attempts. The complex mix of narrative (neither too cheesy nor too complex), appropriate challenge (neither too easy nor too hard), motivating rewards (both meaningful and intrinsic), and feedback loops is incredibly troublesome and costly to package into a whole experience.

Trying to align learning outcomes with a narrative runs the very real risk of producing what has been termed "chocolate-covered broccoli." There are, of course, educational games that have stood the test of time. *The Oregon Trail* was designed to teach about the realities of 19th-century pioneer life. The player assumes the role of a wagon leader guiding a party of settlers, in 1848, from Independence, Missouri, to Oregon's Willamette Valley in a covered wagon. Created in 1971, it is one shining example—from forty-seven years ago. Making learning into a game is difficult.
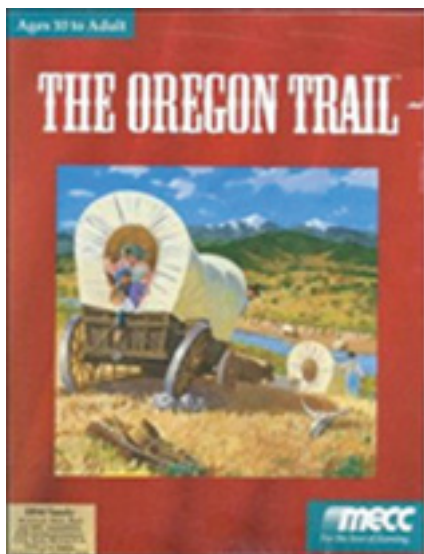
Instead, I prefer (and teach) the concept of *gameful design*. The distinction is subtle but important. Whereas gamification equates to making a game of an activity, gameful design looks at the various aspects and intrinsic motivators that are embedded in successful games (and in other nongame events) and asks whether those elements can be replicated and woven into classroom and online activities. The goal is to move toward flow—to the point where engagement becomes seamless and (even) compulsive, rather than dreaded and/or labored. Gameful design thus looks at the elements that make games, or other forms of engagement, intriguing and then applies those principles to educational experiences. In this way, and by defining intrinsic moti-

vation or motivators in terms that many educators recognize and already try to incorporate, gameful design reflects and builds on things that good instructors do as second nature. In good learning experiences (as in good sports or good hobbies), participants are challenged, are provided with prompt and supportive feedback, are supported to reduce their fear of failure, and are encouraged through cooperation and/or teamwork. These are all gameful design principles.

In a semiregular online class, I teach these principles to academics, practitioners, and "pracademics" (the combination term for career academics who are also active practitioners in their subject). My class is aimed at people who have picked up the role of supporting their colleagues in basic edtech logistics and who, in the continual quest to find new ideas and means of motivating and engaging students, want to hear more about and experiment with gamification. During the course, we typically end up spending a lot of time on definitions. Some class participants want to make real games, whereas others "get it" when I try to gently redirect their attention to gameful design—which, in my mind, has a better chance of actually influencing teaching and learning. The conversation in class frequently reminds me of the dialogue in *Monty Python's Life of Brian:* "Judean People's Front? Nah. People's Front of Judea!" But the distinctions here do merit attention. They represent the difference between the unachievable and the potentially significant applications of current and emerging technologies.

My course participants run the gamut from tech-challenged (or even tech-phobic) to geek-savvy or "nerd-ish and proud." Most are women and claim to not be gamers or even competitive at all. Interestingly, it seems that the nongamer/noncompetitive participants are the ones who jump to the most immediate gamification ("make a game

of it") solutions. The danger with this jump is that it gets us immediately to the place where a growing majority of career academics and educators tune out of the discussion. If academics and administrators are looking to gamify courses that will compete for the attention of the fickle hearts and minds of trend-chasing customers, they are looking at serious funding and development time. The development of Blizzard Entertainment's late 2004 hit *World of Warcraft (WoW)* required an estimated $63 million and approximately four to five years. Just over two years later, in January 2007, *WoW* was apparently in need of refreshing, as evidenced by the launch of *The Burning Crusade,* the first expansion of the game.[1] This suggests that the shelf life of your average (multimillion-dollar) game is around two to three years. Added to that, in 2009 EA Chief Creative Director Rich Hilleman noted that his company "now typically spends two or three times as much on marketing and advertising as it does on developing a game."[2]

Can't you just imagine if the following email were sent from an instructor?

Dear University Administrator,

I teach Social Science 101 at our institution and am interested in trying to better reach my students, with an eye on increased engagement and, possibly, better outcomes. I am going to make a game out of my class and will need approximately $20–$30 million per year (ongoing) for the development and maintenance of this project. I believe that I will demonstrate efficacy to the extent that many of my colleagues will likely want to learn from and copy my efforts. You might therefore want to give the CFO a heads-up that we will need to sell off a campus or two.

Yours truly, Instructor A
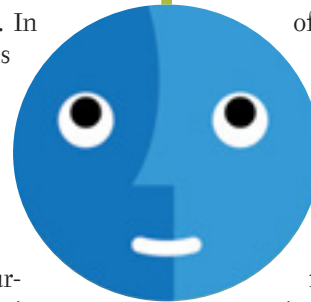
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Still, I don't believe we should give up on the idea *behind* gamification—that is, on the desire to engage students. Students who are ridiculously engaged in certain elements of their personal world, who spend nearly every available minute checking in on platforms that motivate them, are close to being completely *dis*engaged in the academic milieu. Adding to the challenge is the fact that as we work to increase access to, and support the right of, an education to a wider tranche of society, we are supporting rising numbers of students from backgrounds with significant risk factors. The higher education student body at large is increasingly composed of students combining multiple risk factors—such as low socioeconomic status or first-in-family—that could categorize them as "fragile." These challenges are significant; the 2017 ACT report *STEM Education in the U.S.* showed that "on average, first-generation college students who are from a racial/ethnic minority group and a low-income family are *sixteen times less likely* to be ready for credit-bearing STEM coursework in college than the group of students who are not considered underserved."[3]

From a motivational perspective, students from these demographic and life situations frequently have one strong reason to study: the resolute and genuine attempt to better themselves. But even that is set against multiple, extremely stressful disincentives and reasons they feel they might be better stepping away. These disincentives can include trying to hold down multiple jobs, having a family to care for, and even experiencing peer pressure not to persist.

