Constructing Innovation and the Student Experience

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EDUCAUSE review

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Rethinking the Rules

Although higher education is reputed to be slow to change, the rules surrounding “it can’t be done” have been shifting dramatically. Many of today’s “rules” would have been unthinkable a few years ago:

- Colleges and universities are no longer the only providers of college courses. Think of StraighterLine.
- Class size has gone from dozens to hundreds to hundreds of thousands. Think of MOOCs.
- Credentials are being offered outside the academy. Think of badges.

The status quo is being reshaped by entrepreneurs, government, and the academy itself. New institutions, such as Southern New Hampshire University, are predicated on principles of disruptive innovation. New business models, with disaggregation as their core element, are emerging. MOOCs (massive open online courses) symbolize a shift in the rules. As Phil Hill writes in this issue of EDUCAUSE Review, even the most traditional institutions are reconsidering what it means to be a college or university in the connected age: “Online education should now be considered part of any institution's strategic planning process, even if the decision is to not offer online education.”

Innovation hinges on rethinking the rules. In “Business Model Innovation,” Christine Flanagan quotes Clayton Christensen: “You don’t change a company by giving them ideas. You change them by training them to think a different way.”

One “different way” of thinking involves using the emerging field of service science as a way to provide a perspective on the forces reshaping higher education today. In their article “Ten Reasons Service Science Matters to Universities,” Jim Spohrer, Dianne Fodell, and Wendy Murphy describe service science (the “science of win-win”) as “the application of knowledge and resources for the benefit of others.” As they explain, colleges and universities are complex, adaptive systems. These service systems “manage and provide for housing, transportation, safety, health, food, water, energy, education, and entertainment. All of these systems have a series of interactions, costs, and interdependencies. . . . Service systems require smart people, technology, and business leadership. The quality of life for students depends on the quality of their education and their experiences in college.”

According to Mary Jo Bitner, Amy Ostrom, and Kevin Burkhard, the key to this service-oriented view of higher education is to “focus squarely on the student experience as a way of creating value for all stakeholders.” A core tenet of viewing higher education through a service lens is that value is co-created by the consumer, meaning that value lies in the experience itself rather than in the “thing” provided. Service blueprinting can help higher education leaders “redesign, reinvent, and reimagine their educational offerings and service processes from the student's point of view.”

Focusing on the student experience can also lead to the direct participation by students in business model innovation. In her article in this issue of EDUCAUSE Review, Christine Flanagan talks about putting design into the hands of students. For example, the Business Innovation Factory (BIF) Student Experience Lab partnered with Utah State University to suggest ways to enhance students’ engagement with the institution. Blending their experiences, broader research, and training in design, students developed a prototype that has been adopted as a model for student services. Flanagan states the desired vision: “Innovation—whether student-led, student-driven, or student-centered—will be just another routine competence, much like budgeting or auditing.”

Richard Culatta offers still another way for higher education to rethink the rules: innovation clusters. The interconnection of basic research, product development, entrepreneurship, and test-bed sites in

(continued on page 5)
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such clusters allows the market to innovate much more rapidly. These regional innovation clusters, first developed in fields such as biotechnology, have been established in Pittsburgh, Los Angeles, and Phoenix, among other cities. Rethinking the tradition of the institution as the data custodian, Culatta also suggests that we empower students with their own data: “Data about learners is spread across a variety of systems at various institutions. Students can often see their data online but may have no option to take it with them.” If students could control their own data, they might create learning profiles and educational portfolios, ultimately allowing them to make better decisions about “which classes to take, which colleges to attend, and how much to pay for tuition.”

Finally, one key rule that higher education leaders must rethink is the habit of “going it alone,” according to Brad Wheeler and James Hilton. In “The Marketecture of Community,” the authors note: “We must find ways to be more effective in solving the problems that face us all. Communities can be an essential part of the solution.” Many investments in information technology do not result in competitive advantage or comparative advantage. The solitary approach, write Wheeler and Hilton, must give way to new models for buying clubs, cooperative communities, and collaborative communities. Higher education faces a partnership imperative.

The old rules of “it can’t be done” are being flipped into questions of “why can’t we do that?” So much is possible. We can learn new approaches, we can innovate business models, and we can provide even greater value. Rethinking the rules must be part of higher education’s discipline of innovation.

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10 Faculty Perspectives on What Works in Lecture Capture

“I was concerned that streaming courses may encourage absenteeism but the attendance has been 100 percent, and they are all viewing the lecture as well. I think that is remarkable. It tells me the students are interested in going back for learning purposes.”

— Dr. Imran Currim
Chancellor’s Professor of Marketing
The Paul Merage School of Business
University of California, Irvine

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Associate Director and Instructor
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University of Toledo

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Regents Professor
Ira A. Fulton School of Engineering
Arizona State University

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— Dr. James Craig
Professor and Educational Consultant
School of Dentistry
University of Maryland, Baltimore

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— Dr. Anne-Marie Lerner
Assistant Professor, School of Engineering
University of Wisconsin – Platteville

“I’m getting extremely positive feedback. We have the person speaking in one window and the slides very clearly presented and in sync in the other window. Mediasite has been absolutely integral to us delivering this seminar series to a worldwide audience.”

— Dr. Glenn Geher
Professor/Director of Evolutionary Studies
State University of New York at New Paltz

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— Dr. Christina Eyers
Assistant Professor
Central Michigan University

“My biggest challenge is the instructor view was feeling that people were judging my teaching. But as soon as students watched and gave feedback I realized this isn’t about judging.”

— Dr. Jennifer Flatt
Associate Dean and Professor
University of Wisconsin – Marinette

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— Dr. Diane Zorn
Course Editor, York University

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— Dr. Pamela Havice
Associate Professor, Clemson University

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Re-envisioning a Polytechnic Commitment

The prominence of information technology as a transformational force in higher education is affecting campuses everywhere, but it has special resonance at California Polytechnic State University. Cal Poly, as the institution is widely known, is one of a small number of U.S. colleges and universities that embrace a polytechnic mission. Since its inception in 1901, Cal Poly has also infused a distinctive “Learn by Doing” approach throughout its curriculum. Although it is a mid-sized (18,000 students) comprehensive state university that includes the familiar array of majors in the humanities, sciences, education, and business, the polytechnic components remain at the core of the school’s identity. Thus, as the expansion and diffusion of information technologies is prompting rapid and profound changes in American society and in cultures around the world, we at Cal Poly are taking this opportunity to re-envision what polytechnic means for the campus—and we are leveraging this re-envisioned perspective to inform our approach to innovative technologies in educational practices.

Given the rapid and alluring developments in technology, it’s critical to resist “the next big thing” as a quick-fix solution to drive change. We are striving to ensure that our core educational outcomes remain the touchstone for decisions about how we can better educate our students and which technologies we will use toward that goal. Our aim is to craft a thoughtful, informed approach that will enhance the rigor of students’ learning while preserving the university’s unique polytechnic character and distinctive “Learn by Doing” principles.

To that end, we are working to build into our approach the idea of continuous improvement so that we assess as we go, recalibrate, and continue to push forward in an effort to thoughtfully incorporate effective and relevant technologies into instruction. This notion of continuous improvement is a key component of reinvigorating Cal Poly’s educational effectiveness to meet our students’ needs today, so that they can be successful leaders in tomorrow’s society.

The new reality of today’s technological society demands that all graduates be prepared with technological competencies, regardless of their major and their career plans. Our response to that imperative is to embed a form of “technology across the curriculum” into the university’s academic vision. This is best captured in the language of the strategic plan: “Cal Poly will define all majors as ‘polytechnic’ having depth of expertise in the professional or academic discipline, and breadth, balance and literacy in technology, the arts and sciences, integrated seamlessly to prepare whole-system-thinker graduates.”

When our students graduate—whether their major is engineering or English, architecture or art, computer science or chemistry—they should possess not only the competitive technology skills that are essential for their personal and professional lives but also the ability to critically evaluate today’s technologies and to assess those that will emerge in the future. Our students should be able to provide leadership in selecting and using technology ethically and sustainably from personal, societal, and global perspectives. This re-envisioning of polytechnic literacy as a core competency for an educated citizen adds a new dimension to Cal Poly’s efforts to incorporate technology into instruction. It means that instructional technologies should provide opportunities to enhance student learning, along with the mechanism and a model for infusing polytechnic competencies throughout the curriculum.

Of course, as is true on many other campuses, there is great excitement at Cal Poly about how innovative instructional technologies and online resources can improve student learning. That enthusiasm was apparent last spring at a President’s Cabinet meeting, which was open to the campus community. With the theme “Leveraging Technology to Enhance Student Learning,” we highlighted the work of Cal Poly faculty members who are already incorporating technology into their teaching. In addition, leaders from other campuses across the country described their impressive technology-related accomplishments. Finally, representatives from a spectrum of industries talked about their current pushes to leverage technology in their companies and detailed the competencies they expect of their employees.

Momentum is clearly building at Cal Poly for innovative methods of applying technology in instruction. The Academic Senate passed an e-learning policy to recognize faculty members’ growing interest in—and the importance of quality for—the design and teaching of online and blended courses. The campus teaching center was recently incorporated into the
newly created Academic Technology unit, thus consolidating resources for exemplary teaching practices and support for instructional technologies. This partnership will help to ensure that the university’s academic rigor will remain high even as the specific instructional methods and technologies evolve for blended and online instruction.

It is specifically through this support of faculty that Cal Poly can accelerate its progress toward a campus-wide polytechnic commitment. To this end, more opportunities are planned to help faculty strengthen their use of instructional technologies and hone their abilities to infuse a broad set of technological competencies into student learning experiences. To effectively leverage technology, faculty need to be able to make informed decisions about the specific instructional and professionally relevant technologies they will employ for achieving the desired student learning outcomes and objectives. Faculty can make effective decisions only if they are able to critically analyze the benefits and tradeoffs of the various technological options and then couple those options with appropriate instructional methods.

Accordingly, faculty across all disciplines must have “breadth, balance and literacy in technology” to be able to apply principles of critical analysis to technologies for instructional use, much as Cal Poly strives to foster “breadth, balance and literacy in technology” among all its students. As more faculty engage this challenge, the result will be instruction that reflects the exemplary design and effective use of technology for clear learning goals. In addition, faculty will be able to model for their students how to incorporate polytechnic competencies into learning activities, thus embedding the skills in learning outcomes. This is an example of Cal Poly’s enduring “Learn by Doing” principle. Faculty members’ polytechnic literacy will show students, firsthand, how to apply these skills as an essential part of their learning process—over multiple classes and throughout their degree program.

As a residential campus, we have an appreciation for nurturing a meaningful “sense of place” in which learning occurs not just in the classroom but in the field, in the community, and online. We see selective and informed use of technology as critical to enriching the learning environment and students’ connections with each other and their professors wherever learning occurs. If we intend for all students to develop polytechnic competencies, their degree should include broad experiences in many courses—and in co-curricular activities—where faculty are modeling real-world technological competencies and weaving those principles into course goals and learning outcomes. Online instruction, with all of its advantages for student access and instructional efficiencies, is thus a complementary component of Cal Poly’s more comprehensive polytechnic approach.

Amid this wave of opportunity triggered by seismic changes in technology, we are working to keep the best of what Cal Poly has always been while simultaneously working to create the best of what the university can become. This is an ambitious agenda—one that will take time and ongoing work to achieve its full promise. But we are confident that we are moving in the right direction. Our polytechnic identity, coupled with the “Learn by Doing” philosophy of instruction, has earned Cal Poly a strong reputation for producing resourceful professionals and innovative leaders. As employers have noted: “Cal Poly graduates have two hands on the problem and both feet on the ground.” By re-envisioning our current polytechnic commitment, we can continue this tradition of success for future graduates.

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Business model innovation is one of the most challenging components of 21st-century leadership. Making incremental improvements to a business model—creating new efficiencies, expanding into adjacent markets—is hard enough. Developing and experimenting with new business models that truly transform how an institution delivers value (while continuing to drive the performance of the current business model) is exceptionally difficult. Yet nowhere is the imperative for business model innovation more prevalent or more relevant than in higher education, which is under intense scrutiny and facing rising costs and potential disruption from all angles.
To compete in a world where the shelf life of business models is shortening, higher education leaders need the tools, skills, and experience to envision, test, and implement new business models. They must believe in the power of experimenting in the real world, with a network of collaborators who have the audacity to change everything. As the legendary innovation mastermind Clayton Christensen says: “You don’t change a company by giving them ideas. You change them by training them to think a different way.”

Turning Threat into Opportunity
A business model is an organization’s blueprint for creating, delivering, and capturing value and for generating the revenue needed to cover costs, reward stakeholders, and reinvest funds in order to remain competitive. All organizations, both for-profit and nonprofit, have a business model, whether or not that business model is explicit.

To understand how to think about business model innovation in a different way, higher education leaders first need to abandon long-held beliefs about what innovation is, how it works, and what makes it successful. They then must engineer and architect a true platform for transformation—a place where the intractable system that is higher education can design and test proposed solutions in a real-world environment. Moreover, leaders must establish an ongoing process to explore new models for delivering value—even those models that are disruptive to current operations.

As an institution entrenched in legacy systems, behemoth operating models, and disruptions coming from all directions, how can a college or university experiment with innovative approaches? First, it is important that new ventures—both public and private—have a solid foundation for success. Enabling the creation of an autonomous place to pursue alternative channels without hindering the institution’s current value network is thus critical. In other words, institutional leaders must seek or build a place where sound innovation theory can be applied in a safe, manageable, and real-world environment.

It’s easy to see why start-ups have a much easier time creating innovative business models. For them, new models represent pure opportunity. For established institutions, this is a wholly different story. Following a potentially disruptive, new business model strategy involves fear, risk, and possible cannibalization. As Christensen notes: “Current customers [in this case, students, faculty, and alumni] are the lifeblood of the company; they must be protected at all costs.”

