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Higher Education in the Connected Age

The change started with the network. Moving digital information instantly from one place to another has reshaped delivery systems, business models, and economics and has led to the globalization of almost every industry. However, this “network effect” is about more than the dissemination of information. It is about connections. We are no longer in the information age—we are in the connected age. Everyone and everything is interconnected. Anyone who can access the Web can participate. The connections magnify the reach and value of not just information but also our relationships, creating opportunities for learning, working, and collaborating on an unprecedented scale.

Higher education has always been about more than information, no matter how quickly that information can be disseminated or how much of that information can be stored. Our institutions have always been communities driven by connections—connections among faculty, students, research, education, disciplines, communities, and the institutions themselves. In the connected age, it doesn’t matter where the information is, where the student is, or where the faculty member is. What matters is the value that comes from the connection.

Learners are connected. They connect with other students, faculty, advisors, and their families and friends through multiple systems and applications. Learners also need to connect formal and informal learning, education and exploration, the physical world and the virtual world. Information technology can enable those connections as well. The data that institutions collect can be used to provide feedback to students and to offer them the next opportunity. Analytics can be used to reveal pathways for students, whether those are personalized learning pathways, course-selection systems, or tools to ensure students stay on track to graduate. And for those learners whose academic careers encompass multiple institutions, information technology can make the process of connecting credits to credentials more seamless and productive.

Faculty are connected. They are connected to databases, archives, tools, and other scholarly resources. They are connected to students. They are connected to colleagues. They are connected within their discipline and to other disciplines. They are connected within higher education and to the world at large.

Institutions are connected. Colleges and universities have local, regional, and global alliances. They interchange students, faculty, and staff. They interact with entrepreneurs, established industries, and governments. Whether through public service, education, or scholarship, our institutions rely on technologies, applications, and systems to sustain an expanding range of connections that are critical to higher education’s mission.

For our learners and scholars, “connecting the dots” is critical. Scholars from multiple disciplines may need to collaborate to find answers to “grand challenge” questions such as those affecting the environment or health issues. In the connected age, data, collaboration tools, and communities can come together in ways never before possible. Students may need to connect the dots between different disciplines, such as science and literature. Information technology can help. Immersive learning experiences, augmented reality, simulations, and other tools enhance our ability to “teach information” to help students develop the valuable skill of transfer—of being able to take what they know and apply it to a new area. Transfer is a 21st-century skill that differentiates high-impact learning from information age approaches.

Technology makes the connected age possible. Cloud networking allows us to connect to data, applications, or services regardless of location. The implications of the cloud go well beyond where the bits are going (or coming from). Ownership of an asset becomes less important than access. Technology enables pervasive and continuous access, not only to information and ideas but also to resources, tools, people, and communities.

If everything is connected, we can connect, disconnect, and reconnect. BYOD is an example. Consumers are choosing to mix and match devices, applications, providers, and more. Megan Fitch, in “The Wild-Card

(continued on page 6)
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Character of ‘Bring Your Own: A Panel Discussion” in this issue of EDUCAUSE Review, observed: “We need to embrace BYOD not to save money but to be able to spend money instead on specific technical capabilities that our community members really need from us and that they find unquestionably valuable as they pursue their goals at our institutions.” Another panelist, Michael McPherson, commented: “This is a unique moment in technology, a fundamental shift in the expectations, needs, and technology self-determination of our users… What is different this time is ubiquity—the fact we can assume that virtually all of the members of our communities have access to some sort of computing device.” BYOD can be extended to a much larger scale with “bring your own everything” (BYOE), even to the institutional level. Colleges and universities are contracting with third parties in order to add “private label” services. Many institutions are using the “put your logo here” approach for products that range from student support to website services to online degree programs.

If everything is connected, institutions can connect data and integrate advising systems to improve student success. In “Bigfoot, Goldilocks, and Moonshots,” Josh Jarrett describes systems that provide online advising and personalized student support for degree planning. Such systems might alert a student who just enrolled in a course: “You just moved yourself from the four-year plan to the five-year plan. Are you sure you want to do that?” These interconnected systems help the institution as well. Arizona State University’s eAdvisor system, for example, lets the institution know, three semesters out, “how many class sections it will need, which means the university can be much more efficient with classroom space and faculty time. In addition, once the university knows who is on which path, it can use predictive analytics to determine which students will need help staying on the path. As a result, ASU went from 22 percent of students ‘on track’ in their programs in 2007 to 91 percent on track in 2010.”

If everything is connected, questions may be raised about institutional affiliation and roles. Individual faculty members are offering their courses, independent of their institution, to MOOC providers. Some institutions are disaggregating faculty roles, separating course development from mentoring, tutoring, and evaluating. In “Thinking about Accreditation in a Rapidly Changing World,” Paul J. LeBlanc suggests this “may signal new possibilities for how faculty members are situated within the industry. For-profit StraighterLine (http://www.straighterline.com/) has announced a model for ‘self-employed’ faculty to teach courses: faculty set their own price models and share the tuition revenue. Similarly, Udemy (http://www.udemy.com/) offers 5,000 courses in which the professor sets the fee and shares 30 percent of the revenue with the company. With MOOCs, the “course” is disconnected from institutional credentialing systems. As LeBlanc observes, these new models “reinforce the notion of learners ‘grazing’ or assembling their learning from multiple sources.” Although a MOOC can be independent of a particular institution, it can be reconnected in different ways through testing and competency measures. In a world where individuals and institutions are choosing to bring a bit of everything together into a degree, questions are being asked about whether accreditation should be at the institution level, the course level, or the provider level. LeBlanc notes: “Accreditation is now faced with assessing learning in an increasingly disaggregated world with organizations that are increasingly complex, or at least differently complex, and that include shifting roles, new stakeholders and participants, various contractual obligations and relationships, and new delivery models.”

Pragmatists may ask: why bother with a notion like the connected age? Because metaphors matter; they help us integrate what we are experiencing into a coherent picture of where we are and where we might go. Information technology is about more than information or the information age. Information technology can change learning experiences, catalyze new forms of scholarship, reveal pathways, and interconnect a world that is highly interdependent. Information technology can enable alternative business models that have disrupted many industries—and that may disrupt our own.

Information technology is about connections, which are fundamental to our institutions, our faculty, and our students. Information technology forms a vital neural network—it isn’t plumbing. If we can shift the metaphor we use for information technology—the way information technology is seen and understood—perhaps we can realize more of the potential that resides in the best uses of information technology.

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How Disruptive Is Information Technology Really?

In an administrative career lasting over thirty years, first as a provost and then through three presidencies and a stint at the National Science Foundation, I have watched while changes in technology have reshaped the nature and character of discovery, the gathering and interpretation of increasingly complex observations whose patterns would be completely opaque if we did not have high-speed computing to sort them out, and the integration and use of knowledge in ways that would have been impossible when I went to college in the early 1960s. I went from having to learn the purpose of each of the F (function) keys on my keyboard in order to send an e-mail message on my orange-colored screen back in the early 1980s to being able to find exactly the document or information I need by simply typing a word or phrase into my search engine. I have served as the president of an institution, Winona State University, that became one of the nation’s first “laptop universities” and then shifted from focusing primarily on the equipment to emphasizing what we were trying to accomplish: e-learning. Now back in Portland, Oregon, I am teaching my first fully online course. If we can so readily take for granted all of this easy access to ideas and information, what capabilities can we tap for scholarly and learning purposes if we set our minds to the task? When we do, are we really being “disruptive,” or are we simply expanding our senses to see the world in new ways and building our networks of people with whom we communicate on a regular basis?

My hypothesis, based on my observations as a university president and arising from my experiences as an instructor of hybrid/blended courses and now an online course, is that the use of cyberspace expands our approach to learning because it opens up and reveals our mental landscapes, stimulates our thinking processes, and allows people who process ideas at different rates and in different ways to contribute to the building of a shared understanding of a complex or controversial topic. The act of teaching is becoming more about designing the educational context and engaging students as they learn to approach material in more insightful and demanding ways. We are not transmitters of knowledge very often today, although an occasional superb lecture by a remarkably perceptive and even prescient speaker or a carefully crafted blog contribution can open up new ways of thinking about things. In one of those earnest and now inevitable conversations about Massive Open Online Courses (MOOCs) and other recent “disruptive” ideas, a friend of mine asked: “If all knowledge is really socially constructed, what do we do when there is no one else in the room or online with whom we can interact?” I saw an echo of this in a recent essay, “A More-Radical Online Revolution” by Edward L. Ayers. Ayers made an equally simple but important observation. He asked whether there is another way to think about new technologies and new ways to deliver instruction. “The skeptics might ask whether the new technologies cannot offer useful amplification to our scholarly work of discovery, the advocates of the new technologies need to think more directly about how to reach broad audiences while also fostering meaningful conversations across the disciplines and bridging a division between teaching and scholarship.”

In January 2013, the Presidents Forum at the annual meeting of the Association of American Colleges and Universities (AAC&U) focused on “The Digital Revolution.” The speakers explored the path that we in higher education have taken as technology has shaped our access to ideas and information, our capacity to communicate with each other, and the environments in which learning can take place, both on the ground and in cyberspace. That day, EDUCAUSE President and CEO Diana Oblinger argued that information technology is not simply another channel through which to deliver material but is, rather, a new kind of experience and an enabler of new ways of learning.

Oblinger’s observation set off a chain reaction in my mind. It is as though we can extend our senses and the workings of our brains to “see” in different wavelengths and to explore ideas in several dimensions that would otherwise lie flat on a page or fade away in the air after someone tried to explain them. In exciting ways, concepts that used to be presented in words or with the use of simple stick figures or diagrams suddenly open up into rich, colorful, and engaging images that move in space and across time to reveal how a process works or how a phenomenon changes over time. The classroom itself expands beyond the limits of four walls to embrace the entire known universe if we wish. Furthermore, the “classroom” can be anywhere when inquiring minds are engaged, and essential information can be found whenever we require it. It is no longer stored only in physical form in a library. At the same time, information does not become knowledge and knowledge does
not yield wisdom without the kinds of social interactions that we must foster in person or online. The new technologies give us much more to work with and a better way to explore topics in depth, but we still need to do so in the company of others.

We all know these simple things about how the educational experience is changing, but how recently have we paused to think about how truly wonderful it is to be able to use our smartphones to answer a question right immediately? My real concern is that not all questions have a quick, well-researched, and easy-to-find answer. Many, perhaps most, questions in today’s world are hard to formulate, are seen in very different ways by different people, or simply do not have good answers at all. That is why we still need real people who interact with each other in real time in order to frame questions that matter, to explore the ideas that they carry in their own minds or that they can bring along with them on paper. They can tap into a true universe of material whenever they wish.

How disruptive is this technology revolution, and what does this expansion of the world of knowledge portend for higher education? Certainly the boundaries that once separated teacher from student, research from teaching, and basic scholarship from practice are disappearing. This leads to some interesting questions about what lies ahead for those of us who chose to cast our lot with the academy. Who will be the teachers in the future, and who will be the learners? What role will a sense of place play in defining the distinctive character of learning? When will learning be informed by personal experiences, and when will it be more universal in character and conducted in cyberspace? What will it mean to “know” something, and what will we expect of a person who has completed an advanced education beyond high school? How many different ways will open up to achieve that goal, and what guidance will we offer to people who are managing their own learning and steering along their own path? Frameworks such as Liberal Education and America’s Promise (LEAP) or its close relative the Degree Qualifications Profile (DQP) can provide a map that a student can follow through an educationally confusing and complex terrain. Both frameworks offer form-giving goals that can define the direction and purpose of advanced learning and that can help students navigate in often unfamiliar territory. Yet both models still rest on some assumptions that are less and less applicable as students pursue many different pathways toward an advanced degree (either on the ground or in cyberspace or both and often at several different institutions), as the professoriate changes in its nature and age structure, and as the process of discovery and the use of knowledge continue to expand beyond the academy to include the wisdom and experiences of people across society.