The nature of the changing student body, students' fear of missing out (FOMO), social media, and the pressing need to "beat my classmate's new *Rider* best score" combine to present an engagement challenge that faculty have not been trained to cope with. They often don't have the tools to even try. We are asking our colleagues to address these

issues with minimal extra resources and support. The vast majority of faculty are already wearied by a lot of heavy lifting, having added instructional design, technical troubleshooting, (complex) materials development, and student support more akin to social work to their load. They are now being asked to step up even further to retain increasing numbers and proportions of at-risk students. Not surprisingly, they are scrambling to locate the means to motivate and engage students (particularly in early-entry or intro-level classes). Instructors realize that they most likely have just one shot to engage these new students in this new world. Fragile learners who lack confidence and whose self-doubt is exacerbated by failure will almost certainly not loop back round for another try. Given the obstacles these learners are facing, the costs they are incurring, and the life-load they are carrying, if they fail they generally do not (or cannot) come back.

So, how do we help instructors engage students? I return to gameful design. Way back in 2003, James Paul Gee, one of the earliest advocates of the potential gaming-education nexus, wrote in *What Video Games Have to Teach Us about Learning and Literacy:* "Better theories of learning are embedded in the video games many

children . . . play than in the schools they attend." He continued: "The theory of learning in good video games fits better with the modern, high-tech, global world . . . than do the theories (and practices) of learning that they see in school."[4]

If Gee's talk of "better theories of learning" sounds reasonable but a tad dry, take a walk with me down Memory Lane. Assuming you're of a certain age, think back to the 1970s–1980s video arcades and the first home console games such as *Pong* and *Breakout.* They were fun, despite pixelated graphics and limited interactivity. They were fun because they were well thought out and involved motivators to engage, dopamine-generating hooks and triggers, competition, challenges, narrative, sense of progress, and user-centricity (before we ever appended that suffix to our students). The premise of something like *Space Invaders* was immediately graspable, the controls were usable after milliseconds of thought, the feedback was instant and unambiguous, and the reward—"You Saved the Earth!"—was tangible. Players experienced both collaboration and competition (through the leaderboard) while they also needed to concentrate. The *Space Invaders* game was—and this statement is not as redundant as it sounds—*gamefully designed.* Basic human motivators, competition, challenge, narrative, and reduced fear of failure combined to wonderful effect.

Many of the elements or hooks that made *Space Invaders* addictive have been apparent not only in good games but also in good sports, good books, and good movies since time immemorial. Back in 1978, the developers of *Space Invaders* saw how the integration of these tenets of engagement

> **Fragile learners who lack confidence and whose self-doubt is exacerbated by failure will almost certainly not loop back round for another try.**

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could entice all users—young and old, male and female, all ethnicities across the globe, from privileged and penurious backgrounds. Yet forty years later, our engagement with academic users remains woeful. We expect them to self-motivate, and we provide them with very limited (or even no) feedback. Furthermore, we set up minimal human social interactions; we don't leverage competition, collaboration, or cooperation; and we provide next-to-no clear sense of progression or framing narrative. What about "fun"? Well, that just couldn't possibly help, could it?

Beginning in about 2004–2006, social media became an omnipresent part of students' lives. Today games—both complex (*Assassin's Creed, Halo*) and ridiculously simple (*Flappy Bird, Rider*)—are still influential, but gamefully designed apps like Snapchat, Facebook, and Instagram play a much bigger role. Millennials (1981–1996) and Post-Millennials (1997–present) play mobile games much less than Gen Xers (1965–1980) do or did. Post-Millennials "over-index" (i.e., do significantly more than other age groups) in sports, health and fitness, music, media, entertainment, lifestyle, and shopping. They interact disproportionately, and significantly more, with apps and media that have gameful elements built beneath

a nongame interface. To put it another way, they are intrinsically motivated to engage with systems that are intentionally designed to be hard to not engage with—systems in which engagement provides numerous feel-good rewards along with the sense of being part of something bigger, connected, informed, challenged, and empowered and in which users can create their own narrative for immediate feedback and positive reinforcement. Sounds just like the LMS and related platforms at our higher education institutions, right?

Educators need to become more psychological and analytical to see if they can engender a picture of engagement from a more limited palette. In some ways, it may be a blessing to not have substantial multimedia budgets. When big budgets are blown on complex and interactive "educational games," typically the games are not very educational and, honestly, not even much fun. This is where we can jump into the crossover world of game principles being applied to education and pedagogy (aka gameful design). This may also be the opportunity to achieve empathy through shared experience—or shared experience via decontextualized or recontextualized teaching and learning. It remains a challenge, as it has always been, for older educators to get through to or to connect with younger, culturally shifted students by finding shared experience or even shared context.

Again, Gee was one of the pioneers here. He aligned specific aspects of teaching and learning with key features of successful video games. In addition, he recognized that these aspects or elements might well be applied to help engage those learners who were referred to as fragile learners (particularly first-generation

students). He referenced three elements that were addressed by game designers and from which he felt educators could learn. They seem somewhat obvious, but they provide a solid initial framework when contemplating next steps:

1. The learner must be enticed to *try,* even if he or she already has good grounds to be afraid to try.
2. The learner must be enticed to *put in lots of effort* even if he or she begins with little motivation to do so.
3. The learner must *achieve some meaningful success* when he or she has expended this effort.[5]

The working theory is that some barriers for learning might be surmountable if students can reach a state of engagement—that is, can become hooked and committed, possibly with some additional elements to the learning experience, at least until they reach a level of sophistication at which the subject matter itself becomes motivating. For modern-day students, particularly those penalized by the absence of intrinsic motivators that come through birth or good fortune, the need to be encouraged and supported is accentuated. Gameful design offers the possibility of meaningfully endorsing and strengthening their commitment, which might just get them over the initial "fragile" hump and to a place where they feel they belong and where they have a fair chance at persistence and, ultimately, success.