Unfortunately, these fears often become self-fulfilling prophecies. So, what can higher education leaders do? The answer may seem counterintuitive, but leaders should not invest dollars trying to advance the existing model to please existing customers in the existing value network. Doing so, according to Christensen, will “force the disruptive technology to compete on a sustaining basis” and will “nearly always fail.”

Instead, leaders should shift responsibility to an autonomous organization that can then frame the new model as an opportunity. This organization can pursue alternative channels, suppliers, and services. Most important, the organization can do so without hindering the current business model and while giving new growth ventures a solid foundation for success.

The Higher Education Innovation Factory
Moving from the idea of an autonomous place for business model experimentation to the elements of such an approach, let’s start with a myth-buster: New ventures that overturn old industries or reignite established ones are often driven by underlying networks of individuals and organizations. The greatest challenges and opportunities reside with those who can see and build these networks first.

A modern business example that epitomizes the value of network design is Apple. Through the iPod, Apple changed the way we buy, share, and listen to music. Apple didn’t do this alone, and in actuality, there was very little inventing going on within the walls of the Apple headquarters. To create this new business model, the company collaborated with hardware and software vendors, record labels, and artists to compete in a wholly new fashion.

Apple understood what education leaders must embrace: Network innovations connect rather than create value. Whether a higher education institution offers a product (a degree) or a service (knowledge, competency, or skill sets) or a social good (the creation of 21st-century citizens), it needs to determine what value it creates within the value chain. Is the institution helping or hindering the flow of value? Creating business model innovation through disparate capabilities (is there a more disparate system than higher education?), starts with the following steps.

1. Getting the right people on the bus and thinking outside the current knowledge base. This means tapping into silos outside the organization and looking beyond the current skill sets. It also means working with institutions that have the capacity and motivation for trying new things—that is, not just making tweaks to the way things work today but trying true transformational approaches. Leaders need to look beyond functional skill sets like finance and engineering and move away from reductionist perspectives that hinder holistic systems thinking. Larry Keeley, co-founder and president of the innovation and strategy consulting firm Doblin, notes: “Although historically innovation
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was used to keep people out, now you use it to invite people in.”

2. Thinking adjacent. It’s not easy to untangle existing capabilities from outside contexts and then to put them together in new ways. To do that, leaders need to focus attention and energy on how things are the same—which means an idea that works somewhere else should not be automatically dismissed because it comes from a different industry or a different customer or a different material. “The best ideas won’t come looking like they’re just right,” says UC-Davis Professor Andrew Hargadon.

3. Embracing the discomfort zone. Sitting between worlds can be a disarming place, especially when the seat rests consistently on a steep learning curve. Yet that’s precisely the place to be. To be a coalition-builder means accepting that you’re not going to be as smart in one network as you are in another. Yet “the benefit of this discomfort lies in freedom from the binding (and blinding) ties of any one small world,” explains Hargadon.

4. Thinking big, starting small, scaling fast. In the end, an institution’s ability to move between various disciplines and industries and to see possible recombinations of innovation is not enough. It is at the point of intersection that the hard work starts. Stefan Thomke, the author of Experimentation Matters, says that integral to innovation is the ability to experiment quickly: “Rapid feedback shapes new ideas by reinforcing, modifying, or complementing existing knowledge.”

At the same time, while you are experimenting frequently, don’t overload your organization. Thomke adds: “A good experimentation strategy balances the value of early information against the cost of repeated testing.”

A Radical Approach: Putting Students in the Driver’s Seat

Although many educational institutions seek to put the student at the center of their transformation effort, they often fail due to institutional barriers between departments and disciplines, incoherent engagement strategies that fail to deliver on the needs of the student, insufficient innovation processes, abilities to experiment, and general inertia toward new and novel solutions. Sound familiar?

As an obsessive investigator into the root causes of innovation failure, Keeley states: “Almost everything about the way innovation is taught and practiced and asserted is wrong.” Since innovation fails about 96 percent of the time, he wonders why people even bother to listen to innovation “experts.” He adds that generally, the field has advanced to “about the same state as medicine when leeches, liniments and mystery potions were the sophisticated treatments of the day.” Part of this problem can be attributed to the field persistently remaining stuck in old patterns of seeing and acting.

So, what if we change our perception of “expert” and switch things up? What if we put students in the business model driver’s seat?

Instead of designing a new business model and hoping students engage and embrace it, what if we enabled the students themselves to participate directly in the process?

Solving the Student-University Engagement Gap

In 2010, the Student Experience Lab partnered with Utah State University to give undergraduates the opportunity to use real-world research and design methodologies to transform how they understand, evaluate, and articulate the skills, competencies, and capabilities they learn in college.

Over the course of a year, students traveled through a “participatory design” cycle of discovery, prototyping, and experimentation. Ultimately, the goal of this initiative was to find fresh, new approaches to support student success and timely and appropriate progress toward degree completion.

The USU students, ranging in age from freshman to graduating senior, designed and developed a vision of the future for a “holistic” student service delivery model that is both seamless and democratic—a web-based, “one-stop-shop” that is tightly linked to a student’s evolving personal, strategic, academic, and financial objectives.

The delivery model they designed

- connects independent support services together to learn from and engage with one another for the betterment of the student;
- provides an easily navigable process for student self-discovery and self-actualization; and
- allows students to conveniently build their own personal web of support based on need, issue, or circumstance.

The new model that the students designed shifts the digital environment away from a framework in which knowledge and expertise are insulated and siloed toward an environment in which knowledge is connected and shared and is personal to the students. It also provides a seamless flow of experience, allowing all students the opportunity to understand how complex student services relate to one another.

The pilot launch of this new platform is slated for January 2013.
What can you learn from your students?

Find out which IT services they’re using, what they value, and which devices they’re bringing to campus. Read this year’s ECAR study of undergraduate students and IT and sign up to participate in 2013 at educause.edu/student-study.
Instead of designing a new business model and hoping students engage and embrace it (think about how many new student service efforts fall by the wayside each year), what if we enabled the students themselves to participate directly in the process? What if instead of designing a new model based on a deep understanding of the student experience, we give the innovation keys directly to students and support them in the design, prototyping, and testing of new models?

This is the scenario currently being played out in the Business Innovation Factory’s Student Experience Lab (http://www.businessinnovationfactory.com/sxl). For the past three years, the Lab has been exploring how good design can improve the quality of the learning experience for students by not only listening to students but also engaging them in the conceptual development of wholly new educational experiences.

Through “participatory design,” students act as both participant and designer, boldly creating the experience that is right for them while leveraging the expertise and experience of all players in the system. By encouraging this deeper level of learning and doing, we begin to create an awareness of the larger whole, leading to actions that can drive us toward genuine business model innovation. Likewise, by building young people’s capacity, skills, and competencies and strengthening their ownership of the results, higher education institutions can construct the right kind of environment for ongoing experimentation, culture change, and radical student engagement. It’s the missing link to systemic change.

This is not an attempt to belittle the role of expertise at the academic and administrative levels. Specialized training and workplace experience, both technical and interpersonal, are critical. In the participatory model, however, this special expertise is yet another resource rather than a source of unchallenged power and authority.

This way of thinking can be a stumbling block for many in higher education—especially for those with analytically-geared minds that prefer probabilities over possibilities, statistics over instincts, and algorithms over mysteries. But through participatory design, meaningful partnerships are created between implementer and user, teacher and student, administrator and teacher—partnerships in which everyone takes responsibility for the success of the challenge. This is an easily replicable model for institutional innovation.

**A Call to Experimental Arms**

In our nation’s ongoing effort to increase both the attainment level and the quality of higher education, a key stakeholder is often missing from the equation: the student. If we are to design a student experience for a 21st-century educational system in which all students can succeed—regardless of learning style or life circumstance—then we must bring their experience to life in actionable and relevant ways. This can be obtained only through business model innovation.

Higher education needs to adopt a vision of the world a few years from now. Innovation—whether student-led, student-driven, or student-centered—will be just another routine competence, much like budgeting or auditing, that

---

**Insights, Challenges, and Solutions from the Student Experience Lab**

Three videos demonstrate the power and impact that student voice and student participation can have on the innovation process:

1. **Capturing the Experiences of Young Men of Color**

   In 2010 and 2011, the Student Experience Lab captured the experiences of 92 young men of color from 39 institutions across the country to explore how they get ready for, get in, and get through college. The purpose of the study was three-fold: to engage these young men directly in order to understand how they view their experiences, to add their voice to the discussion of how to better meet their needs, and finally, to develop opportunity areas and solution ideas to improve their higher education experience.

2. **Translating Insight into Opportunity**
   http://www.businessinnovationfactory.com/projects/sxl/insights/design-challenge-how-might-we-help-students-develop-coherent-goal-focused-educ

   The Young Men of Color research uncovered many of the needs, emotions, and meanings involved in these students’ higher education experience. What models, environments, resources, support structures, curricula, programs, and policies are needed to improve their experience?

3. **A Radical Approach to Change**

   How can we take insights and opportunities and create a winning student experience? By giving students the opportunity to solve the challenges for themselves.
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Business Model Innovation: A Blueprint for Higher Education

Christine Flanagan
(cflanagan@businessinnovationfactory.com) is Student Experience Lab Director for the Business Innovation Factory (http://www.businessinnovationfactory.com/).

Established in 2004, BIF designs, prototypes, and tests new models in education, health care, and entrepreneurship in a real-world environment.

BIF will be thoroughly analyzed, shared, and taught. We are entering a time when many individuals—from student to faculty member to parent to administrator—can participate (and succeed) in producing something new and noteworthy for the betterment of all students. By putting students at the center, higher education leaders will create a new institutional business model, one that will serve as an innovative blueprint for the future.

Let the model creation begin.

Notes

3. Ibid.
5. Hargadon quoted in “Report from the Field: Designing Networks for Innovation,” BIF website, http://www.businessinnovationfactory.com/weblog/archives/2006/04/report_from_the_field.html. For more about “thinking adjacently” check out IDEO co-founder Bill Moggridge’s book Designing Interactions (Cambridge: MIT Press, 2007), which traces the evolution of many networked ideas from creation to valuation. One reason companies such as IDEO (a product-design firm) are able to exploit the networked innovation process is that they freely share the problems and solutions they come across through their broad access to diverse industries and projects.

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From Innovation Clusters
Accelerating Innovation in Educational Technology

By Richard Culatta

Education in the United States is entering a very exciting moment. For the first time, all of the digital stars are aligning in such a way that the technology is available to design truly transformational learning experiences. The ubiquity of inexpensive and powerful mobile devices is creating the potential for all students to learn at any time and in any location. Increased wired and wireless broadband is creating the potential for learners to engage and interact with peers and experts around the world. A proliferation of data from digital learning activities is creating the potential to leverage “big data” and learning analytics for personalizing learning. All of these elements are combining to create the potential for this to become education’s Internet moment.
To take advantage of the energizing technological promise to improve learning, we need to determine how to accelerate the rate at which new learning tools and techniques are developed and implemented. By accelerating the pace of innovation in educational technology, we will have the opportunity to close the achievement gap, improve national competitiveness, and drive economic growth.

The National Education Technology Plan (NETP), developed by the Office of Educational Technology at the U.S. Department of Education, sets the national agenda for using technology for learning. According to the NETP, the Department of Education has a role in “encouraging, promoting, and actively supporting innovation” and in “nurturing collaborations” so that “the best ideas can be scaled up.”

Perhaps it’s worth taking a minute to define innovation. According to Jim Shelton’s blog post in Education Week, innovations are ideas and approaches that “shatter the performance expectations of today’s status quo; to make a meaningful impact, these new solutions must also ‘scale,’ that is grow large enough, to serve millions of students and teachers or large portions of specific under-served populations. True educational innovations are those products, processes, strategies and approaches that improve significantly upon the status quo and reach scale.” (See Figure 1.)

One strategy to encourage, promote, and actively support innovation is to identify approaches that have worked to accelerate innovation in other industries and apply them to education. Although the domain may be very different, the underlying approaches often can still be very effective. Two such examples are innovation clusters, from the bioscience field, and open data initiatives, from the health care industry.

Innovation Clusters: Learning from Bioscience

The St. Louis region has a long history as the home to world-class scientists in medical and plant biosciences. However, the region was not always as successful at translating that research into practical application. The expertise that already existed in the region mostly comprised independent services, isolated research efforts, and siloed commercial ventures. Regional leaders recognized the opportunity to accelerate the commercialization of bioscience innovation and to capture the economic benefit of the region’s research base. They realized that if they could treat these independent projects as a coordinated effort, they could accelerate the pace of innovation.

In 2001, the St. Louis Coalition for Plant and Life Sciences, now known as BioSTL (http://biostl.org/), was formed to create an innovation cluster, bringing together all of the elements to foster a burgeoning innovation ecosystem around medical and plant biosciences. For over a decade, BioSTL has played a leadership role in stimulating and facilitating necessary elements of this entrepreneurial infrastructure—including facilitating new company creation, growing local venture capital, establishing science districts with lab facilities, and promoting public policies to support science, entrepreneurship, and the growth of the bioscience industry. This work has spawned a range of new research initiatives and 183 startup companies in the bioscience industry and, along the way, has brought nearly $1 billion in biosciences venture capital to St. Louis.

As BioSTL has shown us, innovation can be accelerated by taking a regionally coordinated approach to research and development and the infrastructure that supports it. The idea of innovation clusters comes from the work of Michael Porter, of the Harvard Business School, who observes that even though in theory location should no longer be a source of competitive advantage (thanks to high-speed communication and global markets), in practice geographic location remains central to competition.
INSPIRE BRILLANCE

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According to Porter, innovation clusters are regional concentrations of interconnected companies, service providers, and associated institutions that enjoy unusual competitive success in a particular field.3 Some have suggested that learning how to strengthen innovation clusters may be the key to rebuilding a damaged economy.4 In May 2010, the Economic Development Administration (EDA) created the i6 Challenge (http://www.eda.gov/challenges/i6/), and in May 2011, the Regional Innovation Cluster Initiative announced the Jobs and Innovation Accelerator Challenge (http://www.eda.gov/challenges/jobsaccelerator/), both intended specifically to fund the creation of innovation clusters to accelerate technology commercialization, new venture formation, job creation, and economic growth across the United States. The challenges have now funded more than thirty regional projects ranging from aerospace to food processing and, soon, education.