Many years ago, I was told a story of how technological innovation unfolds. The first automobiles were really horseless carriages, designed on the same frame as a horse-drawn carriage and with power defined in horsepower. The capabilities of these early contraptions were limited, and the infrastructure to support this new form of mobility was slow to develop as the early car owners rattled across the ruts and sank into the mud of unpaved and poorly maintained roads. These days, our society is built around the mobility provided by today’s automobiles, and we are seeking to expand the infrastructure to accommodate battery-powered vehicles. How close is this analogy to the early stages of experimenting with cyberspace? I think the two stories are very similar, and I look forward to the day when the ruts in the cyberspace highway have been smoothed for a true community of learners to improve our world.

Note

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Looking at the Bring Your Own Device (BYOD)—or, more accurately, the BYO* (substitute nearly anything for the asterisk)—phenomenon in the higher education computing and information environment is a disorienting exercise. First, it is impossible to read or listen to any higher education discussion for long these days without hearing the subject mentioned. Second, definitions are vague, and the scope that BYO* represents is of sufficient proportions that two people in a conversation on the subject may not be touching on the same conceptual part. So let's find a definition broad enough to include most of whatever it is that people are thinking about when they discuss BYOD/ BYO*. *Wikipedia* is as good a place as any to start: “Bring your own device (BYOD)—also called bring your own technology (BYOT), bring your own phone (BYOP), and bring your own PC (BYOPC)—means the policy of permitting employees to bring personally owned mobile devices (laptops, tablets, and smart phones) to their workplace and use those devices to access privileged company information and applications. The term is also used to describe the same practice applied to students using personally owned devices in education settings.”¹
Bring Your Own

The Wild-Card Character of
A recent report from the EDUCAUSE Center for Applied Research (ECAR) refers to an even broader concept: “We are living in the era where affordable, easy-to-use, and readily accessible technologies facilitate a bring-your-own everything (BYOE) standard. This ‘consumerization of technology’ is setting a new standard in which students, faculty, and staff bring their own devices, software, apps, and cloud-based technology to create a personal computing environment.”

A Google search on “BYOD” returns more than 8.5 million results and highlights another point the BYO* phenomenon is not lost on higher education’s corporate partners. Many have developed safeguards, architectural strategies (and related products), and consulting expertise that they are happy to offer (for a price) to those of us in colleges and universities as we grapple with the implications of our diminishing control over how the populations we serve interact with our systems. For many IT professionals who have built admiration-worthy careers on closely managing the choices available to users as a means of ensuring reliability, scalability of support, and security, the growth of BYO* can lead to paralyzing FUD (fear, uncertainty, and doubt). Clearly, that can’t be our response, but how should we react?

*EDUCAUSE Review* decided to ask some of those on the front lines of higher education information technology what BYOD/BYO* looks like to them:

- Gardner Campbell, Director, Professional Development and Innovative Initiatives, Division of Learning Technologies, Virginia Polytechnic Institute and State University
- Megan Fitch, Chief Information Officer, Beloit College
- R. F. “Chip” German, Project Director, New Internal Financial Model, University of Virginia
- Dale B. Hulvey, Assistant Vice President for Information Technology, James Madison University
- Keith “Mac” McIntosh, Vice Chancellor for Information Technology and Chief Information Officer, Pima County Community College District
- Michael R. McPherson, Associate Vice Chancellor for Information Technology and Deputy Chief Information Officer, University of Virginia
- John O’Keefe, Associate Vice President and Chief Information Officer, Lafayette College

Each panelist approaches the phenomenon from a different perspective, of course. Thus the conclusions drawn vary somewhat, as might be expected when the endpoint of a technology trend is not apparent. Perhaps we should take a measured approach, or perhaps we should not just tolerate but, instead, lead the charge toward BYOD/BYO*. It all depends on your point of view.

1. How strategically important to higher education is the BYOD phenomenon? Is it simply a passing fad?
   Let’s try a thought experiment. What if the question were not about Bring Your Own Device but about Bring Your Own Ideas Expressed in Your Own Words? If we want our students and colleagues to be technology agents instead of technology parrots, at some point we must rely on the agency, customization, and improvisation inherent in people creating and using their own technology-enhanced learning environments instead of being confined within the computing equivalent of phrase books supplied by the Central Department of Managed Phraseologies. As computing devices become smaller, more ubiquitous, and more thoroughly woven into all aspects of our lives (in the case of wearable computing, literally woven), they become more like extensions of ourselves. And because their primary richness lies in their power as communication and expression devices, these computers will become more like words we speak than like devices we carry. They may even become more like extensions of our very brains as we move from portable computing to wearable computing to neurological implants. (See Michael Chorost, *World Wide Mind*, for a moving and hopeful vision of such a future.) So no, this is not a passing fad, and yes, it is of great strategic importance to higher education—unless we really want parrots after all. Now is the time to allow our device ecosystem to be diverse enough to permit the full flourishing of our learners’ potential.

2. Should higher education institutions and their IT organizations resist or embrace BYOD?
   For best results in any long-term relationship, an embrace should be thoughtful as well as wholehearted. A thoughtful, wholehearted embrace of BYOD would indicate the commitment to the meaningful learner individuation that we profess to desire in our democratic society. The industrial model of scaling up higher education led to standardization and a heartless commodification. Now we can do better. Now we have the chance to use complex tools to empower and nurture complex computing ecosystems. We have the chance to foster meaningful personal learning networks on these devices, and within the “personal cyberinfrastructures,” that students bring to their work. We can use this opportunity as a teachable moment for all of us, one that has increasing significance in a globally and diversely connected world.
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3. Hasn’t the pressure to deal with BYOD always been an issue for IT leaders? What makes this time different?

In one way, yes, the BYOD pressure has always been an issue, but several factors make this time different. Networked computing increasingly takes place in mobile, cloud-based, and multifunction contexts that are evolving very quickly past the “office desktop” paradigm of the initial experience of personal computing in higher education. Mobile computing means connectivity has to be delivered wirelessly, of course, but it also places demands on everything from the electrical grid (power availability to recharge batteries) to geolocation to privacy. Cloud-based means that computers will access, compute, and store data both locally and remotely in an increasingly seamless and synchronized set of interfaces. Multifunction means that smartphones in particular—but also, in the end, our clothing, our eyeglasses, and possibly even our brains—will be computing devices or linked to computing devices, and that we will use these computers in every aspect of our lives. When the “D” in BYOD becomes that various and that complex, the “B” of “Bring” and the “YO” of “Your Own” become hypercomplex. We’ll look back nostalgically to the days of trying to manage laptops (remember the carts for the special “laptop classes”?) as a time that seemed complex—because it was before we knew what true complexity meant!

4. What worries you most about enabling BYOD on your campus?

My chief worry has little to do with infrastructure, or security, or management of devices, though these concerns are undeniably important. My chief worry has to do with culture. Very few faculty or administrators are curious enough about the Internet, or eager enough to learn about the participatory culture it empowers, to even begin to imagine how to use or empower personal, interactive, networked computing in meaningful, effective ways in teaching and learning. In The Children’s Machine, Seymour Papert wrote: “Before the computer could change School, School changed the computer.” Sadly, I agree—and I believe the circumstances have worsened since the early 1990s when Papert wrote those words. Our anxieties about a computing ecosystem of BYOD mirror our anxieties about a school that engages and celebrates individual learners. We try to manage learning the same way that we try to manage devices. The analogy is eerily exact. And although I think stubborn human diversity means that both management efforts are ultimately doomed to failure, I regret the expense of spirit and the wasted years as we continue to do damage to learners and to colleges and universities in such ongoing and misguided management quests. I hope a move toward BYOD, in expectations and empowerment, can engage with the idea of “spreadability” that Henry Jenkins and his co-authors explore in Spreadable Media: Creating Value and Meaning in a Networked Culture. If we consider learning as a medium, not simply as a transfer of information, BYOD should be an important part of creating “spreadable learning,” value, and meaning in school considered as a networked culture, not simply a credit-hour ATM.

5. If BYOD becomes established within higher education, what will change because of it?

It is never clear what will change, but if BYOD does not become established within higher education, immediate and necessary changes will certainly be blocked. We will create yet another “digital divide.” Learners’ experiences of a sophisticated, agile, and personally responsive computing ecosystem reflecting their own growing powers of judgment and creativity, powers linked to their own developing identities, will be destructively absent from their experience of school. Our institutions of higher learning will thus deny learners their best opportunity not only to participate in their society but to reshape that society into a more just, effective, and democratic home for themselves and their fellow citizens. These extraordinary intellect-augmenters that we so casually call “computers” will be one-size-fits-all commodities designed for administrative convenience, thus depriving both learners and teachers of the experiences they need in order to thrive in a truly complex world. Adrian Cockcroft, cloud architect at Netflix and millicomputing expert, predicts a day when we will carry web servers in our pockets, connecting wirelessly to the cloud and to all the peripherals—keyboards, mice, gesture-based controllers, printers, etc.—in our workspaces. We will bring our own devices, our own workspace configurations, indeed our own networks into each learning environment. If we have the imagination and curiosity to answer these opportunities, we can transform the experience of education. If we do not, we will be caught in an increasingly grim downward spiral right up until the day that the last proud insignia on the Good Ship Higher Ed slips beneath the waves of history.

In “Inventing the Medium,” her introduction to The New Media Reader, Janet H. Murray writes: “The task is the same now as it ever has been, familiar, thrilling, unavoidable: we work with all our myriad talents to expand our media of expression to the full measure of our humanity.” Education should be devoted to that task, those talents, and that expansion. In this way, the “full measure of our humanity” will continue to grow, like a redwood reaching toward the sky, rather than like a
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The Wild-Card Character of “Bring Your Own”: A Panel Discussion

plastic jug that is filled only once. Asking if we should embrace “BYOD” is like asking if we should embrace the task Murray describes. If we don’t, what exactly do we believe it means to be educators? What, in the end, is our task, if it is not what Murray says it is?

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Megan Fitch
Chief Information Officer
Beloit College

1. How strategically important to higher education is the BYOD phenomenon? Is it simply a passing fad?
I do not think BYOD is a passing fad. Students at residential colleges have been bringing their own devices for years, though the number of devices and the expectations around how they can be used are changing, both for work and for personal uses.

Between wireless and cellular network ubiquity, not only students but also faculty and staff are increasingly accustomed to being able to use their devices anywhere; indeed, they are expecting it. Many use the same device for work and for personal matters. The move to browser-based access to tools and information creates much more flexibility: users are no longer bound to a client or software that must be installed on an institutionally owned machine. Requiring local installation used to be a powerful gatekeeper.

Is it strategically important? I’m not sure yet. Does the BYOD movement have the potential to significantly alter how we spend institutional resources? Is it simply another connection method, or does it have the promise of replacing something we spend time and/or money on? Does BYOD significantly alter institutional risk vectors? For a small college like mine, BYOD to the classroom seems to have the most promise.

2. Should higher education institutions and their IT organizations resist or embrace BYOD?
Institutions have more to gain by thoughtfully embracing BYOD than by resisting it. I would rather channel the effort that users put into workarounds, the “energy” that is expended when users encounter “no,” and the effort that IT staff invest in keeping “YODs” off of the network into working together to make sure devices are connected in the right ways to the right things and to create mutual understandings of what the appropriate use of YOD is when working with institutional information. Doing so is more time-consuming, especially upfront, but I think it yields better benefits. In this age of portable computing and Internet-based access, we need to be having these conversations regardless of device ownership.

3. Hasn’t the pressure to deal with BYOD always been an issue for IT leaders? What makes this time different?
Yes, the pressure has been there, especially since laptops became affordable. The extreme portability and relatively ubiquitous access off-campus are changing demands and expectations. People are used to being able to plug in with their phones (in particular) anywhere and anytime.