Gameful design provides a means of creating a dialogue in academic terms that colleagues will support. It is not an on/off switch. In my gameful design course, I present my students with the rubric in table 1 and encourage them to select two to four intrinsic

> **Educators need to become more psychological and analytical to see if they can engender a picture of engagement from a more limited palette.**

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Table 1. Intrinsic Motivators for Gameful Design

	Absent	Arguably/could be	Established/functional	Signature element
Rules (clear and effective)				
Effortless involvement—"pick up and play"				
Appropriate level of challenge (whitewater rafting)				
C.C.C.P. Conflict, Competition, Cooperation (are) Possible (humanity)				
Clear goals with inherent, clear reward structures				
Immediate & continual feedback				
Level up/progress				
Narrative/curve of interest				
Aesthetics				
Fear of failure reduced (*Mindsets*)				
Student control over actions				

Source: Kevin Bell, *Game On! Gamification, Gameful Design, and the Rise of the Gamer Educator* (Baltimore, MD: Johns Hopkins University Press, 2017).

motivators that interest them and to play with those in their course design. For example, *narrative* is certainly an important motivator and one that I have seen used to great effect in creating sustained, term-long interest, but no one should be forced to go with it. If you don't play *Dungeons & Dragons* (and I didn't), then don't use narrative. My students often focus on means of expediting the *immediate and continual feedback* that adaptive learning (and even versions of it in the LMS adaptive release feature) can provide with a degree of personalization, while the C's (*Conflict, Competition, Cooperation*) can be dealt with creatively. For the C's, I like the "dependent hero contingency" tactic (aka The *Harry Potter* protocol), in which teams compete while individuals feel peer encouragement and collaboration without the weight of the world on any one person's shoulders.

There are no simple right answers in gameful design, but the flip side is that there are no truly wrong answers either. Millennial/Post-Millennial students tend to deeply appreciate and be supportive of any efforts to meet and engage them. I encourage low-tech-first iterations so that feedback can be gleaned and tweaks made prior to any technical build. Even a focus on *aesthetics,* shown by making materials more visually appealing with better graphics and/or a better LMS layout, is a gameful element. Somewhere out there, someone new to academe is right now discovering clip art and/or animated GIFs. We should help.

As we scan the horizon and consider the approach of emergent technologies (e.g., virtual reality, augmented reality, artificial intelligence), we are again approaching a new vista from where we might take some major leaps forward in terms of student-centricity and student engagement. These technologies have potential, but if poorly applied, they will add little to the student experience. We should remain wary of repeating prior false dawns in the form of bells and whistles that are implemented just because we can and because they sound cool. Any implementation of technology, cutting-edge or not, should be questioned against which intrinsic motivators it impacts and how. Viewed from a technical perspective, the Intrinsic Motivators for Gameful Design table could also be employed as we look to richer, newer, cost-coming-down-all-the-time technologies. If the answer to the question "Which motivators does this technology move?" is "none," then the next question is, "Why bother?"

Gameful design embraces incremental implementations of proven intrinsic motivators. At the same time, gameful design acknowledges and accentuates the work that good instructors are already doing and have been doing since all games were board—not bored. It holds true potential as a game changer. ∎

Any implementation of technology, cutting-edge or not, should be questioned against which intrinsic motivators it impacts and how.

Notes

1. "*World of Warcraft* (WoW)," *Wikipedia: The Free Encyclopedia* (accessed April 2, 2018).
2. Superannuation [pseud.], "How Much Does It Cost to Make a Big Video Game?" *Kotaku*, January 16, 2014.
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4. James Paul Gee, *What Video Games Have to Teach Us about Learning and Literacy* (New York: St. Martin's Press, 2003), p. 7.
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How Change Has Changed: The Community College as an IT Enterprise

Change has changed. For a surprising number of colleges and universities, this is not understood. In particular, this is not understood by community colleges. While there are many components to the decline of higher education, particularly in the United States, realizing how change has changed is the most open to correction but also the most critical to recovery. Doing so requires a very serious review of the college as an entity and a rethinking of why it exists and how it should evolve. This rethinking needs to focus on information technology as it has shaped and continues to shape the structure and nature of the institution and the campus.

Historical Development

As in businesses back in the 1970s and 1980s, information technology on campus used to be managed by technicians who were located in a back office somewhere and who focused on records and billing. Often the IT department was part of the accounting division, since IT employees were seen as operators of a glorified adding machine. This was the logical model for large mainframe record-based computers. But the arrival of PCs disrupted this model: the back-office systems shrank in size and became specialized while PCs appeared on people's desks and grew into departmental networks. Still, the traditional IT technician didn't touch the PCs, which were viewed as amateur (if not outlaw) devices.

The conquest of information technology by the client-server architecture reshaped the institutional IT environment into a world of servers, clients, and help desks. This happened very rapidly in some parts of the business world and much more slowly in other areas that could not afford a separate, fully staffed IT department. Community college campuses fell into the latter category. Generally, a responsible person was pressed into service, without having the knowledge to do more than turn things on and perform basic backups or updates. In small colleges this was covered by release-time faculty, helped by AV (audio-video) staff and maybe a facilities telecommunications person. Meanwhile, the transition to the internet and the web in the 1990s complicated things quickly—a situation exacerbated by the arrival of distance (online) education. Online education was clearly a "faculty thing," whether faculty wanted it or not,

> How many community colleges are organized as IT enterprises or even as technology enterprises? The world we now live in requires this change in organization.

but who would take care of the technology? The answer was AV staff because this was clearly some kind of correspondence or TV course.

Many campuses managed to drag the 1990s well into the 2000s. For the most part, community colleges too stayed caught in some distorted form of the late 1990s, with faculty and staff left on their own to handle their PCs and online courses (whoever was silly enough to do so) while the IT department remained concerned with registration and back-office accounting, plus HR (human resources) and ERP (enterprise resource planning) in larger systems. This continued to hold true up until 2010 or so, when enrollments began to decline as students dropped out before completing their degrees. Something needed to change to fix this situation, and not surprisingly, IT solutions began to be developed to track students and flag them for assistance before they disappeared.