Innovation Clusters in Education

There are many opportunities to leverage the concept of innovation clusters to advance research and development in education. Today, basic research in learning science is often disconnected from the practical implementation of products and services. Acquisition processes can make it difficult for new tools and approaches to be deployed in educational institutions, and limited infrastructure can stifle broad adoption. Yet developing cross-disciplinary partnerships to create an intentionally integrated innovation ecosystem could help remove the barriers that slow innovation in learning technologies. Figure 2 shows the key players of an education innovation cluster and the unique expertise each could bring to the partnership.

Education Partners could provide an environment where emerging learning technologies can be tested and new solutions can be developed with input from students and instructors. Education partners could also serve as a reality check for ideas that appear promising in theory but may be impractical to implement.

Research Partners could conduct basic and applied research related to advancing the field of learning science. They would be integrally connected to the entrepreneurial Commercial Partners to ensure effective design of learning technologies. They would also have deep relationships with the Education Partners to streamline the collection of data and outcomes to conduct ongoing evaluations of the products and approaches developed in the cluster.

Commercial Partners could exploit new technologies to scale and bring to market applied research that addresses Education Partners’ needs. They could also provide investment capital to accelerate the commercialization of intellectual property and increase the probability of success of new enterprises built on the knowledge and solutions generated in the cluster. The quality and relevance of products would greatly improve with consistent access to the Education and Research Partners in the cluster.

In combination with a supportive regulatory and funding context, education innovation clusters have the potential to lead the nation in the creation of new knowledge, tools, and approaches.

Elements of an Education Innovation Cluster

Although the focus and structure of education innovation clusters could vary from region to region, the following are some elements that will likely be a part of an effective cluster:

- **Innovative Schools and Learning Environments.** Are there schools with the flexibility and infrastructure to implement new technologies? Are there schools that are instrumented to capture process and performance data?
- **Research Centers.** Is there capacity to conduct and synthesize basic and applied research and ongoing...
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evaluation of solutions as they are developed and scaled? Will researchers have access to developers to help transfer and scale solutions?

- **Entrepreneur Supports.** Are there startup supports to help entrepreneurs launch and scale? Will new entrepreneurs and developers have access to researchers and test-bed sites, with students and educators for feedback?
- **Design Centers.** Is there a design center to support researchers and entrepreneurs with the best-known practices in human-centered design?
- **Knowledge-Sharing Platforms and Practices.** Are there processes and tools in place to share knowledge and resources among regional partners and with others?
- **Common Metrics and Ongoing Evaluation.** Is there capacity to perform ongoing evaluation of the effectiveness of the cluster based on data captured from the learning environment? Are there common performance metrics across the cluster?
- **Financial Support and Interest.** Is philanthropic or government funding available to support the cluster? Is investment capital available to support innovations?
- **Next-Generation Schools of Education.** Are there schools of education within the region that are preparing educators and scholars to implement and contribute to the new knowledge and solutions emerging from the cluster?

**Innovation Clusters in Action**

Education innovation clusters are not just a theoretical hope for the future. A number of forward-leaning regions across the country are already beginning to form clusters, modeled after the same principles that led to BioSTL. For example, Pittsburgh has created an innovation cluster—initiated by the Grable Foundation (http://www.grablefdn.org) and supported by the Sprout Fund (http://www.sproutfund.org), with partnerships between local foundations and Carnegie Mellon University—to support the local entrepreneurial community through business incubators, catalytic grants, and knowledge sharing. Los Angeles is advancing science, technology, engineering, and mathematics (STEM) education. This cluster includes partnerships between six research centers at the University of Southern California and the L.A. Unified School District, with a focus on implementing and evaluating new ideas in public, urban school systems. Phoenix boasts Arizona State University’s SkySong innovation center (http://www.skysongcenter.com)—collaborating commercial office space, incubator space, the Venture Catalyst program, and ASU staff. SkySong accelerates innovation by facilitating partnerships between ASU’s Learning Sciences Institute, the Mary Lou Fulton Teachers College, and local entrepreneurs.

In July 2012, the University of Pennsylvania Graduate School of Education hosted a convening of leaders from thirteen regions from across the country, all of whom were at various stages of implementing an education innovation cluster. The goal of the convening was to share best practices and to help create not only regional partnerships but also a national network of innovation clusters, so that different regions can begin leveraging each other’s strengths. By coordinating their innovation efforts at both a regional and a national level, clusters can accelerate the development of the new tools and technologies needed to educate the next generation of tech-savvy and highly connected learners.

**Open Data: Learning from Health Care**

Another approach to accelerating innovation comes through “opening up” new types of data. For example, Hudson began to notice a troublesome pattern: patients didn’t have the right information about their health care at the right time to make informed decisions. This led to increased costs and inefficiencies and in some cases even cost the patients their lives. Hudson and a partner ER doctor, Wayne Guerra, decided to create a smartphone app to help patients connect to the right medical provider at the right time. They were able to build a tool that aligns patient needs with the right provider by leveraging open-source data from the U.S. Department of Health and Human Services. These open data sets—including clinical information and data on providers, federally qualified health centers, and mental health/substance abuse—fueled the creation in 2008 of the app iTriage, which helps millions of people reach the right provider. As Hudson puts it, in twenty years he and Guerra took care of 50,000 patients as ER doctors, but in only three years they served 7 million patients through their app. The flow of open data that led to the creation of Hudson’s app became the fuel that propelled the creation of an entire new industry of tools and services for helping people make better decisions about their health.
Less downtime, more learning—that’s the big picture. Delivering reliable, high-quality projector solutions for higher education is how we’re engineering a better world.

panasonic.com/education-technology
Open Data in Education

Educational choices have a lifelong impact. In addition, education is one of the most significant investments many families ever make—and therefore deserves all of the tools and supports possible to ensure informed decisions. Following the model of health care, “opening up” educational data could accelerate the innovation of tools and services to help students, their families, faculty, and institutions. Recently the U.S. Department of Education launched education.data.gov—a website hosting more than 200 educational data sets ranging from school performance data to the actual costs of college to the amount of Pell Grant money institutions receive. Additional data sets are being added to education.data.gov on a regular basis, and an invitation to help prioritize which data sets should be opened has been posted on the department’s website.

Open educational data sets are not limited to federal government data. The folks at Noodle have been compiling nearly 150 advanced programming interfaces (APIs) for connecting to sets of educational data created by the private sector and nonprofit organizations (http://www.noodle.org/best-education-APIs). Examples include data from a comprehensive chemical database, museum mapping data, and multilingual dictionary definitions. Open data sets, whether from the federal government or private-sector organizations, can fuel the creation of tools that help learners make the right educational decisions and prepare them for the next learning endeavor.

MyData and Personal Learning Profiles

Opening up data about student enrollment, matriculation rates, and school achievement is essential to monitoring school performance and visualizing trends. However, in order for innovation in education to accelerate, the future of open educational data must go beyond highly-sanitized aggregated data sets to also include data about educational resources (where digital content is located and how it is being used) and individual students’ competencies (securely provided to the learners themselves) in standard formats.

One of the most significant elements of open educational data is the ability to empower students with their own information. Currently, data about learners is spread across a variety of systems at various institutions. Students can often see their data online but may have no option to take it with them, out of the system. The MyData initiative—a collaborative effort between the U.S. Department of Education and software developers—allows students to export all of their personal data in open machine-readable formats from any system. By clicking a MyData button, students can securely download copies of their transcripts, course grades, and/or demonstrated competencies. This approach is similar to the Department of Veteran Affairs Blue Button initiative, which gave more than one million veterans access to their own health care records. The federal student financial aid systems (the Free Application for Federal Student Aid and the National Student Loan Data System) will soon have MyData buttons, allowing students to securely export their financial aid information as well. Students can use the data to create a personal learning profile—an educational portfolio for their own records. They can then choose to share pieces of their learning profile with an ever-growing network of applications being built by the private sector to help students make better choices about which classes to take, which colleges to attend, and how to pay for tuition.

Opening New Doors with Open Badges

Another type of open data involves tracking individual learners’ competencies in a variety of skill areas. Until now, it has been difficult to track students’ experience or employees’ on-the-job work skills or military veterans’ years of practical experience in the field in a common way. Sharing information about learner/worker competencies could help job-seekers find the right job and could potentially lower college costs by reducing time to completion.

The Open Badge Infrastructure (OBI) addresses this problem by creating a common format for storing data about a learner’s competencies as a series of badges (http://www.openbadges.org). Industry organizations, such as the Manufacturing Institute, have already begun working with colleges to award badges to students who demonstrate proficiency in specific competencies. A student can earn a badge for a particular competency by demonstrating prior experience or can sign up for courses in order to reach mastery in that skill.

Because the technology behind describing the badges is open, a learner can collect badges from any number of different organizations and showcase them in one place. Eventually, employers may be able to use open badges to find new employees based on specific competencies, leveling the playing field for
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Because the technology behind describing the badges is open, a learner can collect badges from any number of different organizations and showcase them in one place.

Data about the Best Learning Resources
Educational materials are not one-size-fits-all, and new innovations in both the types of educational resources that are available and the ways that instructors can find this content are helping to empower more effective learning experiences. Finding commercially licensed and open educational resources (materials that reside in the public domain or have been released under a license that permits sharing or repurposing) aligned to specific curricular standards can be challenging. The Learning Registry (http://www.learningregistry.org) is a directory that collects information about the location, ratings, and curricular alignment of digital learning content. Publishers can add information about their content to the registry, and as with all other types of open data, developers can create tools and services based on the data. Although the registry is still in its infancy, it currently has tools for users to post resources via a Chrome Browser plugin and/or to explore the available resources with a visual browser. Because the Learning Registry infrastructure is open source, anyone can push new content, display its content, and/or build additional tools on top of it, resulting in an entire ecosystem of applications focused on creating and surfacing the very best in educational resources for every learner.

Datapalooza
Opening up educational data becomes meaningful for students, parents, and faculty only when talented developers use the data to create practical tools and services. To encourage the creation of these new products, the U.S. Department of Education and the White House Office of Science and Technology Policy hosted an “Education Datapalooza” in the fall of 2012. The event brought together educational technology experts and entrepreneurs, policymakers, companies, and community advocates with a focus on showcasing and developing new web-based and mobile services leveraging open data. It highlighted many of the innovations that are being developed using open educational data and encouraged new entrepreneurs and developers to add their talents to the effort of accelerating educational innovation through technology.

Final Thoughts
In 2010, President Barack Obama challenged the nation to once again lead the world in college graduation rates by 2020. Strengthening education in the United States helps ensure the country’s future economic stability, worldwide competitiveness, and national security. However, meeting that goal depends on our ability to accelerate innovation in education and develop the technologies that support learning. Other industries that have successfully accelerated the pace of innovation can serve as a guide. Innovation clusters and open data initiatives are two approaches that hold great potential for education. By implementing these approaches while simultaneously leveraging exponential advances in technology and improved infrastructure, we can create truly transformative, innovative learning environments.

Notes

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Richard Culatta is the Deputy Director of the Office of Educational Technology at the U.S. Department of Education.
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Department of Fisheries and Allied Aquaculture, Auburn University
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Transforming the Student Experience

By Mary Jo Bitner, Amy L. Ostrom, and Kevin A. Burkhard

There is much discussion today about the need to transform higher education for the benefit of students, employers, and society at large. Experts and researchers list the numerous challenges: low student retention and graduation rates, the increasing cost of higher education, and concerns that graduates don't possess the skills required to compete successfully in today's interconnected, global marketplace. For example, less than 60 percent of students who enter four-year institutions in the United States earn a degree within six years. In addition to the time burden, college can be a financial burden for all types of students and their families. Those graduating in 2009 had, on average, student loan debt totaling $24,000.1
Although recent research provides evidence of the positive outcomes, financial and otherwise, that come from earning a college degree, other evidence suggests that a substantial number of students are not making sufficient gains in fundamental skills such as critical thinking and written communication while in college. Further, some of the cross-disciplinary skills and knowledge demanded in today’s economy are often missing in traditional, discipline-based degree programs. This may leave many students who do complete degrees without the skills necessary to compete successfully for jobs upon graduation and in the future.

These are just a few of the issues that point to the need for new thinking and innovative approaches in higher education. Clearly, technology can be used strategically to aid in finding solutions to these critical challenges. Yet technology alone is not the answer. We believe that technology must be used strategically to support a service-oriented view of higher education—one that has student, employer, and societal goals at its center. Although these challenges and goals are complex, one key to addressing them is to focus squarely on the student experience as a way of creating value for all stakeholders. The use of service design techniques—in particular, service blueprinting—can support this service view and aid in innovating and transforming the student experience within higher education.

By “transforming the student experience,” we mean improving or innovating the student experience in ways that significantly benefit the individual student, the collective (e.g., families, groups, cities), and/or society at large. “Student experience” is a broad term that encompasses various types, including the entire higher education experience, spanning many years and multiple institutions; or a student’s experience within a single course offering or degree program; or one or all of the student services that surround the higher education experience (e.g., financial aid, degree-completion tracking, housing, health and wellness, and other related experiences). Viewed at the highest level of abstraction, the total, end-to-end student experience encompasses all of these interrelated services and the entities that provide them. Any effort to transform the student experience thus involves the challenge of multiple goals, and sometimes conflicting motivations and incentives, within the system, as well as the complex needs and demands of multiple stakeholders, including individual students, families, employers, government officials, other funding entities, policy-makers, and faculty and other experts. Yet if the student and his or her success is not the primary focus, none of these other higher-level goals or objectives can even begin to be achieved.

In this article, we draw from our earlier report published by the Center for American Progress. We explore the transformative power of viewing higher education and the student experience through a service lens and explain and provide an example of how service blueprinting, a simple but powerful service design technique, can be used to transform student experiences in higher education. Throughout, the strategic role of technology in transforming student experiences is emphasized.