4. What worries you most about enabling BYOD on your campus?
BYOD does increase the ways in which sensitive information can go astray, but that risk is present whether or not BYOD is enabled on campus. I would argue that the barn-door opened pretty wide when institutions started issuing laptops to employees and when USB keys came on the scene. Students have been bringing their own devices to campus for years and connecting them to the network, particularly at small residential colleges. I do worry about adequate bandwidth to handle multiple simultaneous device connections per person.

Finally, I worry about support expectations if colleges and universities go beyond allowing BYOD use and move to depending on BYOD use, particularly in the classroom. Students at many institutions are on their own when it comes to substantive hardware and software support. If we expect students to use their own equipment in place of institutionally provided hardware, for example, does that create an obligation to support that hardware, and is that obligation feasible? On the other hand, it seems increasingly hard to justify replicating a hardware environment, in particular, that students are already bringing to campus. What are the costs associated with BYOD when the devices are the primary work tools for staff or faculty?

5. If BYOD becomes established within higher education, what will change because of it?
If higher education institutions move beyond simply allowing BYOD to incorporating those devices into the educational experience, institutional software licensing is going to have to change. Current difficulties in licensing some software for virtual lab environments suggest there is a long way to go in this area, especially if local installations on personally owned student or employee machines are required. Support models may need to change significantly.

Institutions may be required to rethink where their “access gatekeepers” are and where they need to change. However, in light of the move away from client-based access to web-based access and with the rise of cheap personal cloud-based storage, the issue of where data should be stored goes well beyond BYOD. I argue that this issue may be exacerbated by BYOD but that BYOD is
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far from the main culprit forcing institutions to think carefully about data access. BYOD is just the latest/another access vector.

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R. F. “Chip” German
Project Director, New Internal Financial Model
University of Virginia

1. How strategically important to higher education is the BYOD phenomenon? Is it simply a passing fad?
This isn’t a passing fad, but even if higher education IT leaders regularly recognize its persistence, I don’t think we’re doing an adequate job of connecting the phenomenon to the fundamental changes that the higher education economy is experiencing and will experience in more obvious ways in coming months and years. As others have noted, some IT aspects that higher education institutions previously supplied to their constituencies at low cost and high quality are now often available cheaper and better from other sources. Back when we in higher ed were very good at supplying those things to our populations, what we provided was deeply valued—but now, not so much. For a culture that is particularly sensitive to the unique value of each of its activities, this is a big shift. If we don’t do what we do better than anyone else, our faculty, staff, and students will increasingly look quizzically at us and ask why we’re doing it at all.

2. Should higher education institutions and their IT organizations resist or embrace BYOD?
I’m in favor not only of closely hugging BYOD but of getting hitched to it. Some folks believe we should do so to save money. Although that’s a worthy consideration, my view is a little more subtle. In the past, just about the only way our campus populations would experience information technologies was when we provided them. Now our students, faculty, and staff are carrying technologies on their belts, in their pockets, or in their handbags—technologies that are nearly as capable as the technologies we provide for them. So whereas we used to make them pay (in tuition and fees) for technologies that they could not get any other way, now we’re using a portion of their tuition and fees to pay for technological capabilities that are roughly comparable to what they already own. We do so because we want them to use those technologies in a particular way—which is usually not the way they prefer to use the technologies. We thus should not be surprised that sometimes (maybe even “often”), that philosophy irritates the people we say we’re here to serve. We need to embrace BYOD not to save money but to be able to spend money instead on specific technical capabilities that our community members really need from us and that they find unquestionably valuable as they pursue their goals at our institutions.

3. Hasn’t the pressure to deal with BYOD always been an issue for IT leaders? What makes this time different?
Perhaps the BYOD pressure has always been an issue—it certainly has been around as long as IT tools and devices have been widely available and relatively affordable. For me, what makes this time different is the maturation of virtualization. All of my arguments in favor of BYOD make no sense unless the hardware and software that our users already own and personalize can also be used to access the environments they need in order to advance both their learning and their professional activity, as well as the missions of our colleges and universities. Every day, we’re getting closer to being able to provide those environments in platform-agnostic ways using virtualization. When access must be bounded, we can offer what may be appropriately described as container applications, in which institutions can exercise the level of control they need to have in order to enhance security and privacy while delivering the applications to the users' own devices. I’m still trying to learn how close to reality this vision of firm control within an environment of flexibility and variability actually is (beyond vendor hype), but I’m optimistic. Much of what we’ve seen in recent years seems to be headed this way.

4. What worries you most about enabling BYOD on your campus?
Let me start with what doesn’t worry me: user support with BYOD. If our post-secondary users can’t be self-sufficient (or, more properly, self-actualizing) with respect to their use of the basic technologies of living and learning, this model is useless. If, alternatively, we can focus on designing container applications when we need to and providing free-flowing access to information resources at all other times, and if we leave it to the users to provide the device-based capabilities on their end to make effective use of those resources, then I think we’ll be fine. The ubiquity of these devices in the general conduct of life means that the users should be comfortable with their part of that bargain. Clearly, we have much still to do to enable an infrastructure that is scaled sufficiently and flexible enough for BYOD, but that is just another example of the things on which we in higher education information technology should spend our dollars.

5. If BYOD becomes established within higher education, what will change because of it?
A big piece of the fundamental economy underlying higher education will change. Let me give an example. I believe
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that in a few years, faculty and staff will be given stipends to acquire and use their own devices rather than the institution buying devices and providing support and service. At the same time, students will (continue to) be expected to provide their own devices for accessing campus information environments. For the majority of uses on campus (with the exception of the most routine business tasks), the users of the technologies provided by the institution will creatively weave those technologies into their personalized lifelong learning and information-management systems. To say that another way, if we don't expect all of our constituencies to make continuous investments in their means of managing the rich, ubiquitous, and complex information context in which they live, learn, and work, we're selling them—and our enterprise—short. This isn't about meeting our audiences/constituencies/users where they are; it is about focusing our efforts where we can truly add the most value.

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Dale B. Hulvey
Assistant Vice President for Information Technology
James Madison University

1. How strategically important to higher education is the BYOD phenomenon? Is it simply a passing fad?
In some aspects, BYOD has been important for a number of years, if we think in terms of students bringing their own computers and devices to campus. Whereas higher education institutions have provided faculty and staff with computers, we have also allowed folks with active accounts and credentials to connect their own devices to our networks and to access most services. For faculty, this included smartphones and connecting to institutional e-mail systems. Tablets are not far behind. We are continuing to see a large increase in both smartphones and tablets on campus, and I expect that to continue. I'm not sure of the strategic importance of this phenomenon other than that connectivity to college and university services is now expected. Our challenge is to figure out a way to maintain security and privacy of institutional data while allowing access via personal devices. Again, I believe we have been seeing this with students for a long time; it is the faculty and staff aspect that is relatively new.

2. Should higher education institutions and their IT organizations resist or embrace BYOD?
BYOD will be difficult to resist. As products become cheaper, with more capabilities, saying no to BYOD by members of the campus community is going to be extremely hard. On the other hand, embracing it and allowing access is one thing; demanding BYOD to reduce cost is a different issue. Given the current economic climate, I don't see how we can expect or require faculty and staff to provide their own equipment.

3. Hasn't the pressure to deal with BYOD always been an issue for IT leaders? What makes this time different?
Yes, I do believe this has always been an issue. The difference this time is that since the cost of devices can be rather inexpensive, the sheer volume will increase, making support more difficult. Also, the threats of compromise with these devices continue to increase, complicating our ability to protect our data when accessed by a machine over which we have little to no control.

4. What worries you most about enabling BYOD on your campus?
Understanding how to secure the data and systems being accessed by these devices and understanding the support expectations of the owners/users are both worrisome to me. Just because someone owns a device does not mean he or she knows how to administer, maintain, secure, and use it appropriately. The other worry I have centers on standardization. If faculty have varying devices and software, will that put extra burden on students to use whatever applications are required by the faculty? However, considering that our future students will probably have much knowledge of and a high level of comfort with technology, this may not be an issue.

5. If BYOD becomes established within higher education, what will change because of it?
Together with mobility requirements, the ability to access everything from anywhere at any time will be the standard way that folks want to work. The challenge for the central IT organization will be to figure out how to allow this in a secure and efficient manner.

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I wonder who else can’t find their phone.

We have a dozen recruiters traveling the nation with university-issued smartphones. I need an antivirus solution that protects lost or stolen phones or tablets, and defends against mobile malware. That’s why I’m trying VIPRE.

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Keith “Mac” McIntosh  
Vice Chancellor for Information Technology and Chief Information Officer  
Pima County Community College District

1. How strategically important to higher education is the BYOD phenomenon? Is it simply a passing fad?
BYOD is definitely not a passing fad, but I can’t say that it is of strategic importance to higher education at this time. It is something we should recognize as part of the way we do business. This means that we, particularly those of us in higher education information technology, should embrace the fact that BYOD is here to stay. The consumerization of information technology has arrived, and we must be prepared to plan for and manage personally owned mobile devices. “Supporting the Trends toward IT Consumerization and Bring-Your-Own Device” was listed as #2 on the EDUCAUSE top-ten IT issues list for 2012 (http://www.educause.edu/ero/article/top-ten-it-issues-2012). This indicates to me that it is more than a passing fad.

2. Should higher education institutions and their IT organizations resist or embrace BYOD?
Resistance is futile. . . . We should definitely embrace BYOD. The consumers have spoken, and they want choice. They want to be able to select their device and have it integrated into all the areas they need, whether at home or at work. In my experience, there has always been a strain or competition between the individualization, personalization, and choice that our consumers desire and the controls, policies, and structures that the IT organization has put in place. This has to change, if it is not changing already. The change requires IT leaders, as well as those front-line staff delivering services, to understand the consumers’ needs and work to figure out a way to deliver those services to the consumers’ devices of choice. Of course, this also requires consumers to understand the balance between the freedoms they desire and the protections the institution needs in order to ensure the safety of critical data. We in information technology must be ready to manage and support our faculty, staff, and students who arrive with their personal computing devices, and we must figure out ways for them to integrate into our ecosystem securely as well as conveniently.

3. Hasn’t the pressure to deal with BYOD always been an issue for IT leaders? What makes this time different?
I’d have to say yes. With the advent of the laptop, there has been some pressure, for lack of a better word, for IT leaders and their departments to service and support the mobile user. I believe that as a community, we have improved how we’re doing this, but I suspect the end user still thinks we’re slow to adapt. Now, having said that, I’ll add that I think the creation of the tablet (especially the iPad), coupled with WiFi and cloud storage, has put increased demands on the IT organization to move at a far more rapid pace. This time, the devices are more portable and more powerful. This time, the devices, whether tablets or smartphones, are capable of the delivery of information, entertainment, and productivity to users in a convenient and readily available way unlike any we’ve seen before. The way I know this time is different is that when I travel around the country, I see young and old pulling out their devices—iPhones, Android phones, iPads, Kindles, Windows tablets, and more. Even more important than the form factor or the device is the capability of the user to access information and the many applications that are available. Another sign that this time is different is the quantity of devices that faculty, staff, and students carry, with individuals increasingly carrying more than one device.

4. What worries you most about enabling BYOD on your campus?
I have more serious worries at my institution than enabling BYOD. But as CIO, I will always be concerned about maintaining security and protecting the institutional data/information. We’ll need to review our policies to ensure they are in line with the technology changes anticipated with BYOD. Another concern is the division of labor required for the support of personally owned devices.
He hadn’t updated Java since April 2011

- Dave, IT Manager

I took back control with patch management.

My boss wasn’t very understanding when out-of-date software brought down our network during finals week. I need an antivirus that auto-updates Java, Adobe and other software. That’s why I’m trying VIPRE.