Still, for a number of campuses—and again, particularly for community colleges—information technology remained in the back office or continued to be decentralized in administration, records, engineering, and other scientific departments. Media centers evolved to be more like IT services or were allowed to atrophy as younger faculty, mostly adjunct, had no choice but to provide their own computing systems and applications. Enrollment losses continued, and tenured faculty retired—to be replaced, if at all, with adjunct lecturers. The primary solution to these problems was the purchase and partial integration of student pathway systems, tracking systems, an improved student management system (SMS), and maybe a new learning management system (LMS)—all chosen from nearly identical lists of offerings.

The Failure to Succeed

None of these systems offered the magic bullet. Improvements were made, however, by giving a new generation of students access to information on their programs and progress and by sending them notifications when/if things began going downhill. This access was expected by the newest, always-connected generation of students. Yet a major misunderstanding exists between the social sophistication of most in the Millennial and Connected Generations and the less-collaborative style of earlier generations and non-connected students. Unlike previous generations that have been either dismissive or silent on things they

Connections Editor: **Bret Ingerman**

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environments, but only—for many faculty—if they can avoid putting their courses online. Years of surveys and analysis have proven that students prefer courses that incorporate online components for at least some of their courses but also like good face-to-face presentations and direct interaction with their instructors.[1] What more reason is there to keep things the way they are?

The Missing Force

Again, a major issue is the failure by many in higher education to understand how change has changed. This is a direct result of the failure to identify how the new process of change must be managed. The Western higher education tradition is based on scholarly communities that became modern institutions managed structurally and administratively by faculty and committees. That worked for several centuries. But it does not work well in the IT-based organizations of today and will not work well in the college or university that is organized as an IT enterprise.

We have watched the accelerating destruction of powerful organizations in industries that have been forced through the transition to e-commerce: music, books, travel, entertainment. We are currently watching the collapse of very nearly all the once-great department stores and retailers. And we are beginning to watch a transportation transformation that will redesign our cities. Meanwhile the banking industry is starting a second round of evolutions that will lead to a completely modernized financial-management world based on fully virtualized currencies and ledgers using blockchain technology. This same blockchain technology is beginning to replace all contractual, identification, and educational certifications.

The successful new organizations that have resulted are all IT-based. They are all IT enterprises. Managing them requires extensive IT experience and specialized application and content knowledge. Staff with this experience and knowledge are the UI (user interface) and UX (user experience) workers and managers who support and deliver services and information within evolving environments for specific populations and requirements.

How many community colleges are organized as IT enterprises or even as technology enterprises? The simple reality is that the world we now live in requires this change in organization. Do it sooner and win. Fail to do it and die. We need to restructure our institutions, and we must learn to be ready to do so again—quickly. Change has changed. ∎

felt were not relevant to them, these students have a lifetime of social media experience that makes them a good bit more polite and open. They tend to smile and go along with rituals of education and to work hard even though they are amazed or befuddled when confronted by a lack of valid information technology or by the irrelevance of what is being presented to them. These students know how to work in an online world. If they really need to figure something out, they will check with their friends online or find a link to the relevant YouTube presentation on how to do it. Unfortunately, more and more community college students have serious socioeconomic issues isolating them from the online world and their online peers. This is making the gap between networked students and those without home access greater.

Meanwhile colleges and universities continue their struggle with decreases in funding and enrollment. Faculty continue their struggle to make their classrooms into successful learning

Note

1. D. Christopher Brooks and Jeffrey Pomerantz, *ECAR Study of Undergraduate Students and Information Technology, 2017,* ECAR research report (Louisville, CO: EDUCAUSE, October 2017), p. 20.

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Empowerment, Experimentation, Engagement: Embracing Partnership Models in Libraries

What relationship do we want learners to have with their library? This is an essential question for those of us who work as library faculty and staff in higher education. As the information landscape becomes increasingly diverse, complex, and digital, we need to consider the different roles that libraries are embracing. From makerspaces and digital scholarship centers to open-access initiatives, digital library projects, and literacy education, academic and research libraries are engaging with communities in ways like never before.

Just as the physical and virtual environments of libraries continue to evolve, so too does their service philosophy. Intellectual empowerment remains a sustaining value, but how we approach this mission is changing. Historically, libraries have been rooted in a transactional model, one in which library faculty and staff provide access to content and tools and offer assistance to library patrons. Although these responsibilities and our expertise in acquiring, navigating, and evaluating information remain in demand, we are also taking on more active roles as scholarly collaborators, co-teachers, co-PIs, and consultants. We are increasingly being sought out to provide the insights and infrastructure that can empower people to create, share, curate, and reflect on their learning. As a result, libraries are shifting from a transactional model to partnership models.

As this effort evolves, our attention moves beyond purchasing, licensing, and providing access to collections and encompasses a greater emphasis on content that students and faculty generate themselves. Libraries are repositioning themselves as laboratories for exploration, incubators for ideas, and essential collaborators across the teaching, learning, and research enterprises. Our own institution, Virginia Tech Libraries, offers a few examples of this transformation:

- *Digital and Information Literacies.* If, as the media literacy educator Renee Hobbs has stated, "literacy is the sharing of meaning through symbols,"[1] what is the library's role in promoting and empowering learners across the spectrum of digital and information literacies? As our society and culture increasingly use symbols as formal modes of communication, how should we shepherd the development of these literacies across our specific learning contexts? Over the past year, we have been working on the creation of a digital literacy framework that provides a structure for addressing these questions. The framework identifies a set of core competencies for a digitally literate citizen, as well as the values that learners should strive to personify through practice as they engage in both digital and physical contexts. One initiative that has emerged from our digital literacy efforts is the ePortfolios program. Libraries leading an e-portfolio initiative provide unique opportunities to explore the intersection between teaching digital and information literacies through both the pedagogical and the technological lens. While this is a new service area for libraries, it offers unprecedented opportunities for connecting higher-order learning to technology initiatives across campus units, while becoming deeply embedded in student success initiatives at the ground level. E-portfolio work also aligns nicely with typical library values such as openness, curation, preservation of student work, and the idea of library as platform.