A service lens puts the consumer at the center of improvement and innovation initiatives and considers the consumer’s experience to be a foundation for analyzing and making enhancements.
You spent all morning going from office to office trying to locate Jessica’s student file to make sure her transfer paperwork is processed before the Friday deadline. Mrs. Jenkins has already called twice this week to remind you that her daughter is moving into her dorm room on Saturday. The project you planned to work on today will have to wait, because how is Jessica supposed to enroll if you don’t find that file in the next 24 hours?

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Viewing higher education through a service lens represents a significant shift. It takes us from the idea of students navigating an often complex and fragmented higher education system to earn or receive a degree and moves us toward the idea of the higher education system being integrated and aligned to deliver the best experience for its students, allowing them to co-create outcomes that will benefit them for life. To move in this direction, higher education institutions must apply the tools and techniques that have been shown to facilitate consumer-focused improvement and innovation. In the use of these tools and techniques, the role of technology emerges as a strategic support and transformative resource rather than as an answer in and of itself.

**Service Blueprinting: A Technique for Innovation**

One specific technique is service blueprinting, which facilitates collaboration among key contributors and stakeholders across a broad customer experience to create a visual depiction, or blueprint, of a service. Service blueprints are typically created by cross-functional teams of individuals who have knowledge and awareness of the focal service process. Whether service blueprinting is being used to examine existing services or to develop new ones, the discussions that occur during these sessions have the potential to improve services or conceptualize services in new and important ways?

Service blueprinting is a simple-to-learn “process modeling” approach. It involves bringing contributors and stakeholders from potentially diverse groups within the organization together in a room around a common, externally focused process to discuss how the organization is delivering and should deliver, its services. The outcome of this collaborative process is the creation of a visual depiction or map of the service that highlights steps in the process, points of contact that take place between consumers and employees and among employees, and physical evidence of the quality of the service that exists from the customer’s point of view. The key distinction between service blueprinting and other process mapping techniques is its anchoring on the consumer and his or her experience over time.

Figure 1 shows the typical components of a blueprint and their definitions, along with the lines that separate them.

On a service blueprint, the consumer’s experience is shown across the top of the blueprint as the experience occurs, chronologically through time, and from the consumer’s perspective. All of the activities and interactions that support and help to co-create the consumer's experience are shown in rows below, with vertical connections showing the relationships to the consumer experience.

For ease of understanding, we present a simplified service blueprint of an overnight hotel stay in Figure 2 to highlight the outcome of using this technique. Although a blueprint of a hotel stay could go into significantly more detail at every level, this example demonstrates how a

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**FIGURE 1. Service Blueprint Components and Definitions**

<table>
<thead>
<tr>
<th>PHYSICAL EVIDENCE</th>
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<tbody>
<tr>
<td><strong>DEFINITION:</strong> All tangibles that customers come in contact with during the service experience that impact their customer quality perceptions.</td>
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<table>
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<tr>
<th>CUSTOMER ACTIONS</th>
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<tbody>
<tr>
<td><strong>DEFINITION:</strong> All steps that customers take or experience as part of the service being examined.</td>
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<table>
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<tr>
<th>LINE OF INTERACTION</th>
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<tbody>
<tr>
<td><strong>“ONSTAGE” TECHNOLOGY ACTIONS</strong></td>
</tr>
<tr>
<td><strong>DEFINITION:</strong> The actions by customer-facing technology (e.g., websites, automated telephone systems, kiosks) that customers experience as part of the service.</td>
</tr>
</tbody>
</table>

| “ONSTAGE” CONTACT EMPLOYEE ACTIONS |
| **DEFINITION:** The contact employee actions that involve face-to-face interactions with customers. |

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<tbody>
<tr>
<td><strong>“BACKSTAGE” CONTACT EMPLOYEE ACTIONS</strong></td>
</tr>
<tr>
<td><strong>DEFINITION:</strong> Other contact employee actions (not involving face-to-face customer interactions) including email and telephone contact with customers, preparation work, and any activities that facilitate the service process.</td>
</tr>
</tbody>
</table>

| LINE OF INTERNAL INTERACTION |
| **SUPPORT PROCESSES** |
| **DEFINITION:** Activities that facilitate the service and are done by individuals who are not contact employees. This also includes technology-based and other systems that are needed for the service to be delivered. |
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Figure 2. Service Blueprint of Overnight Hotel Stay

The role of technology as a delivery and support element of the service is clearly apparent in the row labeled “Onstage Technology Actions” and also as a support element in the row labeled “Support Processes.” In the hotel blueprint, onstage technology actions include providing a selection of movies for guests and processing their check-out information remotely through the TV screen. Registration system technology appears in the support processes row. In a higher education context, the onstage technology actions row of the blueprint would include technology that the student directly interacts with, such as the online interactive registration system and course-delivery websites. The support processes row of the blueprint would include critical technology support elements such as the student registration system, degree tracking systems, admissions support, and the institution’s IT support group.

Service blueprinting can help college and university leaders and employees to redesign, reinvent, and reimagine their educational offerings and service processes from the student's point of view. Although there are many initiatives focused on improving higher education, it is important to ask whether the proposed changes will improve or worsen the student experience and student outcomes. Do the changes eliminate current “pain points,” those moments that customers or employees perceive to be annoying, challenging, or dissatisfying, or do the changes create new pain points? Do the changes lead to innovative and sustainable educational models, or do they just reinforce the existing ones? Do multiple initiatives work at cross-purposes, not in alignment with the student experience? Could further discussion and insights with stakeholders help improve how the problems and proposed changes are conceptualized or implemented? Often these questions are not considered as they cut across the organization, and venues or techniques are not readily in place to address them. We believe that service blueprinting is a technique that can support the answers to these types of questions.

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Service blueprinting can be used to transform a traditional course to an online offering while simultaneously enhancing efficiencies, the student experience, and student learning outcomes. At Arizona State University (ASU), computer literacy had traditionally been taught in large lecture sections in which all students, no matter their individual starting point or need, experienced the course in exactly the same way. During a major redesign initiative, the course was transformed from this traditional large-lecture format to a hybrid and online course that could accommodate the diversity among students as well as create efficiencies for students, teaching assistants, and the faculty member teaching the course. The catalyst for the redesign was the belief that both the content and the delivery method for the course were outdated. For example, creating an interactive learning environment for students in a large lecture hall is difficult; thus, the student experience and learning opportunities were compromised. Other pain points addressed in the redesign included the time spent collecting and distributing hard copies of assignments, an activity considered by many to be a waste of class time. The challenges related to coordinating computer lab time for hundreds of students were also addressed. Given redundancies in instructors, graduate teaching assistants, and graders, the administration felt that reduced costs could be achieved by redesigning the course. Overall, it took two years to accomplish the redesign, with the overall goal to improve learning outcomes and the student experience while reducing costs.

The redesign occurred in phases, with a pre-pilot and then a pilot of the full redesign. The faculty member in charge of the redesign followed a user-centered approach similar to the service blueprinting technique. The redesign involved looking at the process by which students and faculty best realized value and achieved their goals and approaching the end-to-end experience of the course from the student's perspective. Great attention was given to understanding the different types of students in the course and their learning preferences, their learning styles, and their learning expectations.

The final redesigned course has two versions: a completely online class, with one section that can serve approximately 500 students; and two hybrid sections that each have the capacity to serve approximately 300 students who meet once a week face-to-face, with other elements of the course occurring online. In both versions, 100 percent of assignments are turned in online, which removed one of the traditional course problem areas. All the sections are taught by one faculty member or course coordinator, with one teaching assistant. One benefit of the redesign is that all sections of the course use the same course-delivery website. On the first day of class, hybrid students are told that all the course material is available online and that coming to class is optional. Typically, the number of students coming to each meeting dwindles over time, with just the ones needing help attending regularly. This allows the faculty member to tailor the discussion and give more personalized attention to those students who need the most help. All the material for the entire course is available at the start of the semester, so high-speed learners can complete the course more rapidly than those who require more time to get comfortable with the material. The redesigned course has more sophisticated content but also makes it easier for students to get help. Students complete nine online quizzes that demonstrate their understanding of computing concepts, seven self-guided learning assignments in which they are asked to apply computing concepts as well as computer-driven problem-solving techniques, and four major projects that require substantial inquiry. Based on each student's preference, the students are given scheduled times to receive guidance in the computer lab, reducing and in many instances eliminating wait times.

A number of positive outcomes emerged from the student-focused redesign. First there was an increase in student success. Although the redesigned course provided more challenging
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content, 65 percent of its students earned grades of 70 percent or higher, compared with 26 percent of students in the traditional course. Student satisfaction with the course also improved. In addition, the course cost per student decreased from $50 to $28, due to the need for fewer faculty members and graders. This brief example clearly illustrates how consumer-centered techniques that focus on the student experience and goals can help direct a major change initiative. The result was greater value and a better experience for the student, lower costs for the institution, and greater productivity for both students and faculty.

While this specific example illustrates the power of a student-centric view in transforming one course, the beauty of blueprinting is that it can be applied broadly to help rethink and invent service processes throughout higher education institutions. It can be applied to academic processes, such as the online course just described, or nonacademic support services, such as advising, housing, and even parking. At ASU, the technique is being used to blueprint the parking experience, the admissions experience, the orientation experience, and other student activities. The technique can be used to examine micro processes delivered by and contributed to by a small number of departments or units. It can also be used to examine macro processes that involve many departments, groups, and functional areas—for example, a student billing experience that cuts across admissions, financial aid, scholarships, and housing. The technique could even be used for services that involve other campuses or private companies—for example, developing new collaborative degree programs across institutions. Blueprinting can focus on existing customer-facing processes or offerings as well as on service processes or offerings that are being put into place for the first time. (Although our focus here is on the student experience, service blueprinting can also be used internally within an institution for services provided by one unit to another, where the customer is the internal client or unit.)

Figure 3 highlights examples of how the technique can be used. The placement of any particular process along the micro-macro process continuum is influenced by how many groups, departments, and people contribute to a service and need to provide their expertise in blueprinting efforts. This is likely to differ by institution. When private companies or other institutions are brought in as collaborators, this in and of itself can make the process more macro in focus. Similarly, the service improvement versus service innovation placement on the continuum depends on whether or not an institution has the process of interest already in place. If it does, the blueprinting focus will likely be on service improvement. However, even with a process in place, a radical change may be deemed necessary, in which case the blueprinting efforts would be framed further toward service innovation on the continuum.

**Technology’s Role in Transforming the Student Experience**

Throughout this article, the strategic role of technology and its potential to aid in the transformation of higher education and the student experience has been emphasized. Yet clearly, it is not technology itself that is transformative. Rather, viewing higher education through a service lens and using integrative, student-focused techniques, such as service blueprinting, are what can help organizations come up with transformative initiatives. Infusing technology into these initiatives then becomes obvious and necessary. The example of transforming the online course experience is illustrative. In that case, technology was the centerpiece of the innovation. But again, it was not the technology per se that resulted in the success but, rather, the way in which the technology was used strategically to solve a problem.

We see a critical need for technology to aid in the strategic transformation of higher education through major innovations and significant service improvements. The explosion in online education is one important arena. Through online programs and other innovative and forward-thinking initiatives, higher education will become more accessible and relevant to greater numbers of learners in wider geographic areas over time. Further, the productivity increases that result for both faculty and students in well-designed online programs are apparent and valuable. Still, their design and delivery is not always optimal. This is where blueprinting can
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help. Blueprinting a new or existing online opportunity can shed light on the flow of activities, interconnections, pain points, and opportunities for co-creation in these new offerings, making them more successful.

Beyond innovative new offerings that can transform the student experience, technology is being infused into institutional support systems in ways that can enhance experiences outside of class and increase student productivity. Most colleges and universities today have technology-based systems for tracking student assignments, degree progress, and financial matters, among other services. These systems, when done well, greatly increase students’ productivity and remove roadblocks and barriers that can get in the way of their educational goals. However, as with online education, the design and delivery of these systems is not always optimal, nor do related units on campus always work well together to create seamless experiences. Blueprinting is a technique that can help to highlight the pain points in these types of processes and bring together the right groups from across the institution to make improvements in the internal support structures—or even to come up with totally new models of service.

Conclusion
From the perspective of employers, communities, and society at large, transforming the student experience should, in theory, be good for all. If students have greater access, are more productive, have improved experiences throughout their education, and are better able to successfully co-create their learning, everyone should benefit. Using a service lens to view higher education allows us to put the student at the center and to consider higher education as a co-created set of activities and experiences that have value only in their use over time. The specific design and innovation technique of service blueprinting is valuable for illustrating the student experience and for bringing the right parties together to support the innovation and improve the existing services that can transform higher education. Blueprinting is easily learned and is applicable across all types of services within higher education. Through the application of this technique, the strategic importance of technology immediately becomes apparent. Technology serves as an innovative way to deliver and also support the student experience. Using service blueprinting to strategically integrate technology into institutional processes and offerings will lead, ultimately, to transforming the student experience.

Notes
8. The course, Computer Literacy (CSE 180), was redesigned at ASU by Toni Farley, a post-doctoral fellow at the Translational Genomics Research Institute (TGen) and former lecturer in the School of Computing, Informatics and Decision Systems Engineering and the School of Letters and Sciences at ASU. A discussion of this redesign was also presented in Anya Kamenez, DIY Ed: Edupunks, Edupreneurs, and the Coming Transformation of Higher Education (White River Junction, VT: Chelsea Green Publishing, 2010).
9. Information about CSE 180 as it was delivered before the redesign, as well as information about the redesign and the outcomes that were observed, was provided by Toni Farley through discussions and from presentation materials including those from the 2009 Redesign Alliance Conference in Orlando, Florida.
10. Similar outcomes have been found by the Program in Course Redesign managed by the Center for Academic Transformation; see Carol A. Twigg, “Improving Learning and Reducing Costs: New Models for Online Learning,” EDUCAUSE Review, vol. 38, no. 5 (September–October 2003), pp. 28–38, http://net.educause.edu/ir/library/pdf/ERM0352.pdf.