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How much support should the IT organization provide, and when should we direct users to their vendor or to the store where they purchased their device? Should we be working on personally owned devices at all? BYOD brings with it policy, technical, and legal challenges. As I noted earlier, one of the chief benefits of BYOD for users is the choice they have in selecting devices. This, in turn, is what causes concern for IT leaders. I believe our staffs must be able to assist users in accessing the institutional network and the institutional resources they need. Doing so of course becomes more complex with the variety of devices and operating systems. Again, faculty, students, and staff are increasingly carrying more than one device, leading to growing demand for wireless capability at our campuses and thus the need for more access points. For me, the key BYOD concern will be enabling our students, faculty and staff to use their personally owned devices while both minimizing the burden on my IT staff and maintaining institutional security.

5. If BYOD becomes established within higher education, what will change because of it?
One change I foresee would be a cultural change, not just for information technology but for higher education in general. As the demand for and popularity of mobile devices increase, we will need to figure out ways to use these devices to interact with students in class, to provide new learning opportunities, and to offer IT services and support for faculty, staff, and students. BYOD could also impact institutional security. Many of our systems and services assume that we have end-to-end control over the computing environment: servers and storage tuned for applications; classification, data security, and data loss prevention. We must also rethink the way that we architect our institutional infrastructure. Many of our systems and services assume that we have end-to-end control of the computing environment: servers and storage tuned for applications;

Michael R. McPherson
Associate Vice Chancellor for Information Technology and Deputy Chief Information Officer
University of Virginia

1. How strategically important to higher education is the BYOD phenomenon? Is it simply a passing fad?
Smartphones and tablets already dominate sales of new network-connected devices, and most analysts predict that they will constitute the majority of devices using our networks and services in just the next couple of years. This is no fad; it is the future staring us right in the eye and challenging us to adapt to both the challenges and the opportunities.

2. Should higher education institutions and their IT organizations resist or embrace BYOD?
BYOD—really BYOE (“E” for everything), since it includes devices, networks, storage, and software—is both an inevitability and a huge opportunity for our institutions. Several factors have converged to afford this opportunity: the dramatic lowering of price and the increase in availability of computing devices resulting from commodity mass production; the convenience of acquisition, growing capabilities, ease of use, and simplicity of management of fully consumerized devices such as smartphones and tablets/pads; and the emerging role of these personal computing devices as tools for personal business and entertainment. This is a unique moment in technology, a fundamental shift in the expectations, needs, and technology self-determination of our users. Institutions that fail to embrace BYOD will find themselves falling behind powerful technology and social changes and will be under siege by disgruntled users.

3. Hasn't the pressure to deal with BYOD always been an issue for IT leaders?
What makes this time different?
As soon as our users were able to acquire computing resources without having to come through the central IT organization, we were living in BYOD. For most of our institutions, BYOD started when the second computer arrived on campus, with the first being the mainframe (the second may have looked something like this: http://www.computerhistory.org/revolution/mini-computers/11/31/1893). What is different this time is ubiquity—the fact we can assume that virtually all of the members of our communities have access to some sort of computing device. This ubiquity challenges us to reassess the services that our users need and want from our institutions.

4. What worries you most about enabling BYOD on your campus?
We now operate in a world in which none of our users need us to provide basic productivity computing capability, which means that we can no longer rely on controlling access to the technology as the primary mechanism for implementing institutional policy and protecting institutional data. We have lost ownership and management control of the majority of the devices that are used to access the data and services we provide, and we are not going to get that control back. This means that we must redirect policy and procedure away from the traditional focus on devices and networks. Instead, the focus must be on data classification, data security, and data loss prevention.

We must also rethink the way that we architect our institutional infrastructure. Many of our systems and services assume that we have end-to-end control of the computing environment: servers and storage tuned for applications;
Her clicking has gone viral... literally.

- Tim, One-Man IT Department

I need a way to stay one step ahead.

Jane from Admissions is deadly to my network. After three viruses and a breach, I can’t ignore her trigger-happy click-finger any longer. I need a new antivirus. One that stops whatever Jane throws at me without slowing everyone else down. That’s why I’m looking into VIPRE.

Visit www.support-tim.com to see what happens next.
campus networks with excellent capacity and quality-of-service characteristics; end devices with minimum specifications for resources such as display size, RAM, disk; and end devices with predictable software configurations such as specific versions of browsers, drivers, and middleware stacks. Most of these assumptions break down in BYOD. We must design our systems and services to project themselves successfully into this unknown environment.

5. If BYOD becomes established within higher education, what will change because of it?
Two fundamental changes, or opportunities, will result from the successful support of BYOD. First, our users will finally be able to achieve what we have been trying to provide them with for many, many years: individual personal computing environments that are customized specifically for their needs, their work habits, and their preferences. This is possible now because our users are able to acquire, use, and maintain their own hardware, software, and services to meet their personal productivity needs. Most important, because we all use our devices primarily for entertainment and personal business, we are willing to take responsibility for creating and maintaining our personal computing environments—a responsibility that was not generally accepted for institutionally owned devices.

Second, both central and departmental IT organizations will be able to let go of an activity that has dominated our organizations since IBM introduced the PC: the direct support of individual computing environments. Many of us believe that the era of steadily expanding IT budgets is over, that we are in an era of level or declining IT budgets. If we are to respond to growing demands for new services for online education, data-intensive research and scholarship, and security and compliance, we must find areas that we can stop funding in order to free those resources for reallocation elsewhere. BYOD is a golden opportunity to take advantage of a fundamental shift in user behavior to re-create our service portfolios to meet the future.

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3. Hasn't the pressure to deal with BYOD always been an issue for IT leaders? What makes this time different?
I think the pressure has always been there. What's different now is the low
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cost and the consumerization of the hardware market. This hardware evolution, coupled with the ubiquitous availability of robust wireless Ethernet and cellular networks, has led to an exponential increase in the number of devices being brought to campus. It used to be that students were eager to arrive on campus to get an e-mail account and access to high-speed networks provided by the college or university. But those days are long gone. Similarly, students are becoming less reliant on institutionally provided hardware.

4. What worries you most about enabling BYOD on your campus?
In my view, the most troubling aspect of BYOD is the ease with which sensitive data can be leaked through a poorly managed personally owned device. Another challenge is the alarming rate of change in the device market. Both of these concerns are why we at Lafayette College are focusing on the application components, as I mentioned above. Trying to keep up with the device side is a losing battle. Creating the right application infrastructure is an area in which we can succeed.

5. If BYOD becomes established within higher education, what will change because of it?
As BYOD becomes more pervasive, I hope that IT organizations will become concerned less with device purchase and management and involved more with application development and integration. This would lead to continued improvements in the tools available for teaching, learning, and research. A standards-based constellation web of applications will enable the integration of third-party cloud services with institutionally run applications. This will create a blended and seamless environment, allowing colleges and universities to have highly flexible and tailored choices. In the end, I think this is where our resources should be aligned to create the most strategic impact at our institutions. Done right, BYOD can help us build this alignment in the years ahead.

Notes

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Bigfoot, Goldilocks, and Moonshots
A Report from the Frontiers of Personalized Learning

By Josh Jarrett

More than four years ago, a report from the National Center for Public Policy and Higher Education and Public Agenda noted: “In the view of many college and university presidents, the three main factors in higher education—cost, quality, and access—exist in what we call an iron triangle. These factors are linked in an unbreakable reciprocal relationship, such that any change in one will inevitably impact the others.” In other words, every positive improvement comes with an equal, but negative, trade-off. Unfortunately, that “iron triangle” remains strong, encapsulating a challenge that continues to face higher education today.
Fortunately, the resolve and creativity of higher education innovators are producing a set of solutions that have the potential to break the “iron triangle.” These solutions are not theoretical; they are reaching hundreds of thousands of students today. The detailed results are still emerging, but the initial results suggest we may be able to deliver high-quality education at an affordable price without sacrificing access. I refer to the three categories of innovations as Bigfoot, Goldilocks, and Moonshots—and will explain each of them below.

**Figure 1: Three challenges for the next decade**

**ACCESS**
- Enrollment caps
- Course availability
- “Non-traditional” new normal

**QUALITY**
- Low completion rates
- Unclear learning outcomes

**COST**
- Tuition increasing 3% over inflation
- State budget cuts
- Limited student ability to pay

**The Challenge**

The first angle of the “iron triangle” is access. In the United States, we’ve actually done a very good job of promoting access to higher education. The last three decades have seen steady enrollment growth, and we’ve seen more low-income students and first-generation students pursuing their education beyond high school. However, change is under way in terms of the types of students pursuing postsecondary education and whether there are seats for them when they arrive. Close to 75 percent of college students are now defined as “non-traditional” by the U.S. Department of Education: they are financially on their own, they have dependents of their own, they work full-time, and/or they are enrolled in a college or university part-time. Access for these students is increasingly at risk. In California community colleges, for example, an estimated 470,000 students were put on waiting lists in the fall of 2012. Perhaps not surprisingly, higher education enrollments are dropping in some states, mostly in community colleges but in some four-year institutions as well. In addition, we have “hidden capacity constraints” (see Figure 2). A fall 2010 survey of nearly 1,500 community college students reported that nearly one in five had difficulty getting into required courses. So, even if students can get into college, their courses may not be available, leading to excess credits and longer time to degree.

The second angle of the “iron triangle” is quality. Looking at completion rates as one measure of quality, we see that 58 percent of first-time students who enroll in a four-year college or university will earn a credential within six years, whereas 30 percent of students who enroll in two-year colleges will compete in three years. That statistic varies by type of institution, not surprisingly, but overall students have just better than a 50-50 shot of reaching the goal of a degree. Digging a little deeper, we see that over 50 percent of community college students, and almost 20 percent of four-year students, are starting college unable to do college-level math, writing, or reading. Finally, when students are in college, what are they learning? According to “Academically Adrift,” 45 percent of students “demonstrated no significant gains in critical thinking, analytical reasoning, and written communications during the
first two years of college." Meanwhile, employers note that graduates are not well-prepared in "global knowledge, self-direction, writing, and critical thinking" (see Figure 3).

Lastly, the third angle of the "iron triangle" is cost. Tuition and fees have risen more than 400 percent since the early 1980s, nearly twice the pace of the increase in health care costs and about four times the rate of inflation. A key problem is that state spending on public higher education is declining—dropping an average of 13 percent from 2006 to 2011. The prospect of state funding recovering as the U.S. economy improves is muted by states increasing long-term commitments to health care, prisons, and K-12 education. Thus, in many ways, tuition increases are being driven by state cuts. The net effect is that students are shouldering more of the load. In early 2010, the nation's total student loan debt surpassed credit card debt, and is now three to four times what it was a decade ago.

How ready are we to deal with the iron triangle of cost, quality, and access? It might be surprising to hear that I think the news is actually good. Some exciting examples in personalized learning are quite promising. People are taking these challenges very seriously and are addressing them systemically, with thousands of students. These innovative strategies fall into three groups: Bigfoot, Goldilocks, and Moonshots.

**Bigfoot**

In the Pacific Northwest, we call Bigfoot by the name *Sasquatch*. But whatever you want to call him, Bigfoot represents our search for a mythical thing that many people believe exists, but where we lack indisputable evidence. In higher education, I would translate this question as: "Can we really find a way to produce undeniably better learning outcomes at consistently lower cost?" If we can indeed do that, we can start to unlock new ways of allocating our resources for student success.

I think we will soon be able to answer this question with "yes." We have a few plaster foot castings and some grainy photos and a little video. So while I'm not ready to declare that our Bigfoot exists, I think the evidence is promising. This evidence comes from people such as Bill Bowen, former president of the Andrew W. Mellon Foundation and of Princeton University, who has stated: "I have come to believe that 'now is the time'—that far greater access to the internet, improvements in internet speed, reductions in storage costs, and other advances have combined with changing mindsets to suggest that online learning, in many of its manifestations, can lead to good learning outcomes at lower cost."