> **Libraries are well positioned to interact at an introductory level and to then scale with individuals and morph as their needs, capabilities, and aspirations grow.**

- *High-Impact Practices ("HIP") Librarians.* To encourage a high level of personal connection, we are piloting a liaison model that embeds library faculty within collaborative, interdisciplinary teams that are organized around the Association of American Colleges & Universities (AAC&U) High-Impact Educational Practices. These librarians are exploring new liaison models based on partnerships in undergraduate research, service learning, first-year experiences, and our living-learning communities (LLCs). Their engagement ranges from leading a student showcase event at an experiential learning conference and developing a customized undergraduate advising system to assisting the Office of Undergraduate Research in designing and implementing the Undergraduate Research Excellence Program. As the relationship among library, campus, and student leaders has grown, so has the complexity and responsibility of the work. By allowing HIP librarians time and space to explore significant and often undefined collaborations, we are discovering that libraries are uniquely situated to provide infrastructure and insight for campus programs that are emerging or currently underserved. In this way, HIP librarians operate as community builders and campus partners within rapidly changing service models.
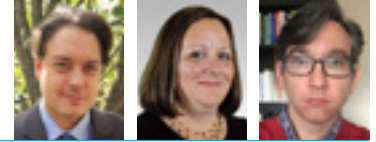
By **BRIAN MATHEWS**, **STEFANIE METKO**, and **PATRICK TOMLIN**

- *Studios.* If, as the designer Chris Flink has claimed, "space is the 'body language' of an organization,"[2] what do the library spaces say about the culture and priorities of the campus? How do they reflect and condition user experience? Over the past two years, we have created a network of studios—spaces that frame the library as a creative partner by encouraging both peer-driven collaboration and engagement with emerging technologies. These spaces range from media production to data visualization. Each studio has a distinct focus, yet all embrace a service-design approach to the creation of new learning environments in the library. That is, fostering service models in which students can build new skills, tackle real-world problems, and hone creativity is considered just as important as providing access to information collections or teaching digital literacy skills. In the 3D Design Studio, for example, we have seen veterinary medicine students who entered the studio as 3D printing novices go on, with our guidance, to create complex and innovative medical models. In our Fusion Studio, a space designed specifically for teams of undergraduate researchers, students are provided with workshops on interdisciplinary communication as part of their access to the studio so that they can more effectively engage in projects across multiple fields. The studios are themselves prototypes: iterative, adaptive, and flexible enough in their service models to meet the evolving needs of users. Their purpose is to nurture and amplify connections among students, technology, and ideas. The library, situated at the intersection of these three strands, is ideally suited to partner in such endeavors.

- *Exhibits and Programs.* Our Course Exhibit Initiative (CEI) transforms course projects into interactive exhibits. These exhibits are true collaborations: students and faculty work alongside the CEI curator to conceptualize and, in many cases, build the exhibits. The exhibits allow students to *materialize* course assignments in powerful and unexpected ways, either by presenting their work within new contexts or by framing the assignments themselves. The process of creating an exhibit often provokes questions that are difficult to raise—or answer—within the traditional context of the classroom. A recent exhibit from an undergraduate English course, for example, featured special collections archival documents on 1960s spaceflight coupled with student poetry, mixed media, and critical reflections on the primary source materials. To design the exhibit, students had to consider their own work in relation to both the collections and the audience engaging with the exhibit. Similarly, the Active Learning Curation Program, which showcases innovative teaching methods at Virginia Tech, encourages our entire academic community to reflect on the processes of teaching and learning. Often digital in format and featuring observations and interviews with students and faculty, the exhibits consider the content of courses less than how students might steer their own learning via active learning pedago-

gies. Again, through these initiatives, the library is increasingly seen as a dynamic educational partner, a co-creator in learning as much as a repository, physical or virtual, of information.

These examples illustrate how we are reimagining the relationship that students and faculty form with their libraries. As colleges and universities are rethinking the role of libraries, we feel this is a critical time to experiment with new engagement models that empower—not just support—teaching and learning. How do we do this?

To start, we embrace the conflicting notion that although more content is being published and more interactions are occurring online, there is an ever-greater need for personalized, face-to-face consultation. We know that just because something is digital, that doesn't mean it is intuitive. We strive to enable library users to ask for help and anticipate social, cultural, and technical challenges. Developing service models that focus on lowering the barriers to entry and reducing fear and anxiety is a top priority, as is also creating models that provide assistance to traditionally underfunded or structurally challenged groups.

Second, taking the long view, we invest in the student lifecycle. We adopt a holistic outlook, pinpointing key engagement opportunities across the curriculum and co-curricular endeavors. Libraries are well positioned to interact at an introductory level and to then scale with individuals and morph as their needs, capabilities, and aspirations grow.

So, to return to the question that started this article: What relationship do we want learners to have with their library? One that is grounded in dynamic, interdependent partnerships. One that propels ideas forward and posits the library not just as a place where learning happens but as an institution that transcends its walls. And hopefully a relationship in which all learners feel included in a community, backed by a support network that addresses their unique needs. In this way, as learners progress through their academic journey, the relationship grows from libraries providing transactional services to learners, to partnering with them, to transforming not only what they can do but also what we do as library faculty and staff. ■

Notes
1. Renee Hobbs, "Literacy," in K. B. Jensen, E. W. Rothenbuhler, J. D. Pooley, and R. T. Craig, eds., *The International Encyclopedia of Communication Theory and Philosophy* (Hoboken, NJ : John Wiley & Sons, 2016).
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Educational Equity and the Classroom: Designing Learning-Ready Spaces for All Students

The urgent and necessary US focus on student success in higher education calls for colleges and universities to close the opportunity gap for underrepresented minorities and to increase graduation rates for all students. Access to higher education may not be the problem, however. Enrollments have exponentially increased since the 1970s, but *graduation rates* have not kept up. Meanwhile state funding remains similar to its 1970s model despite the increases in student enrollments. At this pace, California in particular expects to fall short—by 1.1 million—of the number of college graduates needed to meet workforce demand in 2030.[1]

Campuses are implementing various strategies to address this challenge: faculty-development programs; improved course availability; strategic advising; quality first-year experiences; effective support services to achieve educational equity, directed specifically at first-generation, low-income, and underrepresented students. We believe it is this last concept—*educational equity*—that needs to guide our decisions around resource allocations in support of student success, especially as they relate to capital investments such as learning spaces that will endure beyond the time these students have left the institution, either by graduation (as desired) or attrition (as feared).