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Higher education is being reshaped little by little every day. Slowly but surely, from the smallest community colleges to the teaching institutions to the most prestigious research universities, a new set of key performance indicators (KPIs) is transforming what excellence means in higher education. For developed and emerging market nations globally, higher education creates both an informed citizenry and a high-skill workforce, but how that is achieved is being transformed. What is not changing is the fact that higher education opens up new opportunities in a knowledge-driven global economy. It is what parents want for their children, as well as what professionals want for themselves as lifelong learners with growing career aspirations. So how can institutions compete on the global stage of higher education? Through service science, the emerging science that studies value co-creation in complex systems and proven innovation techniques already being used in other industries.
Service science can provide perspective on the forces reshaping higher education today. From online service offerings to self-service technologies to global brands establishing local franchises, these basic forces are transforming whole industries and are being studied by service scientists. Higher education is not the first industry to feel the tug of these forces, nor will it be the last, with finance, health care, and government on the horizon and with retail, media, manufacturing, and agriculture industries well down the road of 21st-century transformation in the age of global sourcing, cloud computing, and the “Internet of Things.” In finance, for example, brilliant hedge-fund entrepreneurs already control sophisticated data centers with faster, better algorithms that can outwit casual day-traders many times a day. New laws and regulations will eventually constrain some of these financial creations; although they help some customers when applied at a small scale, they border on being unsustainable or even unethical at a large scale (e.g., sub-prime mortgages, shady student-loan practices). Scale matters in service science, and boom-and-bust cycles are one indication that the individuals and institutions of society are on a steep learning curve toward discovering scale effects and how best to control them. Policymakers are learning to replace constants with variables, and this will change everything—as computer scientists and systems scientists already know.

**Understanding Service Science**

The standard definition of service has been revised in the last few decades by disciplines including economics, marketing, operations, industrial and systems engineering, and computer science. In fact, service is so ubiquitous that it can be a bit hard to define precisely. Nevertheless, for our purposes in this article, service phenomena are observed in everyday life as the application of knowledge and resources for the benefit of others. The more that two diverse, resource-rich actors know about each other and the world, the more likely it is that they can find a way to be greater than the sum of their parts through service-for-service interactions. Service science is the emerging study of service in society, with a focus on the dynamic configurations of knowledge and resources embodied in or associated with diverse actors—known more precisely as service system entities.

Service science studies the dynamic configuration of knowledge and resources in people, businesses, universities, hospitals, cities, states, and nations. All such actors are capable of service-for-service exchange and can be viewed as interacting entities with knowledge and resources as well as with rights and responsibilities that are governed by norms and laws in a society. In fact, society can be viewed as an ecology of nested, networked entities interconnected and held together by trust in value propositions that apply knowledge and resources for mutual benefits—held together, in fact, by the force of sustainable service-for-service interaction patterns between specialized actors.

Diversity helps these actors learn from each other and ratchet up overall capabilities over time, due to improved technology (infrastructure), skills (individuals), rules (institutions), and goals (shared narratives about quality-of-life aspirations in a culture).

Service science offers a fresh perspective on the challenges faced by higher education. In a sense, service science is the emerging science of win-win. Diverse stakeholders (students, parents, faculty, deans, mayors, politicians, business owners) interact using traditional value proposition, or win-win, means, until—and this is very important—those value propositions no longer work or are disrupted by alternative arrangements and configurations of actors, knowledge, and resources. Also, mutual benefits or win-win outcomes can be surprisingly challenging to achieve when the value of knowledge and resources possessed by actors is changing and fluctuating at an accelerating pace. For universities, traditional win-win relationships between stakeholders are under stress or are breaking down.

But we are getting ahead of ourselves. Why is service science called service science and not something like geographic knowledge-value science or spatial mutual-benefits science or even simply win-win science? The name comes from the rapid growth of scientific approaches to service innovation in business and society and the need for ever more of these scientific approaches to address national and global challenges in finance, education, health care, government, and even the environment as a service impacted by human activity.

Business and governments are increasingly focusing on service innovation, in addition to product innovation and process innovation. Several decades ago, many economists suggested that service innovation was the “next big thing”—innovation to improve productivity, quality, and compliance in global service sourcing and provisioning. For example, recovering from a near-death blow in the early 1990s, IBM found vast growth opportunities in its service businesses as Fortune 2000 companies around the world began to outsource their IT data centers and IT help desks. Apple recovered from its
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Service innovation gives rise to many difficult research questions as well. For example, how can a society improve the productivity, quality, and compliance of finance, education, health care, and government? Service science is already being used to study and explore possible transformations of universities, precisely because universities are such important actors (stakeholders) in the national knowledge economies of today. For example, education as a service system has been re-imagined as a continuous improvement process by service scientists. Service science studies the win-win value propositions that interconnect business and societal stakeholders. If advanced technologies, in conjunction with new policies, will permit higher productivity, quality, and compliance, then it is likely that new value propositions will emerge to interconnect not only existing stakeholders but new stakeholders (new market possibilities and opportunities) as well.

Ten Reasons
Service science matters to universities for many reasons, but we will elaborate on just ten here.

1. Universities are complex service systems of fundamental importance.
Universities today can be seen as complex, adaptive service systems. Service systems are the fundamental abstraction of service science. Universities are composed of people, buildings, utilities, sports facilities, roads, and land. But universities also manage a system of service systems. Like cities, universities need to manage and provide for housing, transportation, safety, health, food, water, energy, education, and entertainment. All of these systems have a series of interactions, costs, and interdependencies. In addition, universities have a large set of stakeholders: students, parents, employers, insurance companies, financial institutions, and city, state, and federal institutions. Each stakeholder has unique dependencies on the university. And the service providers at the university—faculty, administrators, state governments, food service providers, etc.—are all trying to gain efficiencies, cut costs, and optimize this complex set of service systems.

University service systems require smart people, technology, and business leadership. The quality of life for students depends on the quality of their education and their experiences in college. The quality of life for cities or regions depends on employment, healthy citizens, convenient modes of transportation, access to food and recreation, and the ability to find the right talent to sustain the economy and the livelihood of its citizens. Universities create the pipeline of future workers and are a major employer in a region. They are fundamental to a nation’s success and competitiveness.

2. Disciplines are infusing service innovation concepts into curriculum.
As the disciplines, so go the universities, and many disciplines are retooling around the concepts of service innovation. Economics, marketing, operations, computer science, industrial and systems engineering, design, and communications are changing rapidly with technological advances. The disciplines of communications and marketing have inalterably because of social networking, social media, and the Internet. Marketing and operations now include dealing with data, analytics, and optimizing outcomes. People and businesses are more interconnected than ever before, requiring that service science be introduced throughout every academic discipline, including manufacturing. Every business has service components such as CRM, installation services, web services, training, HR, or software as a service. Service science innovation needs to be a part of everyone’s job, as individuals specialize and find markets for their capabilities. Businesses need to be constantly innovating and
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providing the next service that no one else yet provides. In addition, these services need to employ service science concepts to be profitable and sustainable and to improve customer experiences.

3. Service science can help universities overcome discipline silos.

Service science requires interdisciplinary skills. Each actor in the service system needs to have knowledge of and an appreciation for the parts of the whole system. Service professionals must have a quadruple combination of skills: business, technology, organizational change, and culture or shared information about values and norms. Yet these are usually taught in four distinct colleges within a university: management, engineering, social sciences, and humanities and the arts. Twenty, thirty, and forty years ago, IBM hired software engineers or computer scientists to develop large-scale applications, operating systems, or middleware to sell to its clients. These individuals worked alone or in teams designing and writing code according to a set of specifications and requirements. Having good, deep computer science skills was enough; having good teaming skills was a bonus. Today, IBM hires application developers as part of its service businesses; an application developer’s talent in computer science thus needs to be blended with an understanding of a client’s business and culture and of the culture of the client’s customers. Today’s application developers work on the client’s premises: they need to understand the client’s business model, pricing model, processes, supply chain, and more.

Service science in universities likewise requires this interdisciplinary set of skills, so that universities can tear down the existing walls that silo knowledge among separate colleges. Faculty need to work together, and degree programs need to span the silos. Students from multiple disciplines need to work together and appreciate the variety of skills that make services work. Some call this the new liberal arts, and some call this waking up to the elephant in the room.12

4. University-based startups are often new types of online service.

The key performance indicators (KPI) of universities are changing. Increasingly, these KPIs include measures of entrepreneurship among students and the number of startups and regional jobs being created.13 Kickstarter (http://www.kickstarter.com/) can be viewed as an online crowd-funding service business, catalyzing thousands of other online service businesses. Online student competitions are becoming more common as a way for students to learn and launch their own businesses. For example, students are learning to create apps for smartphones in a growing number of global competitions, often sponsored by industry and judged by members of national academies of science, engineering, and medicine. Yahoo!, Google, Facebook, and more iconic online service businesses were created by university students and in less than a decade were used by millions of customers worldwide. The ability to rapidly scale and use an advertising business model attracts students to experiment with new online service offerings. Rather than creating intellectual property or new technologies and licensing them immediately to big businesses, students and faculty can today create companies that leverage online or 3D printing to create service businesses with real customers. They can then grow these businesses and realize even greater rewards by merging with other small businesses; when they become large enough, they can exit by being acquired by a large business. In fact, large global businesses offer incentives for universities to adopt their platforms, and they help university businesses improve and grow (e.g., IBM Smart Camps).

5. Professional associations are adding service science SIGs.

As disciplines infuse service innovation concepts into curriculum, the professional associations associated with those disciplines are adding special interest groups (SIGs), conferences, and journals related to service science.14 For example, the Services SIG (SERVSIG) serves American Marketing Association academics who are interested in services research. The journal IEEE Transactions on Services Computing (TSC) focuses on research on the algorithmic, mathematical, statistical, and computational methods that are central in services computing. The Institute for Operations Research and the Management Sciences (INFORMS) has a Section on Service Science to promote and disseminate research and applications among professionals interested in theory, methodologies, and applications in service science, engineering, and practice and to provide a forum for the exchange of new ideas. The Production and Operation Management Society (POMS) College of Service Operations has held twelve International Research Symposiums on Service Excellence in Management. The IT Service Management Forum (itSMF) is an internationally recognized forum for IT service management professionals worldwide. The Technology Services Industry Association (TSIA) provides benchmarking and research, peer networking and learning opportunities, and certification and awards programs. The growth of service science research is also evidenced by the number of papers presented at conferences such as the annual Frontiers in Service Conference and the biennial Naples Forum on Service, as well as many others.

6. Cities, home to most universities, are complex service systems.

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land area of cities. Nevertheless, universities are vital to local economies and frequently are listed in the top 10 percent of largest employers of knowledge workers in a region. Universities with hospitals or medical centers are often the largest employer in a city. Some “university towns” include students on governing bodies of the cities. Universities model a city’s complex system of service systems; as mentioned earlier, both have to deal with residents, transportation, energy, food, water, finance, and health care. Universities can help cities improve operations by experimenting with new or improved services on their campus systems. Universities can be living laboratories for making city improvements by conducting research and experiments on the interaction of service systems—for example, on how transportation modes (walking, biking, bus, car) affect student (citizen) health and obesity or on how water and energy can be conserved to save money, reduce waste, increase productivity, and improve health. What works well for the university will likely work well for the city. Students working on these service systems at their university will make an exceptional future workforce for their cities.

7. Service failures can be costly and can derail the careers of students.

Student loan debt may be the next debt bubble to disrupt the U.S. economy and, through interconnected financial service systems, wreak havoc on global markets. Sometimes service offerings are complex and do not lead to mutual benefits but, rather, are more of a trap for the unwary. Financial service failures can lead to debt burdens that diminish future opportunities for students and families. Health service failures can lead to endless paperwork, or debt burdens, and worse. Government service failures can trap future generations with unreasonable levels of debt as deficit spending bales out failed service systems. It behooves us all to make service systems work better, realizing mutual benefits for all. The view of a global knowledge economy as an ecology of evolving interconnected species (service system entities) is an increasingly important perspective for citizens of all nations. The ecology evolves as entities improve existing service offerings, create new service offerings, and reconfigure the ecology through acquisitions, divestitures, partnering, and entrepreneurial activities that create new types of service system species.

8. Service science can help universities move up in rankings.

Nearly every service system can find a ranking in which it is number one, and this is probably true of university rankings as well. Some of these rankings may become future KPIs used in university rankings globally—for example, the number of startups initiated each year, the number of start-ups that are self-sustaining and/or growing after five years, and the number of regional and global jobs created by university-based start-ups in the last decade. IBM has relationships with more than 500 universities that are working on service science curriculum and research. Service science is still relatively new, and since it spans disciplines, industries, and service systems, the service science landscape is broad and the leadership opportunities are wide open. A service-delivery center in an emerging market nation can create thousands of new high-tech jobs in just a few years, requiring local service science, analytics and big data, cloud computing, and other skills. These service-delivery centers depend on close relationships with local universities and are often the spark needed to develop both infrastructure and skills for university-based entrepreneurial activities.

9. Service science can contribute to good industry-university relations and interactions.

One of the greatest misconceptions about service science and service logic is that they deal only with so-called service businesses or direct provider-to-customer service interactions. All businesses and governments have service components. Industry interaction with faculty and students opens up opportunities for innovation and provides universities with real-world challenges that make studying much more exciting for students. We used to think of service businesses as having human-to-human interaction, but with the enormous use and acceptance of smart phones, we are seeing innovations in applications as a service and the web as a service. These are very exciting times for entrepreneurs in universities, in businesses, and in cities. Students are the future workforce, the future entrepreneurs, the future innovators. The more practical experience they have with business and industry, the faster their contributions will be for making our world a better place to live.