We are starting to see examples that the technology has matured enough, that the solutions are there, that we really can deliver quality learning outcomes at an affordable price. This is not about technology first, however; it's about pedagogy and what we know about learning.

In 1984, the educational psychologist Benjamin Bloom compared traditional
Bigfoot, Goldilocks, and Moonshots: A Report from the Frontiers of Personalized Learning

classroom instruction mastery-based learning, and one-on-one tutoring (also with mastery-based learning). Student achievement in one-on-one tutoring was two standard deviations higher than the traditional classroom instruction. So we’ve known for decades that traditional classroom instruction is not the most effective way to learn. We just have not been able to afford to do anything different.

How do we close the learning feedback loop to reach the achievement of one-on-one tutoring? How do we determine what students intend to learn and represent that in terms of a unique student profile that is individual to each student? How do we provide the right type of learning experience and environment for each student and use assessment to figure out if we are making progress and what else the student might still need to learn?

Let me give some examples of people and institutions doing just this. One is Carnegie Mellon University’s Open Learning Initiative (OLI) (http://oli.cmu.edu/). OLI uses a “learning curve” that shows the number of hints students needed or wrong answers given in their digital tutor versus the number of opportunities they had to demonstrate competency in a particular skill. If the number of wrong answers remains high as the number of opportunities increases, it means the student isn’t mastering the concept being taught. At this point, faculty assess how they can best help. Faculty time with students is probably one of the most precious resources in higher education. How can we use that resource most efficiently and effectively? Faculty time should be spent shoring up concepts that students aren’t understanding, as shown by the learning curve, or on the higher-order thinking skills that can’t be captured in digital tutors.

In May 2012, ITHAKA S+R published the results of a study looking at Carnegie Mellon’s OLI courseware in a blended or hybrid format and in a traditional format at six public universities. They looked to see if there was any difference in outcomes. They concluded: “We find that learning outcomes are essentially the same—that students in the hybrid format ‘pay no price’ for this mode of instruction in terms of pass rates, final exam scores, and performance on a standardized assessment of statistical literacy.” In addition, they noted that “adopting hybrid models of instruction in large introductory courses” offers opportunities “to significantly reduce instructor compensation costs in the long run.” This suggests that we may be getting close to better learning outcomes for a more affordable price.

Another example is the work of Carol Twigg and the National Center for Academic Transformation (NCAT). In the NCAT Changing the Equation Initiative (http://www.thenocat.org/Mathematics/CTE/CTE.htm), 32 two-year institutions redesigned their entire developmental math sequence (involving approximately 100,000 students) using NCAT’s Emporium Model and commercially available instructional software. As a result, most of the institutions experienced increased student learning, improved course progression, and reduced instructional costs (by about 20 percent). What this means is that one-size-fits-all developmental education may soon be an artifact of the past.

A third example is the National Repository of Online Courses (NROC) from the Monterey Institute for Technology and Education (http://www.montereyinstitute.org/nroc/). NROC is developing interactive engaging content and making it available in a growing library of free high-quality online course content for students and faculty worldwide involved in higher education, high school, and Advanced Placement courses.

Finally, in August 2011 Arizona State University partnered with Knewton (http://www.knewton.com) to customize learning for 5,000 students taking remedial math. After just one semester, withdrawal rates dropped from 13 percent to 6 percent, pass rates increased from 66 percent to 75 percent, and half of the students finished their class four weeks early.

To date, most Bigfoot sightings have occurred in developmental education, where teachers have to get students ready for college-level work as quickly as possible. What about college-level courses? Resistance is higher in these courses, which are driven more by individual faculty. One development that could push this type of instructional model forward may be MOOCs (massive open online course)—not the current version of MOOCs but perhaps version 2.0 or 3.0. The interactive and social resources in MOOCs could make them an effective tool for flipping the classroom. In fact, early results from a partnership between edX and San Jose State University showed that the pass rate for one course increased from 60 percent to 91 percent when the course was “blended” with a MOOC.

Goldilocks

Next up is Goldilocks. Remember her? Not too hot, not too cold; not too big, not too small; not too soft, not too hard. She wanted everything “just right.” Actually,
Hand-held devices like smartphones and tablets are rapidly becoming the primary way that students access the Internet. According to a recent EDUCAUSE study, more than half of all college students used mobile devices to get on the network in January 2011, compared with only 10 percent in 2008. Across the nation, IT administrators agree that tomorrow’s residential network is facing bandwidth and mobility challenges like never before.

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she wanted just the right choice for her. In higher education, these are the structured pathways to graduation with some choices—but not too many—for students.

Students have a mind-boggling number of pathways to choose from, including credit hours for the four-year track, the five-year track, or the six-year track (see Figure 4). And courses: think about a course catalogue and the number of permutations and combinations that are possible within it. Now imagine that you are a first-generation student who doesn't have someone to help guide you through that maze, or that you attend an institution that has about a 1,000-to-1 student-to-advisor ratio. It's no wonder many students aren't getting degrees.

More than half of courses taken at a community college do not contribute to a degree. These are courses that students drop, courses that are over students' credit limit, and courses that students fail and have to retake.

Institutions like The City University of New York (CUNY), Georgia State University, Florida State University, Arizona State University, and Tennessee's Tech Centers are leading the way. For instance, Arizona State University's eAdvisor (https://eadvisor.asu.edu/) provides “online advising and personalized student support” for degree planning. It helps students understand the various pathways available in their majors and the critical requirements they must meet for graduation. If a student enrolls in a particular course, the system might note, “You just moved yourself from the four-year plan to the five-year plan. Are you sure you want to do that? You might want to go see an advisor.” The system knows which courses students need to pass for each major and it knows which courses cannot be failed twice. The result is that every student gets a degree plan, and every student is on a path to completion.

The eAdvisor system also helps ASU know—three semesters out—how many class sections it will need, which means that the university can be much more efficient with classroom space and faculty time. In addition, once the university knows who is on which path, it can use predictive analytics to determine which

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**Figure 4: Time-to-degree tracks of “4-year” students**

students will need help staying on the path. As a result, ASU went from 22 percent of students “on track” in their programs in 2007 to 91 percent of students on track in 2010. The university has increased its first-year retention by about 8 percentage points and improved its utilization of classrooms and faculty. But doing so wasn’t easy and took many years.

I view choice like a college green in the middle of a traditional campus. There are hundreds of possible ways to cross that green, but generally only four or five paved pathways across, because those are the most efficient ways to get from the dining hall to the dorm or from the library to the classroom. We need to expose the “paths” to completion for our students. We need to help them get on those paths, we need to intervene if they get off-track, and we also need to let them opt out if their chosen path is not a good fit. This means taking out the guesswork. Social scientists have found that people do best when presented with seven to nine choices. Having only one or two choices can feel constraining, but having more than nine choices tends to be overwhelming and paralyzing.

That is the Goldilocks model: not too many choices, not too few, but a number that is “just right” for students.

Moonshots
On September 12, 1962, President John F. Kennedy said: “We choose to go to the moon. We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard.” I like to edit his words slightly and say: “We choose to provide high-quality, affordable education at scale. We choose to provide high-quality, affordable education at scale in this decade, not because it is easy, but because it is hard.”

Much of what is emerging in higher education represents new programmatic and institutional models that are combining different technology solutions, pedagogical approaches, and learning science to reimagine the teaching and learning moment and to reimagine a student’s progression through his or

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her degree program. But they’re also using these innovations to reimagine how they organize their institutions to support those changes. There’s even a willingness to reimagine how we fund the institutional model. Fundamentally rethinking how we provide education for a significant portion of the higher education student body will not be easy. There are no shortcuts or silver bullets. In fact, it is very, very hard work—but it is imperative that we try.

The Bill & Melinda Gates Foundation has partnered with EDUCAUSE, the League for Innovation in the Community College, and others in the Next Generation Learning Challenges (http://nextgenlearning.org/). We recently concluded the third wave of that program, which focused on breakthrough models. We are challenging institutions to meet the following target performance metrics:

- **Completion Rate**: 50 percent Associate degree completion rate within three years for Pell Grant–eligible students and a 75 percent rate within six years for Bachelor degrees for Pell students
- **Price and Cost**: $5,000 or less per year in student price and institutional costs
- **Scale**: 5,000 additional students by year five with path to 50,000 students
- **Quality**: Clear definition and monitoring process

Participating institutions include Altius Education, Ameritas College of Brandman University, Kentucky Community and Technical College System, New Charter University, Northern Arizona University, Rio Salado College, Southern New Hampshire University, Texas Higher Education Coordinating Board, University System of Georgia, and University of Washington. We’ve also worked directly with The City University of New York, Portmont College at Mount St. Mary’s, University of the People, and Western Governors University, among others. For many of these institutions, this represents innovation from within. They are saying: “We need to try something different. Let’s create a competency-based nursing program. Let’s try an accelerated degree-completion program.”

Some common features of these models include prior learning assessment; competency-based progression; diagnostics assessment and adaptive learning; badges, interim milestones, and motivational science; connective media and peer-to-peer learning; learning analytics and targeting scarce faculty and support resources; and/or online/blended delivery. No one is using all of these, and no one has figured out the ideal formula. Yet everyone is using at least half of these features.

The innovators in this last group are shooting for the moon, not because it is easy, but because it is hard.
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Conclusion

Bigfoot, Goldilocks, and Moonshots represent the three leading groups of innovative strategies: (1) growing evidence that we are finding ways to consistently deliver better learning outcomes at lower costs; (2) “just right” structured pathways to help students reach their goals while balancing student choices with intrusive advising; and (3) entire programs that are shooting for the moon with fundamentally different delivery and cost structures.

Can we use these strategies to break the “iron triangle” of cost, quality, and access, and can we use technology to improve learning and student outcomes? Doing so will require a grand partnership between those who are focused on changing the finance side of higher ed and those who are focused on improving what happens in the classroom. We need to engage both promoters of innovation and protectors of quality. We must reimagine the instructional model and also encourage deep faculty engagement—high tech combined with high touch. We need to think not only about design and research and development, but also about scaling. Finally, we need both traditional institutions and the breakthrough models on the frontier.

Notes


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normous change is under way in higher education, driven by a perfect storm of crisis (around cost, access, quality, and funding), technological innovation and what that innovation makes possible, the growing presence and influence of for-profit providers, abuses (of various kinds), opportunity, and workforce development needs in a global and technological context. Any one of those challenges might fill an agenda for a commissioners’ retreat or a small conference, but accreditors now wrestle with all of these various forces across a broad landscape of change and urgency. They do so at a time when they are already being buffeted by criticism that they are too lax in regulating for-profits and too slow in addressing deeply troubled institutions and by pressure for change from a Department of Education that wants more rigor and oversight even as it seeks ways to support more innovation in higher education.

By Paul J. LeBlanc
Future historians of this period, possessing the clear-sightedness that only time provides, will likely point to online learning as the disruptive technology platform that radically changed an industry largely unchanged in terms of its core delivery of service (i.e., teaching and learning) since the cathedral schools of medieval Europe. Many in higher education today are looking to new technology-based or at least technology-enhanced solutions for their problems, and online learning has in many ways paved the way. Although many non-profit institutions are just now catching up with online programs, often entering that market because of economic pressures, online learning is already well understood, well established, and well respected by those who genuinely know it. In fact, as Clayton Christensen’s *The Innovator’s Dilemma* predicted, the question of fifteen years ago—“How can we make online learning the equal of traditionally delivered learning?”—has been reversed. We now ask, “How can we make traditionally delivered learning the equal of the best-designed online learning?” This is because disruptive innovations always start as inferior to incumbent models, but their technological core improves at a steeper curve than that of the incumbent models (which in this case has remained fundamentally the same and has thus resisted productivity improvement, as explained in part by William Baumol). Eventually, the disruptive innovations surpass the incumbent models.