We recently attended a conference focusing on next-generation learning spaces. It offered the usual visual gluttony for its participants, showcasing multi-tiered lecture halls with swivel seats and electronic displays, mosh-pits of collaborative tables surrounded by lively wheeled chairs, walls of tinted glass-writing surfaces that promised an endless canvas for creative musings, and ivy-covered buildings housing conference rooms with ceilings that would more likely be seen at MOMA or Hogwarts than a public institution of higher education. Admittedly, we were giddy.

When we probed further, however, we learned that the spaces showcased in these presentations were often representative of only 1–5 percent of their total classroom inventories. The presenters too had public-funding shortfalls and faced millions, if not billions, of dollars in deferred maintenance costs. They too wished for a more equitable educational experience for their students, in whichever learning space those students might be assigned.

Therein lies the dilemma for how best to assign scarce resources in support of student success and educational equity in an era of severe consequence. While *active learning spaces*, with their gilded castors and high-potency panels, present the ultimate possibility for human engagement and extreme innovation, the disproportionate resources they claim can create a polarizing effect among the have-nots, who may never have the luck to be assigned to these spaces, and the want-nots, whose teaching identities or learning abilities may not align with the constructivist philosophy of learning.

To ensure equitable learning experiences, campuses can prioritize resource allocations to ensure general classrooms are *learning-ready* to support the multiple teaching identities and philosophies of faculty and the physiological, cultural, and cognitive needs of all students. We appeal to our industry partners to proactively meet universal design standards for accessibility and usability on all their products and to develop equitable pricing models to enable implementation at scale across all levels of society.

Learning-ready spaces meet a baseline set of requirements that pay particular attention to human comfort levels, enable multiple ways for instructors and students to engage with the content and express themselves, and ensure equal access to the environment for all individuals. The active learning spaces that have become so popular in recent years typically enact many of these characteristics as well; however, there is often a gap between the vast majority of general-purpose classrooms and the handful of innovative active learning spaces on most campuses. That gap can be bridged by fostering cross-campus collaboration to make pedagogically grounded, fiscally responsible decisions to ensure learning-ready spaces for all students.

The Learning Space Rating System Framework

The EDUCAUSE Learning Initiative (ELI) Learning Space Rating System (LSRS) is a helpful lens for considering ways to meet students' needs, especially if we consider more deeply, and further expand, the two items that address cultural inclusiveness for all students (Section 4.7) and accessibility for people with disabilities (Section 4.8).

Section 4.7, titled *Environmental and Cultural Inclusiveness*, asks whether the "users perceive the physical environment to be welcoming, stimulating, engaging, and culturally inclusive as a setting conducive to learning."[2] These conditions merit their own subcategories on the LSRS, since they contribute to a student's sense of belonging and success. To better understand students' perceptions of these terms, we surveyed a class of interior-design

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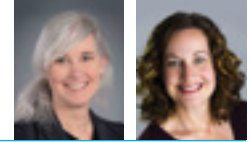
By MAGGIE BEERS and TEGGIN SUMMERS

DuKai photographer / Getty Images © 2018

students engaged in a classroom-redesign project as part of their curriculum. They highlighted the role of natural light and colors to welcome students, textures and paint features to stimulate their senses, and ergonomic and flexible furniture to support engagement and community. Institutions can prioritize these humanistic elements to foster cultural inclusivity; as one student explained, "the aesthetic embodies the natural world, where all cultures can come together and do come together."

If we acknowledge that in many institutions there is a need to close the gap between the majority of general-purpose classrooms and the high-end innovative active learning spaces, we can begin to be more inclusive of the whole student, including cultural backgrounds, by making the general-purpose classrooms learning-ready. Disrupting the traditional design of many general-purpose classrooms, the learning-ready classroom can provide more student agency and choice, both in terms of how students choose to be in the space and how the space supports a variety of activities. At the very least, this means including flexible furniture, chairs that roll and swivel, varying writing surfaces, calming wall colors, and access to natural light. Providing newer furniture and purposefully designed spaces shows students that they are respected and valued members of the campus community.

Section 4.8, entitled *Accessibility and Universal Design,* has the intent to "create an inclusive, safe, and accessible environment for diverse and differently abled participants."[3] The benefits of Universal Design for Learning (UDL) are well documented. Paul Baepler and his coauthors provide inclusive strategies for teaching in an active learning environment, and Frances Smith also offers several suggestions, such as engaging students' prior knowledge and differing cultural orientations.[4] Before prior knowledge can be engaged, however, a space must be inclusive and meet the fundamental human needs of its users, as described by Maslow's hierarchy of needs. A student-centered furniture layout with seating that accommodates different body types and left- or right-handedness helps meet students' physiological needs and contributes to a welcoming environment. Furniture that meets

ADA (Americans with Disabilities Act) requirements and is fully integrated into the classroom, rather than set apart at the side of the room or marked with a different color laminate or upholstery, helps meet students' social needs, since it is inclusive for students with disabilities. Thoughtful design decisions and clear communication allow students with disabilities to confidently locate the accessible furniture and tools they need to experience the same sense of achievement in class activities as do their peers. For example, in a recent general-purpose classroom redesign at San Francisco State University, we included an ADA-compliant chair that had the same color upholstery as the other chairs in the room, with the active International Symbol of Accessibility on the front of the chair so that it is easily recognizable as a resource but is not singled out as different when a student is sitting in it. This low-cost decision represents a welcoming, inclusive way to build universal design into the space. Providing flexibility and choice for students within a more traditional environment is inclusive and also employs principles of UDL.