10. Service science can help all universities improve their service excellence “game.”

Over three decades ago, Arizona State University’s Center for Service Excellence was one of the pioneers in research and executive education related to service science; recently the Center completed an analysis of research priorities in service science. Harvard also had great pioneers, as did the University of Maryland and the Nordic School of Service Research. As more disciplines have come to adopt service innovation concepts as part of their standard curriculum, other universities have emerged as pioneers in aspects of service science related to research, education, practice, and policymaking. The growing number of service science conferences and professional association SIGs makes it easy to attend a
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service science symposium and see how service science is expanding and improving every year. Hundreds of new research projects and papers are added each year, with many being presented at the Frontiers in Service Conference or the Naples Forum on Service, to name just two. Although those who have pioneered in service science continue to innovate and add to the body of knowledge, more innovators and entrepreneurs are needed to continue this expansion, which will never be complete.

Conclusion
The observant reader will see that our ten reasons why service science matters to universities loosely correspond to civic and academic responsibilities. Diverse stakeholders make up the university innovation ecosystem. Universities as institutions have improved by co- elevating the capabilities of other stakeholders—from students who become job-seekers to faculty whose teaching or research changed the world, to local businesses looking for growth, to mayors working to improve quality-of-life for citizens, to immigrant students and faculty looking for new skills and new opportunities. Regarding careers, universities help ensure that students have the opportunity to learn disciplinary and professional skills that will prepare them for higher-value careers. Regarding teaching, universities sustain and challenge top teaching faculty to improve their skills and help more students learn. Regarding research, universities support top research faculty in conducting basic and applied research that changes the way we think about and live in our world. Regarding regionalism, universities provide the brainpower and fresh young minds needed to improve all aspects of local quality-of-life. Regarding credentials, universities empower deans to sculpt their schools of higher education to better serve the changing needs of society, including future students and faculty. Regarding entrepreneurship, universities provide staff to help faculty and students capitalize on their best ideas and turn those ideas into business or societal innovations that create real benefits for others. Regarding citizenship, universities help ensure that students have a safe place to learn critical thinking skills that prepare them to be informed citizens. Regarding opportunity, universities are local pillars and global beacons of what is possible when we improve our capabilities and learn to apply them so that people of all races, religions, and national origins

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can study and work together. Regarding culture, universities are often the homes of local galleries, museums, and concert halls that encourage the liberal arts and humanities and enrich our lives with beauty and passion in music, dance, and so much more. Regarding change, universities have always provided and today continue to provide safe haven for intellectuals and diverse revolutionaries, for those who think differently and dream of future possibilities.

Service science is not simply about the measures of productivity (providers), quality (customers), compliance (authorities), and innovation (competitors). It is also about understanding how regional ecosystems improve measures of innovativeness, equity, sustainability, and resilience. This involves a search for the forces (value propositions and governance mechanisms) and the actors (individuals and institutions) that will improve our understanding of what makes us human. By attracting and supporting the best and brightest minds, universities have let the knowledge genie out of the bottle. Universities, together with their cities and local businesses and social sector enterprises, are essential institutions in the global knowledge economy. In the words of George Bernard Shaw, history is a race between education and catastrophe. Either humanity will develop and learn service science rapidly, thereby bending the curve under our collective control, or the curve will bend and transform us.

Notes

11. IfM and IBM, “Succeeding through Service Innovation,”
16. Lella et al., “Universities as Complex Service Systems.”

18. See, for example, the Academic Ranking of World Universities website: http://www.shanghairank.com/.
20. Vargo and Lusch, “Evolving to a New Dominant Logic for Marketing.”
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The Market of Community

By Brad Wheeler and James L. Hilton

Socrates argued that the unexamined life is not worth living. For the past decade, the two of us—along with many colleagues, organizations, and commercial firms—have been immersed in the booming, buzzing confusion that is the community landscape of higher education. We have communities that build software (e.g., Jasig, Kuali, Moodle, Sakai), communities that buy together (e.g., Internet2, Net+), and communities that create services unique to the academy (e.g., Digital Preservation Network, DuraSpace, HathiTrust). Some of these communities are thriving as they solve common institutional problems, whereas some remain short of their aspirations. For others, it is still far too early to discern if they will reach critical mass and succeed.
Marketecture

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COMMUNITY
“Community”—an approach that has benefited many institutions around the world—has also been a fascinating place to dwell professionally. But as we look to the future, we find ourselves confronted by Socrates’ admonition and by the growing number of challenges in the higher education environment. The 2008–9 global financial crisis reduced public funding to colleges and universities; higher education is increasingly viewed as a privately financed good; the much-discussed student debt crisis is a continuing concern as a demographic wave has shifted public interest from education to health care and dying; and most notably, new educational models are proffering innovative and less-expensive alternatives for some types of education. Collectively, these challenges are causing major shifts in the economics of higher education.

We must find ways to be more effective in solving the problems that face us all. Communities can be an essential part of the solution. But how do we know which type of communities will provide sustainable value toward addressing these common challenges? When should we start, or end, a community? Is there an architecture that will enable the creation of strong and vibrant communities—that will provide the foundations, girders, and crossbeams to structure such communities in the marketplace of ideas? And are there times when the development of communities simply isn’t worth the hard work and effort? After all, we know that creating and growing communities requires considerable time and energy. Participants can be both passionate and fickle. The successes can be amazing, and the disappointments can be profound. Exploring the marketecture of community can help answer these questions.

**The Structure of Community**

The term community, by definition, implies more than one participant. We often use it in very broad strokes: the higher ed community, the vendor community, the library community, the open-source community, the Moodle community. But what makes a community, and what stickiness binds its participants together?

**The Partnership Imperative**

The economic and productivity challenges confronting colleges and universities (e.g., debt crisis, declining public support, flattening research investment) are on a scale that eclipses any single institution. If previous decades were defined by institutional competition over everything, the shift now is to judiciously compete in some areas (e.g., for the best students, faculty, grants) but to cooperate in other areas (e.g., for cost reduction through economies of scale, business simplification, better learner analytics, large-scale contracts and grants, alliances for local and international education). Cost and productivity pressures necessitate a new approach, and institutional success increasingly depends on picking the right set of partner institutions.

The veracity of this “shared fate” perspective is even more apparent for institutional investments in information technology. To be sure, the quality and the cost of implementing essential systems vary, but competitive advantage or even comparative advantage, the sine qua non of strategic decision-making, is rarely tied to how a utility IT system is implemented. And from an industry cost perspective, the competitive approach among institutions has failed miserably: ten years ago, Robert B. Kvavik and Richard N. Katz conservatively estimated that institutions had spent $5 billion on the first round of big-system investments.

In the absence of working together effectively with any real intentional interdependence, institutions have seen pricing and implementation costs skyrocket as each institution negotiates one-off contracts, pays consultants to help implement the vast complexity, and discovers anew the pitfalls of implementing systems in isolation. Where is the financing today to repeat the $5 billion payment for aging systems and for remedying, yet again, inefficient business processes? Benjamin Franklin may have provided sage advice for IT leaders in an era of diminished resources: “We must all hang together, or assuredly we shall all hang separately.”

**Cooperate or Collaborate?**

If these new economic conditions drive greater intentional interdependence for some kinds of IT services, then how should we work together? Though the terms cooperate and collaborate are frequently used interchangeably, they are actually useful labels for distinct motivations and behaviors.

Cooperation essentially boils down to agreeing to abide by a set of common rules or principles. Chess players cooperate around the agreed-upon rules of the game even as they compete vigorously to determine who wins. Similarly, members of Sam’s Club engage in cooperative buying when they agree to a set of membership rules that convey market advantage to the Sam’s Club wholesale buyers. At the extreme, agreeing to abide by the principle “I won’t hurt you if you won’t hurt me” is an example of cooperation. Cooperation is common, it is easily documented, and it has a long time horizon.

In contrast, collaboration requires a greater level of engagement and goal alignment. Successful collaboration involves aligning around shared objectives and actively working...
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together to pursue those objectives. Passive collaboration fails. Unbalanced collaboration, in which participants bring different expectations and relative resource commitments to the endeavor, also fails. Collaboration requires an intense and continuous focus on purpose and investment. And when priorities change, collaboration likely ends—a fact not to be mourned but simply to be recognized as part of the life cycle.

The distinction between cooperation and collaboration means that development and shared service communities can be classified into two basic types: communities of cooperation and communities of collaboration.

Communities of Cooperation. Communities of cooperation are formed around shared principles and/or shared aspirations, but individual members fundamentally retain their autonomy. User groups, professional associations, and institutional associations such as the Committee on Institutional Cooperation (CIC) are examples of cooperative communities. Similarly, Apache, Drupal, and Moodle are examples of thriving, cooperative software-development communities. In each case, the members of the community share an aspiration—for example, bringing greater efficiency to and coordination between institutions, in the case of the CIC, or improving a learning management system (LMS), in the case of Moodle—and are bound together by an emergent membership culture, agreements, and routines. Cooperative communities can last a very long time.

Communities of Collaboration. In contrast, communities of collaboration are bound together by a shared and fairly specific vision. Participants in communities of collaboration embrace intentional interdependence as instrumental to their individual success. These communities are built on principles of shared investment and coordinated action to achieve mutually desired outcomes within a known period of time. Collaborative communities require members to limit their autonomy in the interest of directed action to pursue shared goals.

Collaborative communities come in many forms. For example, multi-institution research teams assemble to compete for grants funded by the National Science Foundation (NSF) or the National Institutes of Health (NIH); the collaboration lasts only as long as the specific goals and funding are in place, though the fruits of the work and relationships may live on. Community source projects such as the Kuali Financial System are created and sustained by a charter and governance structure that explicitly sacrifices individual developer autonomy in favor of clearly specified and coordinated roles (e.g., functional council, executive board, technical council). In shared-services projects such as the recently launched Digital Preservation Network, participants trade autonomy in the interest of building a jointly owned and managed preservation network. In each case, laissez faire local activity gives way to directed, collaborative activity for a specified period of time.

Community Ingredients

Whether cooperative or collaborative, all communities are made up of several key ingredients, including goal alignment, sufficient resources, and shared values.

Goal Alignment. Communities are formed and sustained through explicit and tacit shared goals. Goals are necessarily plural, since few communities form with 100 percent buy-in to a single, unified goal. Local institutional imperatives necessarily shape the ability to invest limited time and resources. For example, HathiTrust (http://www.hathitrust.org/) was formed to serve an economic goal as a digital repository for copies of Google-scanned books that were provided to participating institutions. In the absence of the HathiTrust community, each institution would have had to invest in its own software and storage mechanisms for the extremely large digital book files. Beyond the economic argument, however, the goal of providing access to knowledge is part of the mission of colleges and universities. HathiTrust investors and participants valued a social goal via the ability to make millions of volumes of out-of-copyright works freely available to the world. Others may have valued an affiliation goal to essentially “buy an option” for the future and be part of a group of prestigious institutions.

Explicit goal clarity is sometimes illusive during community formation, however. For example, in the late 2003 formation of the Sakai Project community (http://www.sakaiproject.org), Indiana University, MIT, Stanford University, and the University of Michigan devised plans to build a community-source LMS that would be suitable for large-scale use. The institutions were well into the first year of work before one founder clarified that the institution’s real interest was to build a layer of middleware for connecting various campus tools rather than building a full-feature LMS.

Sufficient Resources. Sufficiency of resources is a second key ingredient for developing successful, thriving communities. Community resources come in many forms: volunteer talent, institutionally assigned staff who work on a community project for their day job, cash investments, in-kind resources, and/or commercial support. Sufficient investment enables stickiness and a
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The Marketecture of Community

shared belief in a community’s ability to achieve common goals. An absence of resources may prove fatal. For example, tens of thousands of open-source projects at SourceForge (http://sourceforge.net) remain stuck, if not fully abandoned, due to a lack of resources. The march of technology moves on and can ultimately render good efforts moot due to a lack of resources to advance them further.

Shared Values. Third, communities need some minimal shared values to hold them together. For example, the Kuali Foundation was formed with a shared value of “member equality” with common rights and privileges afforded to colleges, universities, and commercial firms. This value of the Kuali ecosystem is formally affirmed in the legal bylaws of the foundation, and at least one seat on the Kuali Foundation’s board of directors must be held by a commercial member elected by the members. Yet even with this “member equality” community value, there is a very strong set of shared assumptions regarding what kinds of communications are suitable over the community’s e-mail and wiki services. Commercial marketing is a community no-no, and those who step across the line get a quick reminder of the community’s values.

Software licensing is another means for a community to define and express shared values. When members of a community labor together to create software, documentation, data models, and so forth, who owns these products and under what conditions may they be used, repurposed, combined, or sold? This topic becomes particularly interesting for service-providing communities like HathiTrust, Internet2’s InCommon, or Kuali Ready. Each of these communities develops software, but members pay annual subscriptions to receive cloud-based services. Should the software also be freely available to anyone, including nonmembers, for any use? What about add-on modules developed by members of the community? Diverging views on openness, perceived fairness, profit, and control can sometimes make software licensing a proxy debate for deeper disagreements that can threaten the essential stickiness of a community.

Sustaining Collaboration and Cooperation over Time

Although cooperation and collaboration share variants of these key ingredients, changes in the blend of ingredients may lead to periods of transition during which collaborative projects become cooperative or vice-versa. Since collaborations require more effort to sustain, a shift in goal alignment, resources, or values is likely to weaken the intentional interdependence and time objectives. This may cause an intentional shift or
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natural drift to cooperation. Likewise, goals, resources, and a time imperative may create an episodic collaboration within a community of cooperation.

Consider, for example, the history of Internet2, which has gone through several distinct organizational phases. In the founding phase, it was a highly collaborative project among thirty-four research universities. These institutions joined forces for a very specific, shared strategic purpose: building a high-performance network owned by and operated for the academy. Each institution sacrificed a degree of institutional/regional network autonomy in the service of creating a shared national backbone. Their efforts were highly successful. Today Internet2 has approximately two hundred members and provides network access to thousands of institutions. Along the way, though, the intense focus on strategic alignment among a growing number of members started giving way to a more commoditized view of a general-purpose network. Internet2’s mix of key ingredients shifted from a collaborative community to more of a cooperative community. Access to a more commodity-like network trumped the initial goal for research-enabling performance as more members with less-specialized needs joined. Their goals put pressure on Internet2 to focus less on the research side of the equation and more on the customer service and cost reduction side of the equation. Eventually, the tension became so strong that a subgroup of universities formed National LambdaRail (with Internet2 as a member) as a new collaboration with a shared goal to return to a focus on an alternative high-performance network for advanced research uses. That move led to an intense period of self-examination within Internet2 and its research university members, eventually resulting in a new governance structure that again placed a premium on collaboration around a shared strategic purpose for advanced networking. This is evidenced in the recent announcements about the Innovation Platform with 100 Gigabit services. Even though Internet2 continues to serve many customers, it is governed by the research-intensive universities and their shared strategic priorities.