Disruptive innovations always start as inferior to incumbent models, but their technological core improves at a steeper curve than that of the incumbent models.

As Christensen also predicted, when traditional faculty teach online, they bring back to their traditional classrooms new pedagogical methods and technologies; online education is thus actually helping to improve traditional delivery models. Coursera (https://www.coursera.org/) co-founder Andrew Ng recently reported the same phenomenon for instructors in MOOCs, the most traditionally structured of online courses (biased, as MOOCs are, toward “sage-on-the-stage” teaching and toward more teacher-centered than student-centered structures, at least for now). Accreditors have largely come to understand online learning and readily assess it as part of any institutional review. State regulators are another story, however. The crazy quilt of fifty different state regulatory approaches, many of them built in anticipation of on-the-ground physical campuses and flavored with a protectionist bias, is actually impeding access to high-quality online programs—but that’s another sad story best saved for another day. What we are now seeing in higher education is a new wave of innovation that uses online learning, or at least aspects of it, as a starting point. The meteoric growth of the for-profit sector, the emergence of MOOCs, new self-paced competency-based programs, adaptive learning environments, peer-to-peer learning platforms, third-party service providers, and the end of geographic limitations on program delivery all spring from the maturation of online learning and the technology that supports it. Online learning has provided a platform for rethinking delivery models, yet much of accreditation is not designed to account for these new approaches.

Perhaps most important, this new wave of innovation relies on a disaggregation within higher education, a common phenomenon in mature industries but one that the higher education industry has remarkably resisted for centuries. Indeed, one could argue that the core of the educational enterprise has always been vertically integrated in the body of the faculty. That is, faculty members have thought up new courses and programs, developed syllabi, outlined learning objectives, “curated” the necessary content and learning artifacts (mostly choosing books and chapters and articles), walked the proposed courses/programs through necessary approvals (governance), taught the courses/programs, advised students, stepped in when students needed help, administered assessments and graded performance, and periodically revised the course/program. That was the way of the world until online technology entered the picture.

Online learning has disaggregated the model. Today, various players perform various aspects of what was once the exclusive province of faculty.
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A faculty member might be hired as the subject matter expert to develop a course but never teach it or be involved in it again. Faculty might be hired to teach a course that is already developed and handed to them, with little room for them to change the course (common in large-scale programs where standardization is important). Third-party providers (e.g., Smarthinking, http://www.smarthinking.com) might provide student tutorial help. Students might turn to a peer-to-peer learning network (e.g., OpenStudy, http://opensudy.com) instead of to faculty when they run into trouble. Adaptive learning technologies might intelligently guide a student’s pathway through the learning content. The person assessing a student’s work might not be the faculty member teaching the course (e.g., Western Governors University, http://www.wgu.edu) and some MOOCs using peer assessment. Self-guided learning models (e.g., the College for America program at Southern New Hampshire University) might have no faculty instruction at all.

We do not properly acknowledge the great displacement of traditional faculty in the new delivery models, though we know that when technology enters a “craft” profession, the highly skilled and expensive “craftspeople” at the heart of that industry will see their world irrevocably changed. This will be much less true for faculty members in research, elite, and/or residential sectors of higher educations—even though those roles are not the ones that inspired many faculty to enter academia. Disaggregation plays out in other areas as well, including credentials, non-institutional faculty, and the integrated institution.

**Credentials.** Part of the vertical integration in higher education was due to the fact that colleges and universities fully “owned” the credentialing that came at the end of the educational process. However, today we see growing acceptance of prior learning assessment (PLA) at the front end of the learning process. For example, the Council for Adult and Experiential Learning (CAEL) has launched a new virtual PLA service, LearningCounts (http://www.learningcounts.org/); though still largely under the control of the institutions, it can be accessed by individual students. In addition, numerous industry certifications are often pulled into the learning equation, and there is much discussion of alternative credentialing, especially the notion of badges. MOOC (Massive Open Online Courses) providers are sorting through the kinds of credentials they might offer, and industry stalwarts like the American Council on Education (ACE) have signaled their willingness to work with MOOC providers on assigning credits. Apparently, traditional higher education may be losing some of its monopoly on credentialing, if not in the critical arena of Title IV funding.

**Non-Institutional Faculty.** Faculty have always been somewhat like independent contractors, working within and thus affiliated with their institutions. However, Sebastian Thrun’s 2011 departure from his home institution, Stanford, to create Udacity (https://www.udacity.com/), a for-profit MOOC provider, may signal new possibilities for how faculty members are situated within the industry. For-profit Straighter Line (http://www.straighterline.com/) has announced a model for “self-employed” faculty to teach courses: faculty set their own price models and share the tuition revenue. Similarly, Udemy (http://www.udemy.com/) offers 5,000 courses in which the professor sets the fee and shares 30 percent of the revenue with the company. In yet another variation of this theme, Antioch University (http://www.antioch.edu/) has announced that it will offer college credit for Coursera courses, a model that has an outside faculty member offering an Antioch accepted/licensed course (at least in terms of validation through credit) while Antioch provides advising and other learning support. Although these new models are not likely to have a significant impact for some time, if at all, they reinforce the notion of learners “grazing” or assembling their learning from multiple sources, some of which may be newly independent faculty providers.

The Integrated Institution. In the past, institutions largely managed all of their own activities, with perhaps
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Thinking about Accreditation in a Rapidly Changing World

There is likely to be increasing pressure for accreditation to move from looking at the overall whole—the institution—to considering smaller parts within the whole or even alternatives to the whole. Overall, accreditation has been based on a review of an integrated organization—the college or university—and its activities. These were largely cohesive and relatively easy-to-understand organizational structures in which almost everything was integrated to produce the learning experience and degree. Accreditation is now faced with assessing learning in an increasingly disaggregated world with organizations that are increasingly complex, or at least differently complex, and that include shifting roles, new stakeholders and participants, various contractual obligations and relationships, and new delivery models.

There is a few exceptions (e.g., food service, maintenance, marketing materials). Today, there is an enormous rush into the higher education services sector, with massive for-profits like Pearson either investing in or acquiring for-profit companies that manage large parts of an institution’s activities, ranging from its learning management system (LMS) to marketing activities to admissions and financial aid processing to content and course development to tutoring to . . . . As cash-strapped institutions struggle to establish themselves in the new online marketplace, they are increasingly turning to third-party providers for some or all of what they need. Venture capitalists, entrepreneurs, and traditional publishers (now re-inventing themselves as their print world is being disrupted) are pouring money into the opportunity: Pearson’s $650 million acquisition of Embanet+Compass; John Wiley & Sons’ $220 million acquisition of Deltak.edu; and in a reverse of this dynamic, Apollo Global Management’s $2.5 billion acquisition of McGraw-Hill Education. Accreditors routinely ask institutions to demonstrate control and quality in areas that are increasingly being contracted out to for-profit providers. That expanded use of third parties poses interesting questions.

There is likely to be increasing pressure for accreditation to move from looking at the overall whole—the institution—to considering smaller parts within the whole or even alternatives to the whole.

MOOCs might serve as one example. For all the attention that MOOCs have received this last year (most recently, Thomas Friedman’s gushing endorsement in the New York Times), I remain an intrigued skeptic. MOOC providers often ignore that their principal attraction is their elite brand affiliations. If a local state college offers a MOOC, it is more likely to be a SOOC (Small Open Online Course). But when MIT or Harvard or Stanford, brands built on saying “no” to almost all interested parties, offer free (!) courses to all, it is hardly a surprise that so many enroll. Their numbers are impressive, on the one hand, and also not very interesting or surprising, on the other. MOOCs have problems as well. They reify very traditional educational notions: sage-on-the-stage teaching, the traditional semester structure and three-credit-hour model, and a focus on content over learning. They are most deficient in the areas that adult learners require to be successful: learner support, motivation and persistence, the social aspects of learning, and the other, messy human aspects of learning. However, in their defense, I agree that MOOC providers are forging new ground, that it is still early in the development of the models, and that they are thinking hard about these issues. As pointed out earlier, disruption theory tells us that the early iterations of new models often are not very good but that the improvement curve is steep and fast. A lot of very smart people are working on MOOCs. As for accreditation, ACE is exploring how to provide transcript credit to MOOCs, as noted above. Is this not a kind of accreditation at the...
course level and, thus, disaggregated accreditation?

More profound, if less discussed, is the emergence of competency-based education (CBE). College for America (CfA), a CBE program at SNHU, is the first of its kind to wholly move from any anchoring with the three-credit-hour Carnegie Unit that pervades higher education (shaping workload, units of learning, resource allocation, space utilization, salary structures, financial aid regulations, transfer policies, degree definitions, and more). The irony of the three-credit hour is that it fixes time while it leaves variable the actual learning. In other words, we are really good at telling the world how long students have been sitting at a desk, and we are really poor at saying how much students have learned or even what they learned while sitting at that desk. CBE flips the relationship and says: let time be variable, but make learning well-defined, fixed, and non-negotiable.

In the CfA program, there are no courses. There are 120 competencies—“can do” statements, if you will—precisely defined by well-developed rubrics. Students demonstrate mastery of those competencies through completion of “tasks” that are then assessed by faculty reviewers using the rubrics. Students can’t “slide by” with a C or a B; either they have mastered the competencies, or they are still working on them. When they are successful, the assessments are maintained in a web-based portfolio as evidence of learning. Students can begin with any competency at any level (there are three levels, moving from smaller, simpler competencies to higher-level, complicated competencies) and can go as quickly or as slowly as they need to be successful. The program costs $2,500 per year, so an Associate’s Degree can be earned for $5,000 if a student takes two years and for as little as $1,250 if the student completes the required competencies in just six months (an admittedly formidable task for most). CfA is the first program of its kind to be approved by a regional accreditor, NEASC, and is the first to seek approval for Title IV funding through the “direct assessment of learning” provisions. At the time of this writing, CfA has successfully passed the first-stage review by the U.S. Department of Education and is moving through the approval process.

The CBE movement offers a radical possibility: that traditional higher education may lose its monopoly on delivery models. If we can say with certainty what constitutes learning and how we know for sure that students have mastered that...
learning, we should then be much less concerned with how a student gets there. Accreditors have put more emphasis on learning outcomes and assessment for some time now, but the CBE movement privileges them above all else. When we excel at both defining and assessing learning, we open up enormous possibilities for new delivery models, creativity, and innovation. It is not a notion that most incumbent providers welcome, but in terms of finding new answers to the cost, access, quality, productivity, and relevance problems that are reaching crisis proportions in higher education, CBE may be the most dramatic development in hundreds of years. For example, the path to legitimacy for MOOCs likely lies in competency-based approaches. Although MOOCs can readily tackle the outcomes or competency side of the equation, they face the formidable challenges of reliable, trustworthy, and rigorous assessment at scale (at least while trying to remain free). Well-developed CBE can also help undergird the badges movement, demanding that such efforts be transparent about the claims associated with a badge and about the assessments used to validate learning or mastery.

The CBE movement may provide accreditors with a framework for fundamentally rethinking assessment. In this new framework, accreditors would look harder at learning outcomes and competencies and at the claims an entity is making for the education it provides and the mechanisms it uses for knowing and demonstrating that the learning has occurred. The good news is that such a dual focus would free accreditors from concentrating solely on inputs and organization and stakeholder roles and governance and would allow for the emergence of all sorts of new delivery models. The bad news is that we are still working on how to craft well-designed learning outcomes and how to conduct effective assessment. Both are harder than many think.