Equitable Learning-Ready Spaces

As we look toward 2030, what will next-generation learning spaces look like? Some may resemble the tantalizing active learning spaces showcased by our colleagues, but we hope most will be spaces that meet the needs of all students, including the left-handed learners forced into right-handed desks and the wheelchair users assigned to an ADA table in the corner. For pedagogically informed teachers who use active learning techniques, learning-ready classrooms can support constructivist and connectivist pedagogies that emphasize student agency and choice, and these rooms *also* support more traditional seminar and lecture approaches to instruction. In our vision, the next generation of learning spaces will be *learning-ready* spaces that meet the basic human needs of all individuals, regardless of physiological, cultural, cognitive, pedagogical, or disciplinary difference. As the default norm, they will support educational equity for generations to come. ∎

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Emergent EDU: Complexity and Innovation in Higher Ed

Innovation is a loaded word on college and university campuses. As more institutions dedicate resources to change initiatives, some academics and technologists are skeptical that these efforts—often coupled with entrepreneurship and startup culture—are little more than a perpetuation of neoliberal values. Innovation, so the argument goes, is the leading edge of a corporatization of higher education.[1]

This feared outcome is at odds with what many of us in academia believe is the primary purpose and value of higher education. Although we graduate students into the larger economy, we educate them not to serve it but to shape it. We serve humanity first and foremost.

This tension is not lost on the growing number of us in newly created "innovation" roles, now in place at more than two hundred colleges and universities.[2] We believe that strong, independent institutions create the conditions that make our value proposition possible. We are concerned with preserving the centrality of accessible higher education in a changing and challenging context, rather than promoting a transition to greater corporatization of higher education.

We face an evolving and competitive global ecosystem. The costs of higher education are outpacing incomes, leading to record student debt and causing the public to question the value of a four-year college degree.[3] As the digital knowledge economy demands new forms of postsecondary education and new skills of graduates, less expensive—often online—alternatives are emerging. It is not entirely clear how traditional institutions should respond or how they might best contribute to an evolving ecosystem.

This uncertainty is inspiring institutional investments in innovation strategy. After all, the best time to enact a new vision is when change is already under way. Given the varied change pressures—from economic to demographic—now is exactly the right time to begin planning how to best leverage change in order to move higher education in new and promising directions.

Nevertheless, as we move forward, we should embrace healthy skepticism by making space for critical reflection in this work. Dismissing or resisting innovation misses an opportunity to engage with new organizational structures and ways of working that are ideally suited to this period of uncertainty and emergence.

Complexity and Change

When we talk about innovation in higher education, what we are really talking about is how to manage, or account for, uncertainty. In a thoughtful blog post on innovation and change pressures in higher education, the educator and researcher George Siemens suggests that the Cynefin framework may be the "best guidance … on how to function in our current context."[4] Developed by Dave Snowden and Mary Boone, this framework provides a good model for understanding and managing institutions from the perspective of complexity science.[5]

In basic terms, *complex systems* share many of the attributes of biological systems, in which the environment is constantly in flux and the ways forward are not clear but, rather, emerge as agents interact with their environment. Complex systems possess a degree of unpredictability that isn't evident in complicated (but predictably ordered) systems. The difference between complicated and complex systems is the difference between how engines are designed and built (top-down, ordered) and how ant colonies organize and function (bottom-up, emergent).

Complex systems share characteristics that shed light on how organizations can be designed optimally for emergence. In an excellent primer on the theoretical framework of complexity, M. Mitchell Waldrop distinguishes complex systems from ordered, complicated systems:

- Complex systems are composed of a network of self-organizing agents "interacting with each other in a great many ways."
- These interactions enable a system to undergo "spontaneous self-organization" within flexible constraints.
- These complex, self-organizing systems are *adaptive*, with "the ability to bring order and chaos into a special kind of balance."[6]

The argument when applied to higher education is that the system itself now rests in this "domain of emergence." This isn't a completely new context simply because we are in a period of tremendous change; higher education has always existed in the complex domain because it is a *human* system rather than a mechanical one. Human systems are constantly adapting to social, biological, and environmental factors. Managing them requires an ecological approach. Machines can be engineered. Institutions cannot.

New Ways of Working

Understanding the concept and logic of complexity is an important competency for leading higher education innovation. The frameworks and organizational structures that we design will serve us best if they are aligned appropriately to the system, culture, and context. In the complex domain, future states are not always known in advance. The future is an emergent property of how various agents within an ecosystem interact. We can describe

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successful future states, but we cannot predict the path forward. We need ways to experiment with ideas that come from anywhere and move us closer to certainty.

Entrepreneurs also struggle with uncertainty in product design, with many adopting Eric Ries's Lean Startup methodology in response. Ries defines a startup as a "human institution designed to create a new product or service under conditions of extreme uncertainty." In this way, the Lean Startup principles of "build-measure-learn" align with the concept of emergence in complexity theory. When we cannot predict the future, we can employ a scientific approach by breaking down ideas into a set of hypotheses called "leap-of-faith assumptions" or "what needs to be true in order for this to be a good idea."[7] We can then test these assumptions quickly by deploying a minimal (but viable) design, putting that design into action, and validating the impact.

For example at my institution, Davidson College, four faculty members developed a hypothesis about the habits of our most successful students. They wanted to explore whether a redesigned first-year experience might foster inclusivity by helping more of our students adopt these habits early. Instead of spending multiple years researching and designing a "perfect" solution with a large, permanent financial commitment, we researched a minimal design and piloted it with a representative cohort in the fall semester of 2017. This build-measure-learn approach allows us to understand earlier which of our assumptions are true while making smaller investments of time and money.

The more we understand what works, the closer we move to certainty. Greater certainty leads to better decision-making and to the higher degree of cultural coherence necessary to manage through change. In general, higher education institutions have sound and rigorous processes for known, incremental, and precedent-setting change. What they lack is a valued parallel process for true bottom-up experimentation when the outcomes are unknown.