Likewise, the Sakai Project was officially launched in early 2004 with a $6 million collective investment from four institutions and a grant from the Andrew W. Mellon Foundation. That collaboration grew to more than one hundred
institutions as the software matured with known and committed resources. In more recent years, the community has continued to develop the software through a cooperative community with episodic bursts of pooled investment and shared goals for periodic enhancements.

Since collaboration requires continually aligning and investing around ever-evolving, shared strategic goals, collaborative communities are naturally more rare and more transient than cooperative communities. Collaborations last only as long as the trade-off between autonomy and collective action pays off for the community members. A change in goals or vision among the members of a collaborative community can easily shift behaviors to cooperation—or even to dissolution. This is neither tragic nor unexpected but is, rather, a natural part of the life-cycle of collaboration.

In sum, the economic challenges facing higher education necessitate that institutions work together to obtain benefits that are available only at the scale of multi-institutional engagements. Communities of cooperation and communities of collaboration provide two distinct means to achieve those goals.

**The Marketecture Matrix**

What makes community approaches unique from other choices, and how might institutions best assess which approach is right for a particular need? The Marketecture Matrix (see Figure 1) can help answer those questions. The two axes, authority and influence, define four quadrants, or archetypes, with a view from the lens of an institution of higher education.

**Authority and Influence**

Oliver Williamson shared (with Elinor Ostrom) the 2009 Nobel Prize in Economics for his work in arguing that markets and ownership are alternative means to resolve conflicts. For example, if Ford needs batteries for a new model of car, it could seek those batteries from sellers that offer the particular specifications Ford requires. There would likely be negotiations regarding price, warranty, service-level agreements, liability, and similar issues. Offers to buy and offers to sell provide a means to resolve conflicts, and through negotiation in a vibrant marketplace, Ford could likely fill its need for batteries.

In contrast, Ford might decide that it needs greater control over battery design for its new model or that it needs to develop its own understanding of batteries due to their growing importance for electric vehicles. If these conflicts are not suitably resolved through the marketplace, Ford may choose to resolve them through direct ownership of a battery-production facility. It might invest resources and operate the facility on its own, or it might create a joint venture with another firm that Ford views as non-competing as a means to share some of the cost, risk, and potential reward. Direct ownership provides the authority to resolve conflicts in favor of the interests of the owners.

The horizontal axis of the Marketecture Matrix—authority—expresses Williamson’s means of resolving conflicts via (1) the decision authority of a marketplace of buyers and sellers or (2) the ownership authority of a community. A community is a means for colleges and universities to exert the privileges of ownership to resolve conflicts as they see fit. For example, Kuali participants have sometimes expressed (only jokingly) this value of collaborative communities as the golden rule: “You bring the gold, you make the rules.” In contrast, most privately owned firms that sell software and services retain the ultimate privilege of ownership. They set prices, limit use via licenses and seat counts, support costs, and choose when to drop specific products or versions of software and services to suit their goals. Ownership conveys the authority to resolve any customer or profit conflicts in their favor.

The vertical axis of the Marketecture Matrix expresses influence. Although authority can be decisive in resolving conflicts, those choices may be subject to some degree of institutional influence. For example, a multi-billion-dollar global publisher of journals may not feel much
pressure if a small, isolated campus expressed concern regarding price or technology-integration features. The same publisher may be more responsive, however, if the vast California Digital Library or the Association of Research Libraries (ARL) pushed hard for some change.

Matrix Archetypes
The four quadrants of the Marketecture Matrix present four archetypes that describe models of varied authority and influence for obtaining essential software and services. Each archetype is described below from the point of view of institutions choosing if or how to participate in a model.

Solo Contracts. Solo contracts are the most common approach to IT services. They usually follow highly familiar procurement routines within an institution, such as committee formation, Requests for Information, vendor presentations, Requests for Proposal, evaluations, two-party negotiations, contracts, and ultimate implementation and use. For many institutions, the routines of solo contracts are deeply engrained as the default way the institution solves problems for needed software or service. This quadrant provides relatively low authority to resolve conflicts in the institution's interest and also relatively low influence, since the institution is just one customer in a marketplace. This is evidenced when even very large and prestigious institutions have little-to-no ability to influence a large seller.

The distinguishing feature of this archetype is an institution's independence in designing the process, means of market engagement, timing, and ultimately in choosing to accept negotiated terms. The solo contract consumes large amounts of institutional energy and is a very expensive selling process for a firm. Its prominence is based on the belief that it will allow the institution to choose “the best” product or service for a particular need. Yet industry observers question this laborious process when it repeatedly yields different conclusions for inarguably common needs like an LMS, financial management system, or student enrollment system.

Although contracts are usually one-to-one, solo contracting can also demonstrate elements of communities. For example, Oracle/PeopleSoft has long had a vibrant and highly connected Higher Education Users Group (HEUG) that shares information and best practices and provides some influence for product direction. The stickiness of this type of community is anchored in large institutional investments in a particular product and in a desire to benefit from the experiences of others. The activities (e.g., sharing code) of those communities may be constrained under the authority of the software or service owner.

Finally, innovation may be one enduring advantage of solo contracts. When a market is immature, and conditions are not yet right for sellers or buyers to establish broad deals, one-off experiments or pioneering trials that have exceptional support from both the buyer and the seller can prove enlightening for market development. Examples include Duke University’s agreement with Apple to provide 1,650 freshmen with iPods in 2004, Arizona State University’s move of student e-mail to Google in 2006, and Indiana University’s deals with major publishers for a new e-text fee model in 2011.4 Each of these helped refine the terms for broader adoption, mimicking the wisdom of an oft-cited African proverb: “If you want to go fast, go alone. If you want to go far, go together.”

Buying Clubs. Markets are most efficient in resolving inherent buyer and seller conflicts when there are a large number of buyers, a large number of sellers, near-perfect information, and low switching costs. The seller side of many essential software systems for higher education has consolidated over the past decade and yielded fewer, stronger sellers in the market. JD Edwards and PeopleSoft are now consolidated as Oracle; Prometheus, WebCT, and Angel are now consolidated as Blackboard; Datatel and SunGard Higher Education are now Ellucian; and Addison-Wesley, Benjamin Cummings, Prentice Hall, and others are now part of Pearson.

This marketplace imbalance of fewer sellers and many buyers has motivated a range of “buying clubs” among colleges and universities to rebalance a more efficient market. Examples include the strategic procurement initiative of the Council of Australian University Directors of Information Technology (CAUDIT) and the procurement activities of the CIC. Buying clubs can also aid sellers by simplifying procedures for pricing and terms, but many Buying Clubs still use the familiar one-to-one contracting mechanism between an institution and a seller using pre-negotiated prices.

The rise of cloud computing via fast networks offers a dramatically new approach for buying clubs to function as vibrant communities while also bringing new efficiencies to both institutions and sellers. The logic and means for institutional demand aggregation for cloud computing is clear, and now Internet2’s Net+ Services (http://www.internet2.edu/netplus/) is rapidly enabling that aggregation as a new form of buying club. Notably, the contracting arrangements for Net+ align to a new logic that blends the
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The collaborative community-source model blends elements of both corporate-style software-development projects and open-source individual cooperative development.

When people talk about developing open-source code, the production method they usually have in mind is one that relies on the largely independent efforts of many developers. Just as the ultimate success of bake sales depends on the individual contributions of many cooks, open-source projects depend on individuals to volunteer their time and expertise—sometimes supported by employers—to add features and improve the software code. The work of these developers is largely self-organizing as they individually set priorities via cooperation with minimal direction. Typically, the work is submitted, and once sanctioned by some community-created governing group or individual(s), it is then included in the next release of the software, even though it may be visible and available long before it is packaged into an official release.

By design, open-source communities have both producers and consumers of software. Each community develops its own culture for goals, resources, and values. Anyone can consume (use) the software, with no engagement whatsoever with a community. Licensing rules ensure that community-work products are freely available to anyone. Some consuming institutions may additionally choose to invest as producers to further refine the software for their needs and with the hope to share their enhancements. Open-source communities have also evolved very sophisticated processes for resolving internal community conflicts (e.g., choosing which code to use in the official release or deciding when a new version will be released).

Cooperative open-source communities have a distinguished and rich history as a proven means to create, maintain, and enhance software—particularly in the lower levels of the software stack. Open-source infrastructures like Linux and Apache are widely used by both corporations and educational institutions. Open-source software is ubiquitous, and almost every institution makes some use of it. Apache, Drupal, Linux, OpenCast, and uPortal are all excellent examples of this form of open-source production.

Institutional influence in this method of production is quite low, and that includes direct management for the timing of new features to be part of an official release with the benefit of quality-assurance testing. Although a governing body may set the direction, achievement of that direction is dependent on the action of loosely coupled individuals. Indeed, the distinguishing feature of cooperative open-source communities is often, though not universally, their reliance on a meritocratic culture driven by individual software developers. Openness implies a meritocracy of ideas and code enhancements for software improvement performed by those who are most technically capable of doing so.

The cooperative open-source model works especially well when the market for the software is large, such as for infrastructure software that spans many
industries. Companies and institutions sometimes subsidize open-source software community resources by enabling paid staff to invest some or all of their time on community-directed work. Other resource investments may take the form of volunteers or commercial partnering models, such as Moodle (http://moodle.org/support/commercial/), where 10 percent of earnings are invested in sustaining the software.

Collaborative (Community Source) Communities. Some institutional needs are unique to higher education, and some serve only a small subset of institutions. For example, sophisticated research administration software to manage complex grants and repository software to enable digital preservation at libraries are not needs that span broad industries. These boutique needs, especially those with demanding timelines for essential feature releases driven by institutional compliance, may best be addressed through a community model with elements of both higher authority to resolve conflicts and higher influence to shape timely community outcomes.

The collaborative community-source model blends elements of both corporate-style software-development projects and open-source individual cooperative development. Investing institutions shape goals, resource commitments, and values through a project charter. Investors may also include corporations and individuals. Since both cooperative open-source and collaborative community-source models often share the same software licenses for intellectual property and openness of work products, the distinguishing difference is the role of influence in directing software production and community outcomes.

In collaborative communities, influence is strongly related to resource investments, but even these communities have a meritocracy of influence based on skill and expertise. That relative influence spans all roles of a project, including its executive sponsoring board, the functional experts who define a system's requirements, and the developers who use their expertise to design and code the software. The level of resource investment per institution may vary from small to large and may change over the life of a particular collaboration. For example, the Kuali Financial System was created in 2005–2009 by investments of cash and staff from six institutions and a grant. It is freely available under an open-source license, and now ten institutions and one commercial firm provide ongoing investments of cash and staff to influence the evolution of the community-owned software.

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Two obvious questions arise: Why invest in a collaborative community to pay for “free” software, and isn’t it unfair that “free riders” can use the work of paying institutions without cost? The answer to both is that communities exist and thrive because they are a means to achieve institutional goals, and influence is the goal for investors. For the eleven sustaining members of Kuali Financial, their investments represent less than they would have paid through other software models, and they gain both influence and authority. This situation is no different from when institutions pay for conducting research that may be read by others without fee. The “Tragedy of the Commons” remains a threat if everyone wants to be a free rider, but as Elinor Ostrom proved with her work (for which she shared the 2009 Nobel Prize in Economics with Oliver Williamson), communities demonstrate vibrant self-adjustment to avoid that tragedy.

Collaborative community-source production has a far greater reliance on institutional investment to influence and direct a project. This greater level of institutional resource investment means that holding the collaboration together for directed goals over a defined time period is more difficult than in models of cooperation. The value for this work of intentional interdependence involves a community-developed (e.g., broad expertise) and predictable timeline for software and service features. These collaborative communities, through their directed influence and known timelines for software or services, can be extremely valuable for institutions. But since they are harder to sustain over time than solo contracts, buying clubs, or cooperative open-source models, institutions should use prudence in choosing which of their needs merit creating and sustaining communities of collaboration.

**Straddling the Archetypes.** The world rarely fits neatly into 2x2 matrices, and the marketecture of communities is no different. The archetype quadrants define the four blends of authority and influence, but some practices straddle multiple quadrants to represent other blends. For example, a buying club of institutions might influence favorable terms for the commercial offering of software produced by an open-source and/or community-source project. For example, the community colleges in a state might create a buying club that buys a Software-as-a-Service (SaaS) version of Sakai from a commercial firm that both uses the open-source Sakai software and utilizes open-source Linux, Apache, and uPortal. In this model, the community colleges could have disproportionate influence, via their aggregation, that may also include some commercial contributions of software development as part of the communities. They buy from a marketplace of multiple commercial-support offerings, yet they have the authority of ownership of the community software should they ever need to part ways with one firm for another services provider.

**The Reality Triangle.** Institutional leaders want inexpensive projects that do everything they desire and are available yesterday. Experienced project managers know, however, that a Reality Triangle (see Figure 2) operates as an immutable law of nature in the inherent trade-offs between resources (cost), scope (features), and time: only two of the three can be controlled. For example, if an institution needs a project (e.g., software, content, system rollout, service) that does
many things (large scope) and is ready now (short time), then it has little control over cost (which will likely be high). If it needs a project very soon (short time) and very cheap (low cost), then it has little control over scope (which is likely to be small).