A stronger focus by accreditors on outcomes and assessment leads to additional key questions:

- How will accreditors rethink standards to account for the far more complex and disaggregated business models that might have a mix of “suppliers”—some for-profit and some non-profit—and that look very different from traditional institutions?
- Will they accredit only institutions, or does accreditation have to be disaggregated too? Might there be by multiple forms of accreditation: for institutions, for programs, for courses, for MOOCs, for badges, and so on? At what level of granularity?
- CBE programs are coming. College for America is one example, but some twenty other institutions have announced efforts in this area, major foundations are lining up behind the effort (most notably the Lumina Foundation and the Bill & Melinda Gates Foundation), and the Department of Education appears to be relying on accreditors to attest to the quality and rigor of those programs. Although the Department of Education is moving cautiously on this question, accreditors might want to think through what a world untethered to the credit hour might look like. Might there be two paths to accreditation: the traditional “institutional path” and the “CBE path,” with the former looking largely unchanged and the latter using rigorous outcomes and assessment review to support more innovation than allowed by current standards? According to innovation theory, the new CBE accreditation pathway would eventually improve the incumbent accreditation processes and standards.

This last point is important: accreditors need to think about their relationship to innovation. If the standards are built largely to assess incumbent models and are enforced by incumbents, they must be—by their very nature—conservative and in service to the status quo. On the other hand, never before has the popular press (and thus the public and the policy-makers) been so consumed with the problems of traditional higher education and so intrigued by the alternatives. In some ways, accreditors are being asked to shift or at least expand their role to accommodate these new models.

A new path for CBE accreditation would likely focus on three key areas:

1. The learning outcomes or competencies—looking hard at the clarity of claims, definitions and rubrics, rigor,
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levels of mastery, scope of learning, the basis for the competencies, and more
2. The assessment of mastery—looking hard at mastery assessment, validity, rigor, and more
3. Integrity—looking hard at how the program ensures that the students taking the assessments are those who enrolled, that cheating and fraud are prevented, and that funding support is appropriate and goes to actual demonstrated learning

Programs seeking CBE accreditation should commit to greater transparency, clearer performance metrics, and fuller disclosure than required by current accreditation regimens. Such an approach could go a long way to addressing concerns from the Department of Education and should help prevent the abuses that accompanied the growth of online programs over the last fifteen years.

President Barack Obama fired a very loud shot across the bow of traditional accreditation in his State of the Union address on February 12, 2013, and in the supporting outline of his domestic policy plan. In a now much-discussed passage, the plan states: “The President will call on Congress to consider value, affordability, and student outcomes in making determinations about which colleges and universities receive access to federal student aid, either by incorporating measures of value and affordability into the existing accreditation system; or by establishing a new, alternative system of accreditation that would provide pathways for higher education models and colleges to receive federal student aid based on performance and results.” It is not clear whether the Administration has concrete plans yet for what the “alternative system of accreditation” might look like, but the emphasis on performance and results shifts the focus of any such system to outputs instead of inputs.

If regional accreditors are unable to rise to the challenge, they may find themselves tethered to incumbent models that are increasingly less relevant to higher education. New, alternative accreditors may emerge, as President Obama called for in his domestic policy plan. In other words, the accreditors themselves might be disrupted. There is time. As has been said, we frequently overestimate the amount of change to come in the next two years and dramatically underestimate the amount of change ahead in the next ten years. The time is now for regional accreditors to re-engineer the paths to accreditation to at least offer an alternative outcomes-based option for accreditation. In doing so, they not only will be ready for that future, but they can help usher it into reality.

Notes
This article is based on writing produced for the Western Association of Schools and Colleges (WASC) as part of a convening to look at the future of accreditation.


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In addition, whereas the purchase/download model for e-books seems to have sorted itself out, the e-book lending world of libraries is still like the Wild West. New models appear, models vary widely, formats are in flux, and limitations vary from wide-open to extremely restrictive. Throw in added complications like user authentication, lending to personally owned e-readers, and (shudder) library consortial licensing, and the result is a mess. Not willing to wholly re-invent the marketplace to account for libraries—and for lending generally—purveyors have yet to come up with good models for libraries. (I use the word “purveyors” here because they are in the business of providing platforms for e-book delivery and not the more traditional publishing services.)

But why should purveyors even bother with libraries? With Amazon.com reporting that sales of e-books now exceed those of print books, the marketplace isn’t demanding easy lending. I was ecstatic to hear about a new functionality that allows e-book owners to lend their copy of an e-book to someone else. Then I discovered that its availability is extremely limited and that even when it is enabled, the number of times a purchaser can lend a book is restricted to just once or twice. Sad.

Purveyors of e-books are still trying to figure out how to ensure the continuity of their revenue streams as they move from print to digital formats. Notions of lending do not fit in these models, just as sharing never fit in the models for music or movie companies when they slammed headlong into the digital content world. Publishers believe that sharing doesn’t make good business sense, and now it’s their turn to experience the same growing pains as did the entertainment industry, evidently with few lessons learned. E-books open up new opportunities for purveyors to revisit entirely the rights and privileges delivered to the license-holder—in this case, the library. Any benefits that copyright and/or fair use may allow can be set aside by licensing terms. This means there is an opportunity for the purveyor of content to legally deny the buyer the rights and privileges that came by default with old-fashioned print book purchases. If you don’t typically think of the library (or
even yourself, as a reader) as a “license-holder,” you better start
to do so.

So here are the librarians, trying to help people use e-books. Some library staff are genuinely good at this, despite the complexity and ever-changing landscape. Sometimes I feel like we librarians are making headway, but time and again, we run headlong into barriers. What would I wish for, if I could wave my magic wand across the e-book landscape?

1. For all library e-books, regardless of license terms—whether unlimited use, five uses and then buy, or a temporary collection replaced cyclically—the owning library may loan an e-book to another library. I won’t dictate the technological solution, but this has to happen or libraries as we understand them will be fundamentally altered.

2. E-content purveyors must recognize (and libraries must demand) that fair use—even with all of its limitations—remains in force and should not be undone by licensing. Licensing agreements restrict learning and teaching by conventionally placing a set of terms between the consumers of content and the provider. When the “consumers” are students, society as a whole loses if they cannot access the knowledge they need.

3. Library-owned e-books should not become second-class substitutes for personally purchased ones. E-book purveyors need to invent creative ways for libraries to use e-books on e-readers, not just on old-fashioned computers. This is happening, but too slowly.

4. We need an electronic content doctrine equivalent to the first-sale doctrine. As consumers, we must think about what it means to lose our first-sale rights, which allow us to sell, lend, or give away our physical books. Today, any e-books I purchase will pretty much vanish when I do. Worse still, even if I don’t vanish, I am not entitled to sell them or give them away, so they are stuck in my e-reader until I delete them.

Short of a magic wand and lists of demands, what can academic librarians do?

1. We need to make progress with some of our large, open digital projects. A lot of money, energy, and governance supports them. Meanwhile, the usual corporate entities are running circles around us, getting tools and resources into people’s hands. Unfortunately, people aren’t willing to wait on a nobler delivery platform and will enter into relationships that do not benefit them. Academic libraries feel great pressure to do the same as we serve those users.

2. Copyright and fair use expertise should be a point of pride among all professional library and instructional technology staff. We need to stop making expertise in copyright and licensing a limited specialty role. We do need specialists, for advanced and complex situations. Unfortunately, it seems as if the word “copyright” too often makes us panic and demand a specialist, when a well-educated librarian will do.

3. We need to put e-readers into the hands of as many library staff as possible. Be it a Nook, Kindle, iPad, or the next new product, we need to build the frontline expertise that comes from use, to help us make informed decisions. These folks tend to also fall prey to the lure of the lend, so we will be adding to the number of demanding library users who want more from library e-books.


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The Portmont College Story

When I was growing up in India, college was not the norm in my family. My father barely received four years of schooling and had to start working at the age of fourteen to support his family. By contrast, my mother was valedictorian of her high school class, but women of her background were not expected to go to college, and she was married off at seventeen years of age.

Despite their experiences or perhaps because of them, my parents instilled in me the importance of education. By the time I was in high school, I began to think of education as the path to a different future. With hard work and focus, I applied to and was accepted into the prestigious Indian Institute of Technology. I suddenly found myself in a rarified world that opened many doors for me and set me on a path very different from that taken by my neighborhood friends.

After college, I set my sights on a larger prize and found my way to the Wharton School at the University of Pennsylvania, where I received an MBA. This gave me the knowledge and confidence to build a career in the business world over the next fifteen years, initially working at some large companies and then becoming a technology entrepreneur—starting, building, and selling two companies, one in e-commerce and the other in enterprise software.

With success comes responsibility. After selling my second company, I had a strong desire to give back and be part of a cause bigger than myself, to help others have the opportunities that I was so fortunate to have had in my life. I thus started working with the Bill & Melinda Gates Foundation, finding ways to help farmers in Africa and Asia improve their lives through better access to information and communications technologies. These farmers, with barely a few acres, depended on the land for their livelihood; they were people very much like my grandparents in a small village in India. Their resilience inspired me, and this experience showed me yet again how education and information can transform people’s lives.

I wanted to apply these experiences to address social problems here in the United States, in my own backyard. Helping to close the education gap was a natural cause to devote myself to. I have seen firsthand how education can transform lives. It is the most important doorway to opportunity in the United States and has contributed in no small part to what has made this country great. But we are also at risk of losing this edge; there is a large and growing gap between the rich and the poor in their access to education.

These were the seeds that led me to found Portmont College (http://portmont.la.edu/), a two-year, nonprofit, private college in partnership with Mount St. Mary’s, based in Los Angeles. The college offers associate’s degree programs in business administration, computer science, liberal arts, and pre-health science through a blended online plus in-person curriculum. It is designed to open doors for students who have the grit and determination to succeed but who face barriers to that success today. Portmont will cost about $5,000 per year and so is an affordable option for students with financial constraints.

Portmont College has several unique characteristics that will enable it to take on the higher education challenges of broadening access, lowering costs, and maintaining the highest quality:

1. **Students with Grit.** We aim to serve students who possess the determination to succeed even if they face real barriers (financial, academic readiness, or social) to success in college. Our hypothesis is that when faced with a rigorous program combined with high levels of holistic supports, focused and driven students will apply their natural drive and energies to their academic success. We are selective, but not by academic aptitude or SAT test scores as in traditional institutions. Instead, we require a high level of grit, resilience, and tenacity, and we select our students on this basis.

2. **Connected Students.** We connect students to their campus and larger community: their peers, faculty, coaches, and the workplace they will eventually enter. One of the benefits of a high-quality education is the opportunity to build a personal network of people who are there for you to help you succeed. Though online learning can be isolating, it has the potential for even more meaningful connectivity. We place students in cohorts with a success coach in their city, with the expectation that students will support each other in real life and not just online. As we know from our own college experiences, these students will likely continue to be close friends for many years. We teach students through a curriculum that connects them to their world and gives them opportunities to meet local employers and community leaders who have also overcome obstacles. We thus see an
opportunity to blend the best of both worlds: the personalization and flexibility of online learning with the engagement and support of in-person education.

3. Core Capabilities. Our students not only receive grades in specific subjects but also develop six core capabilities (Work Ethic, Learning to Learn, Teamwork, Critical Thinking, Problem Solving, and Effective Communication) that will prepare them for a lifetime of career success. These timeless skills not only will help them land their first job but also will help them build success over many decades, in their career and community. We know that our students will change employers on average every 4.1 years and that a majority of students now in grade school will eventually have jobs that don't exist today. Employers want these core capabilities, but they don't often find them in graduates from traditional colleges. As detailed by Richard Arum and Josipa Roska in Academically Adrift: Limited Learning on College Campuses (2010), these learning outcomes have much room for improvement. One underlying cause is the failure to teach, measure, and report on these capabilities at the individual student level. Such granularity and transparency will force improvements in our ability to deliver on these core capabilities more consistently and will enable students to demonstrate these achievements directly to employers. This is also the key to bridging the gap between the academy and employers and to addressing the dichotomy between liberal arts education and job-specific training.