Designing Innovation for Higher Education

By adapting a variation on the build-measure-learn model of innovation, colleges and universities can generate and explore ideas faster and can develop a portfolio of options to exercise in the future. However, adopting the principles from startups returns us to the criticisms of innovation and the lack of trust in a process that looks like a corporatization of higher education. In higher education we need our own designs for managing innovation, and we need those designs to develop from within.

Following in the footsteps of institutions such as Northeastern University and Arizona State University, Davidson College launched a pilot framework of our own making in March 2018. The work started with an assessment of our internal capacity for innovation, followed by a framework-design process that brought together thirty faculty, administrators, staff, and students to address three key questions:

- How should Davidson define and categorize innovation?

- What are the right focus areas for innovation?
- What are the critical criteria that must be considered to evaluate ideas?

The result was an inclusive and customized innovation framework that aligns to our aspirations and provides a valued parallel process for experimentation.

At the same time, I joined a few of my colleagues in newly created "innovation" roles who thought we might advance this work faster as a network. We launched a grassroots convening at the University of Michigan to further explore the idea. The result was HAIL (Harvesting Academic Innovation for Learners), a network of higher education leaders committed to experimentation for transformational change as a response to the uncertainty in the broader education ecosystem. We are optimistic that higher education can address external disruption by advancing institution-led innovation. Meeting twice annually on our respective campuses, we seek to develop a discipline for innovation that aligns to our values. We have a goal to produce resources around the most pressing opportunities and challenges facing innovation leaders within higher education—opportunities and challenges such as new business models, innovation frameworks, culture change, the move from pilot to scale, innovation accounting, and more.[8]

The traditional structures and ways of working in higher education run the risk of falling too far behind the pace of change. If we want our institutions to be the center of accessible education, then the most important next steps for higher education may be to rethink organizational structures and establish innovation teams. Guided by the principles of complexity science and working collectively, CIOs, provosts, directors of academic innovation, and others tapped to lead innovation can and should develop the frameworks that both speak to academic values and help us all adapt to a changing context. ■

Notes
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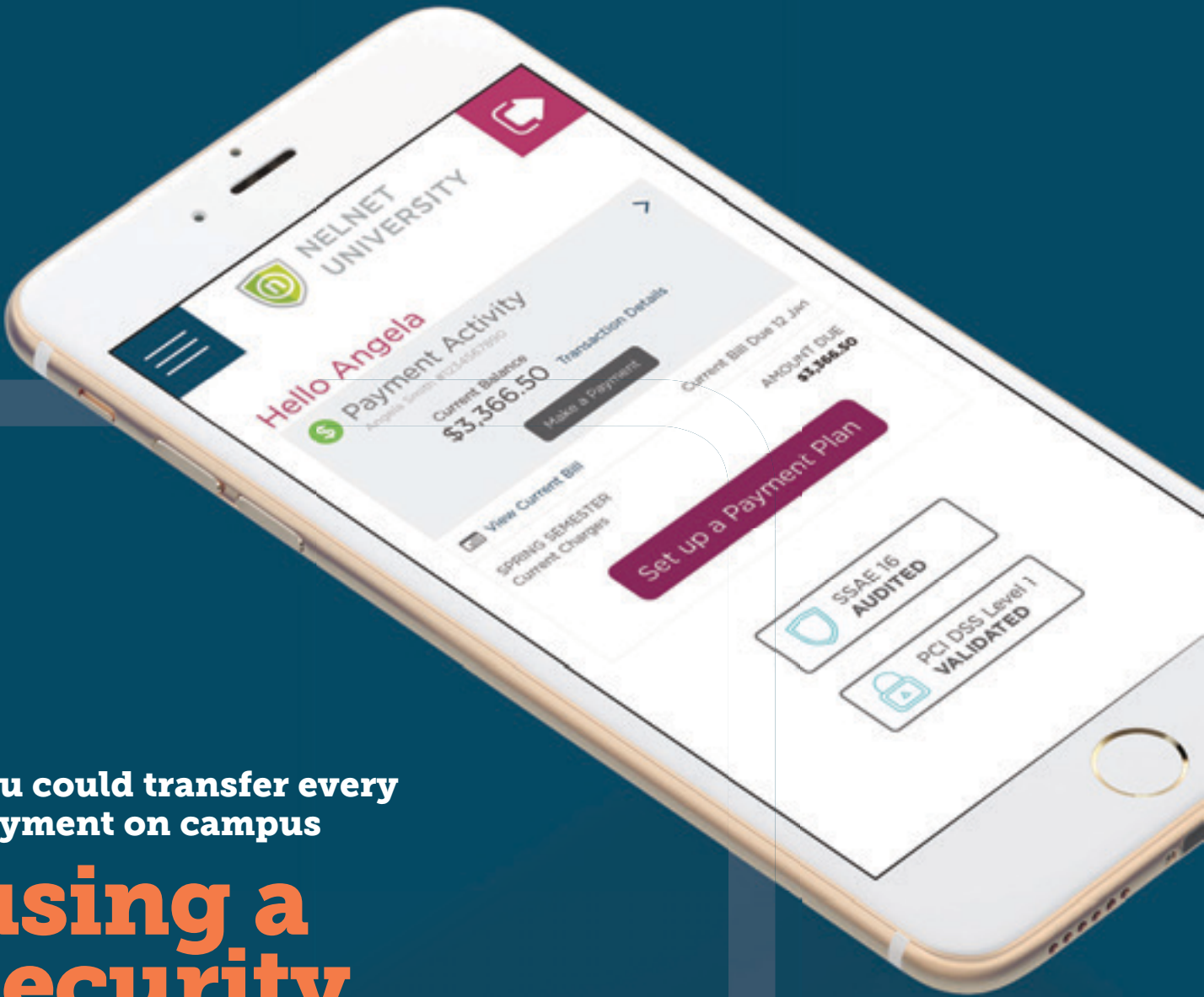**events.educause.edu**

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