4. Visible and Measured Progress. Portmont teaches a high-quality and proven curriculum transformed to the online environment from Mount St. Mary's College in Los Angeles, our partner in this venture. But we take a further step to offer an unprecedented and transparent view into student learning at an individual level. Students' progress will be highly visible and central to the learning experience. Students will know on a daily basis how they're doing, where they need help, and how to focus their time to succeed. This visible view of both successes and failures allows for early intervention by a personal success network. Faculty and coaches will be able to see, through descriptive and predictive analytics, exactly when students need help as soon as they need it, not after the fact. The Portmont Student Dashboard will highlight this progress, as well as items requiring immediate attention (e.g., missing assignments), and will make it easier to help students in a tailored and timely way.

We have a number of such ideas to radically improve the cost + quality + access equation for higher education. We have a long way to go to achieve our vision, but we are off to a very good start in a relatively short time. We are honored and grateful to be a part of this new movement in American education. I am excited about the unique opportunities allowed from being able to build a college from scratch, at a time when innovations in teaching, technology, and student support can converge to create a lasting impact. I am grateful to the Bill & Melinda Gates Foundation for their help in formulating the business plan and providing the financial support to help start MyCollege Foundation. I am proud of my terrific colleagues who have jumped in with both feet to help turn this vision into reality. And I am honored that Mount St. Mary's College, under the leadership of Dr. Ann McElaney-Johnson, has partnered with us to create Portmont College at Mount St. Mary's.

My hope is that the education offered by Portmont College at Mount St. Mary's will do for motivated students across the United States what my education did for me: provide the path to a different future.

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The Policy of BYOD: Considerations for Higher Education

In December 2012, eWeek quoted Gartner Vice President Ken Dulaney: “IT has been saying this is the way, but in today’s world the dictator is being overthrown. I’ve been told by organizations that they’re BlackBerry only, but then I walk down the hall and see iPads. IT is coming to grips with the fact that they’ve lost control.”

Is the answer to regaining control to establish policy? Retake the dictator’s throne? Impose restrictions? Lock down access? Appoint the IT organization as the self-anointed sheriff in the wild, wild west of BYOD (Bring Your Own Device)? If this is indeed the answer, many are already armed with policy, procedure, and prescription to ensure the sanctity of the “IT homeland.”

However, before drafting more policy, we might be wise to explore the concept of policy and what purpose policy serves in the context of BYOD.

What Is BYOD?

BYOD is one component of the consumerization of technology in the workplace. By its very term, BYOD refers only to the device. Consumerization refers to a broader range of concepts including such topics as services (e.g., Dropbox, Google Drive, Evernote), end-user access to personal cloud services, consumer devices and services provisioned by the institution, and the rapid deployment of “the Internet of Things.”

BYOD is not new. Clearly, the term BYOD has become the latest buzzword of consultants and bloggers, among others. But I am referring to the notion of individuals bringing their own personally purchased devices to campus. Students have been bringing laptops to campus for decades. In many cases, doing so was required by the institution. And who knows how many USB memory devices are plugged in to campus networks right now? All the while, faculty are likely establishing their own networks in their classrooms. Aside from the popularity of the term BYOD, what makes the influx of personal-use devices so novel to the campus that the practice warrants policy? Is it the sudden proliferation of smartphones stuffed in pockets and purses and of tablets carried in messenger bags and backpacks? Or is the overwhelming demand for access truly necessitating some response from the IT organization?

If policy is needed, to what extent does existing policy cover the use of personal devices? Is the institutional Technology Acceptable Use Policy sufficient? Are there other policies that could address concerns related to BYOD, such as a data-standards policy referencing data security? An audit of existing policy may be the place to start.

Why Develop Policy?

Why should a higher education institution go through the typically rigorous and lengthy process that results in policy? What purpose does policy serve?

The answer is that higher education faces a unique set of challenges when addressing the consumerization of technology. Those challenges are differentiated as students, faculty, and staff. Each user group brings with it unique demands. A survey of these user groups would be ideal to determine the services, systems, and data requirements on a day-to-day basis.

Students are becoming increasingly asset-light. What systems, services, or data do they need as a result? To what extent are they being required to access or are they demanding to access mission-critical systems or sensitive data? The ECAR Study of Undergraduate Students and Information Technology, 2012, hints at their requirements, with “accessing course websites or syllabi” (66%) and “using course or learning management systems” (64%) heading the list. Does the institution’s existing information and network architecture mitigate a need for new policy?
Faculty are requesting to use their personal iPads and smartphones in the classroom. As the Internet of Things proliferates, other technologies will require wi-fi connectivity. Faculty want to leverage the portability, ease of use, and access to device-specific apps that enhance the learning experience and certainly make their lives a bit easier. These are all legitimate reasons for providing faculty with access to wi-fi. Similar to students’ use of consumer devices, what policy is required to support faculty?

Staff pose a more significant challenge. The question that is most relevant in this case is what systems, services, and sensitive data do staff need to access using their personal mobile devices? A quick survey will most likely reveal that their preference for using their mobile devices is not to access sensitive data, the ERP, or other mission-critical systems/services. Industry surveys indicate how employees currently use their personal mobile devices in the workplace: the top three activities are accessing the employee intranet/portal, accessing e-mail and/or calendars, and reading or viewing documents, spreadsheets or presentations. Similar patterns of use should be considered on college and university campuses.

If policy is determined to be necessary, does each user group require unique policy? How will policy or policies accommodate the ambiguity of emerging technologies that will invariably end up on campuses—in learning spaces, staff offices, and residences? How should the institution draft policy that is sufficiently broad to allow for future technologies yet sufficiently detailed to be enforceable?

Certainly, there is a case to be made for policy that will secure networks, systems, and sensitive data. Policy can also address support for personally owned devices, subsidies for required business use of personal devices, and provisions for institutional liability—among other administrative concerns unique to BYOD.

At What Cost Policy?

Policy brings with it significant costs beyond the human capital invested in the drafting, reviewing, editing, and approval of the documents. Communicating policies to all concerned, monitoring activity and behavior(s), and enforcing prescribed corrective actions all add to the complexity and cost of policy management.

Recently Werner Boeing, CIO of Roche Diagnostics, stated: “People believe that IT is about technology, but it’s really a behavioral science—understanding the behaviors of your company’s staff, leaders, and customers—and facilitating the adoption of a new vision.” Understanding the behaviors of your institution’s staff, faculty, and students may be the best first step to establishing policy. Understanding the culture of the institution is imperative. To what extent does institutional culture influence the desire to establish policy? Is the institutional leadership risk-averse? To what extent do workplace policies influence the development of policy? Understanding the dynamics of trust, mutual respect, and professional confidence will help determine the nature of policy, if required.

If an institution’s culture is driven by policy, there is no shortage of articles, white papers, case studies, and policy templates that can provide a path to BYOD.

If progress and action are the norm on campus, a quick assessment of the infrastructure can establish a next-generation enterprise, always-on middle platform (e.g., wi-fi, 4g/LTE, browser, apps, virtualization), ensuring a frictionless experience for the end-user. Returning to Gartner VP Dulaney, the eWeek article noted: “To hear Dulaney speak of BYOD in broad terms, his advice could be mistaken for toddler parenting advice: Give warnings. Set boundaries. Be clear about consequences.”

The takeaway? To each his (her) own. The decisions to develop BYOD policy will vary campus by campus, college by college, department by department, and individual by individual.

Notes
2. All mention of mobile devices is intended to reference personally owned devices, not organization- or institution-provided devices.

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Accessibility: Front and Center

Earlier in my career, I had the privilege of working closely with two faculty members who cared deeply about issues of universal design. They came from different but complementary perspectives. One was a professor of special education, and the other was a professor of occupational therapy. It took me years of working and talking with them (I was their Assistant Dean), but I finally “got it”: good design intended to benefit those with special needs improves the effectiveness of software and digital content for everyone.

This did not come easily for me, in part because my listening skills had not evolved to the level needed to be fully effective. In other words, I thought that I knew far more than I really did. I’d like to share here what finally got my attention, in the hope that others might be able to skip a few of the more painful missteps I took on my journey to awareness.

Several years ago, I sponsored a project at another campus to deploy web kiosks ubiquitously. The purpose was to provide general access to web services for students, faculty, and staff, and visitors. As part of my “leadership” of this project, I cautioned my staff that they should not forget to ensure that at least one kiosk in multi-kiosk locations was accessible. And then I walked away, feeling pleased with myself about my elevated sense of “doing the right thing.” I did not engage deeply to ensure that my staff had subject-matter expertise or at least access to subject-matter expertise. Fast forward: after the project was complete, one of my two faculty friends who had tried to develop my commitment to accessibility issues asked if he could meet with CIO Office leaders and show us a video that some of his students had made as a class project.

It turned out that the video showed a person who was in a wheelchair and was trying to use one of our kiosks. To say the experience of watching this video was painful would be an understatement. I did not look around the room as the video was shown. I can’t attest for everyone else, but partway through the video I realized that I was having a little trouble seeing because of my misty eyes. There were numerous barriers presented to the individual in the wheelchair, even though the kiosk had been installed at “wheelchair height.” Yet the faculty member knew that making the kiosk difficult to use was not our motivation; it was a result of our execution and my own well-intended leadership. He did not lecture us. He simply wanted us to “feel” what the process was like for people who had significant barriers standing in their way.

Compassionately delivered, this message has stuck with me ever since. It is not enough to have good intentions. It was not enough for me to issue some goals and then walk away without providing guidance. It is not enough to retro-fit a project after it has been executed. If you truly respect all members of your campus community, you need to get services right the first time.

What does this mean? I suggest four action items:

- **Action item 1.** When meeting with vendors of software that is delivered through the web, and when hiring web developers, let them know that your institution is committed to the Web Content Accessibility Guidelines (WCAG) and give them the WCAG link so that they can learn more: http://www.w3.org/WAI/intro/wcag. The standard for accessibility of content on the web, WCAG states that its goal is to provide “a single shared standard for web content accessibility that meets the needs of individuals, organizations, and governments internationally.”

- **Action item 2.** When meeting with software vendors, inform them that your institution expects products to be designed, from the outset, with the Section 508 Amendment to the Rehabilitation Act in mind (https://www.section508.gov). Let them know that this is not optional but is a basic expectation of your institution.

- **Action item 3.** When meeting with publishers, tell them that you expect content to be delivered in a way that is compatible with the twelve guidelines of WCAG 2.0 (http://www.w3.org/TR/WCAG/#contents). These twelve guidelines are organized under four principles: perceivable, operable, understandable, and robust. Let publishers know that you also expect adherence to evolving standards (WCAG 3.0 is emerging now) and encourage them to engage in the dialogue as new standards develop.

- **Action item 4.** When chartering a project, ensure that best practices related to accessibility—and consultation/engagement with true subject-matter experts on your campus—are baked in to the requirements and the project plan.

Getting things right the first time is all about requirements and design. Yes, in the beginning we will still need to do some retrofitting as we build awareness and a culture of “no compromise” moving forward. This requires that we work together respectfully as we transition toward a future in which accessible design is a normal part of what we and our partners do as we create new innovations. The Internet2 NET+ initiative (http://www.internet2.edu/netplus/) is the perfect laboratory for us to do this because their leadership demonstrably
cares about accessibility, and the I2 community has the scale to influence the marketplace. In addition, we in libraries and information technology need to engage with the campus office that represents those who need our services to be accessible. We must move beyond good intentions into purposeful action with real subject-matter experts. Doing so will result in what it has taken me years to learn: designing for those with special needs results in services that are better designed for everyone. And ultimately, we will spend less of our precious budgets by doing it right, from the beginning.

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