Interestingly, the archetypes in the Marketecture Matrix align with specific trade-offs that are well known in the Reality Triangle. For solo contracts, institutions have some control over scope/features and timing, but owners of the software and services determine the costs at which they are willing to offer those features and timing. For buying clubs, institutions have some control over timing and resources/costs, but providers—especially cloud providers—choose the features they will offer. For cooperative communities, institutions have some control over features and costs, but timing is unknown. Finally, institutions in collaborative communities, as owners with high authority and high influence, have the greatest range of choices. They can choose to invest more resources, reduce scope, or extend time, and they can make those tough choices with a full understanding of the Reality Triangle.

The Marketecture of 2020
Although the solo contract quadrant (low authority, low influence) has long dominated institutional strategy for obtaining software and services, there should

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be no single, default sourcing strategy for this decade. Many colleges and universities benefit from the growing and vast connectivity capacities of Internet2 and the Regional Optical Networks, and these networks connect institutions to new possibilities for software and off-premises cloud services via buying clubs, cooperative communities, and collaborative communities. The advantages of these refined models will quickly overwhelm the historical advantages of solo contracting for most institutions and firms.

Yet colleges and universities face great institutional inertia in adapting to models of intentional interdependence. The structure of U.S. higher education has strongly enabled the habit of “going it alone”—an independence enabled by a plurality of funding sources. Although particular campuses or institutions may feel constrained by state or university rules for multicampus institutions, the U.S. system remains remarkable for its highly distributed authority of institutional governing boards, executive officers, deans, and shared governance with faculty. Institutions have long had the independent means to choose and fund unique, solo contract solutions for their distinct, geographically separated physical campuses. The collective sum of these costs across the industry of higher education—a sum that is quite large relative to its modest benefit—looks increasingly peculiar in a digitally connected world of open software and cloud services.

The many virtues of institutional independence are also its many vices. American higher education is a vibrant marketplace of ideas, one that has inarguably yielded numerous benefits over the last fifty-plus years. Protecting and enabling that marketplace for leading research and instruction remains essential; whether higher education can or should sustain such expensive heterogeneity in the many essential services that enable research and education is far more debatable. There is no governance means, other than leadership, to change this expensive trajectory. The responsibility thus falls to leaders—and especially to IT leaders—to inform, influence, engage, debate, and adapt their institutions to an increasingly connected world.

Per the wise admonition of Socrates, higher education IT leaders must examine the lessons learned from the last decade of network-enabled communities and must boldly envision how to best innovate solutions to the shared challenges that lie ahead. Community should be neither a vague concept nor a simple label. By exploring its marketecture, leaders can best assess which community approach matches the particular needs of their institutions.

Notes

2. We use the term marketecture to refer to the blending of a vibrant marketplace of ideas and the architecture or organizational structures that can bring these ideas together. Some uses of the word have referred to the excesses and sometimes vacuous claims of deceptive marketing departments in technology firms, but that use is not our definition.


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Online Educational Delivery Models: A Descriptive View

By Phil Hill

Although there has been a long history of distance education, the creation of online education occurred just over a decade and a half ago—a relatively short time in academic terms. Early course delivery via the web had started by 1994, soon followed by a more structured approach using the new category of course management systems. Since that time, online education has slowly but steadily grown in popularity, to the point that in the fall of 2010, almost one-third of U.S. postsecondary students were taking at least one course online. Fast forward to 2012: a new concept called Massive Open Online Courses (MOOCs) is generating widespread interest in higher education circles. Most significantly, it has opened up strategic discussions in higher education cabinets and boardrooms about online education. Stanford, MIT, Harvard, the University of California–Berkeley, and others have thrown their support—in terms of investment, resources, and presidential backing—behind the transformative power of MOOCs and online education. National media outlets such as the Wall Street Journal, the New York Times, and The Atlantic are touting what David Brooks has called “the campus tsunami” of online education.
Unfortunately, a natural side effect of this new interest in education and educational technology is an increase in hype and in shallow descriptions of the potential for new educational models to replace the established system. All too often, the public discussion has become stuck in a false dichotomy of traditional vs. online—a dichotomy that treats all online models as similar and that ignores blended or hybrid approaches. This false dichotomy is even more evident now that discussions are spilling into national media forums. But in fact, as my colleague Molly Langstaff has described, educational technology is interacting with innovative educational courses and programs to create not only new language but also multiple models for delivering education.4

As we continue to discuss important issues such as access, affordability, and personalized learning in higher education, we would be helped by having a richer understanding of the changes that are already occurring. I would like to offer a more descriptive view to capture the growing number of approaches enabled by educational technology. The following is certainly not exhaustive, since the field is rapidly changing. In addition, not all of these models will end up thriving in the long term. My intention is simply to describe some of the primary models and ideally to reduce some of the confusion evident in public discussions.

What does this emerging landscape of educational delivery models look like? I have categorized the models not just in terms of modality—ranging from face-to-face to fully online—but also in terms of the method of course design (see Figure 1). These two dimensions allow a richer understanding of the new landscape of educational delivery models. Within this landscape, the following primary models have emerged: ad hoc online courses and programs, fully online programs, School-as-a-Service, educational partnerships, competency-based education, blended/hybrid courses and the flipped classroom, and MOOCs (see Figure 2).

**Ad Hoc Online Courses and Programs**

Given the faculty- and department-driven nature of many U.S. postsecondary institutions, the creation of ad hoc online courses and programs—those not based on institutional policy and strategy—is not at all surprising. Due to this ad hoc nature, there are also myriad reasons for the online courses and programs, ranging from faculty exploration of the new medium to the specific needs of particular programs. But many of the ad hoc courses are based on individual faculty members’ belief that they are getting better results and learning outcomes using online tools. This is despite most faculty members’ skeptical view of the quality of online education. According to a study by *Inside Higher Ed* and the Babson Survey Research Group, fully two-thirds of faculty members say that learning outcomes from online education are inferior compared with outcomes from traditional courses. Still, the report also suggests that the more exposure faculty have to online education, the less fear they have as well.5

Faculty members teaching ad hoc online courses are one of the most important yet overlooked sources of knowledge and experience regarding online education. Although ad hoc online courses and programs blazed the trail in what is possible, they are not the primary source for the large growth in online education. Furthermore, ad hoc online courses and programs are typically not intended to scale in terms of numbers of sections or students.

**Fully Online Programs**

The biggest drivers of growth in online courses and enrollment to date have been fully online programs from the for-profit sector and from online-only organizations created by nonprofit institutions. In both cases, these online programs are organized around a concept called the *master course*. This concept of the master course, which changes the educational delivery methods of
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Online Educational Delivery Models: A Descriptive View

FIGURE 2. Primary Models

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an institution, is perhaps the biggest differentiator between traditional, for-profit, and even nonprofit fully online organizations.

A master course gets replicated into multiple, relatively consistent sections in a repeatable manner. In this approach, instructional design teams—typically including multimedia experts, quality-assurance people, and instructional designers—work with faculty members and/or subject-matter experts to design a master course. Once designed, the master course sections can be taught or facilitated by multiple instructors, typically adjunct faculty. The faculty members who are part of the design can also be instructors for a couple of sections, but generally the sections are taught by instructors who were not part of the design team.

The master course concept changes the assumptions of who owns the course, and it leads to different processes for designing, delivering, and updating courses—processes that just don’t exist in traditional education. The implications of this approach are significant. These differences create a barrier that very few institutions can cross. So, how do institutions that want to provide scale and access deal with this barrier? The most common method over the past decade or two has been to create separate organizations that will implement the master course concept. The majority of for-profit organizations—at least the medium and large for-profits that operate at scale—are based on this concept, whether using online courses or blended/hybrid courses. The largest and best-known example is the University of Phoenix (http://www.phoenix.edu/).

In the nonprofit sector, the online organizations typically fit within the overall system of governance, but the operations, budgets, and academic oversight are provided individually. Examples include Rio Salado College, (http://www.riosalado.edu/), University of Maryland University College, (http://www.umuc.edu/), and Colorado Community College Online (http://www.ccconline.org).

Many of the failures of traditional institutions or statewide systems to successfully create, grow, and sustain online programs can be traced to organizational resistance from the rest of the system to the separate online organization.

School-as-a-Service

Another approach to overcoming the barrier between traditional education and scalable online education is outsourcing to, or partnering with, an external company for online content, curriculum, and/or student services. These companies bring experience and capabilities to help schools implement a master course concept and the associated operations while providing these courses through the traditional institution.

There is also a burgeoning industry built around outsourced, for-profit service providers—companies that provide the curriculum and course development, as well as the operations, of an online program. This new category is called School-as-a-Service, and some market estimates indicate future compound annual growth rates of 30 percent for this sector. Pearson has entered this market based on the model used with Arizona State University and California State University. Other providers include...
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Educational Partnerships

An additional promising approach is not well known but has already shown real results. In this model, external organizations provide portions of the online courses and communities of practice, including a network of peer instructors worldwide working in similar programs. The Cisco Networking Academy program (http://www.cisco.com/web/learning/netacad/) is a good example of this model. It has already scaled to serve more than 1 million students, in 165 countries, through more than 10,000 partner institutions. In this model, the educational institution offers the courses within its curriculum, allowing students to pursue industry-relevant certifications and even to use the courses as part of their degree programs. The schools must have or purchase lab equipment, but otherwise the schools benefit from Cisco’s decades-plus investment in curriculum, technology platforms, and growing experience with games and assessments. Established in 1997, Networking Academy is Cisco’s “largest and longest-running Corporate Social Responsibility (CSR) program,” meaning that there is no charge for public and nonprofit institutions. Despite the program’s size, the nature of Networking Academy is often misunderstood: it is not a corporate training program but is, rather, a nonprofit educational program.

Competency-Based Education

One of the keys to potential innovation within higher education is to move from credit hours to competency assessment as the definition of whether a course has been completed. Just two years ago, Western Governors University (http://www.wgu.edu/) stood almost alone as the competency-based model for higher education, but today it has been joined by Southern New Hampshire University (http://www.snhu.edu/), the University of Wisconsin System (http://www.wisc.edu/), Northern Arizona University (http://www.nau.edu/), StraighterLine (http://www.straighterline.com/), and Excelsior College (http://www.excelsior.edu/).

What exactly is competency-based education (CBE)? In 2000, SPT Malan wrote about the generally-accepted origins: It is based on the broader concept of outcomes-based education (OBE), which starts with the desired outcomes and moves to the learning experiences that should lead students to those outcomes. OBE can be implemented in face-to-face, online, and hybrid models. In the narrower concept of CBE, the outcomes are more closely tied to job skills or employment needs, and the methods are typically self-paced. In an article from 2000, SPT Malan listed the six critical components of CBE:

- Explicit learning outcomes with respect to the required skills and concomitant proficiency (standards for assessment)
- A flexible time frame to master these skills
- A variety of instructional activities to facilitate learning
- Criterion-referenced testing of the required outcomes
- Certification based on demonstrated learning outcomes
- Adaptable programmes to ensure optimum learner guidance

What is driving the current growth in CBE models? In a nutshell: the desire to provide lower-cost education options through flexible programs. The government, at both the federal and the state levels, is playing a large role. In a speech in November 2011, U.S. Secretary of Education Arne Duncan said of programs such as Western Governors University: “I want them to be the norm.” In June 2012, Paul Fain reported on an event attended by Eduardo Ochoa, then the assistant secretary for postsecondary education at the Department of Education. Ochoa stated: “The department is looking to see competency-based education develop and flourish.” According to Fain, Ochoa said the Obama administration supports quality competency-based approaches, “which can expand student access while trimming college costs and the amount of time it takes to earn a degree.”

At the state level, in June 2012 the University of Wisconsin System and the Office of Governor Scott Walker described their upcoming CBE initiative:

The University of Wisconsin System (UW) will develop a new, flexible college option, using online instruction and other innovative methods, to deliver the competencies students need at an affordable UW price.

This unique competency-based model will allow students to start classes anytime they like, work at their own pace, and earn credit for what they already know. Students can demonstrate college-level competencies—no matter where they learned the material—as soon as they can prove that they know it. By taking advantage of this high quality, high flexibility model, and by utilizing a variety of resources to help pay for their education, students will have new tools to accelerate their careers.

Blended/Hybrid Courses and the Flipped Classroom

Blended or hybrid courses combine online and face-to-face class time in a structured manner. Although there are varying mixtures of content delivery and interactive activities in this approach, the logical extension is something called the “flipped classroom.” The flipped classroom model involves courses that move the traditional lecture, or content dissemination, away from face-to-face hours and into online delivery outside of class time. The face-to-face class time is used for practice and actual application rather than for introducing the content being studied. The instructor then has time to help students face-to-face with
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specific problems. Flipped classrooms have been in existence since around 2000, but they have recently been gaining popularity in both higher education and K–12 institutions.

The Khan Academy (http://www.khanacademy.org/), with over 3,400 videos covering multiple subjects, has been a leading force in the popularization of the flipped classroom concept. The Khan Academy videos are free and available to anyone. The most common usage within education circles is for the videos to form much of the online lecture or content-dissemination portion of a course, either replacing or augmenting material from the course instructor. Although Khan Academy videos have mainly targeted K–12 math content up to this point, new revenue investment is leading to expanding content outside of mathematics and into postsecondary-level content.

There are many other examples of blended and hybrid approaches. The common theme is to make face-to-face class time more effective, using it to provide much of the instructor feedback and interactive skills portion of a class while pushing content delivery into more-efficient online tools.

**MOOCs**

In most of the online educational delivery models of the past decade or so in higher education, the solution to the problems of scale and access has been the duplication of course sections. But as noted earlier, things started to change with the new concept of Massive Open Online Courses (MOOCs). In a MOOC, the course itself is scaled to enable an essentially unlimited number of students to take the course from the faculty members, who both design and lead the course. This design process replaces the master course concept and leverages the natural scaling power of online tools.

MOOCs had their foundations in 2007–2008, in open online courses taught by David Wiley at Utah State University and Alec Couros at the University of Regina. The name MOOC was first used by Bryan Alexander and Dave Cormier to refer to the “Connectivism and Connective Knowledge” (CCK08) course led by Stephen Downes and George Siemens. As described by Downes:

> Many of the ideas that go into a MOOC were around before CCK08 but that course marks the first time the format came together. In particular, we would point to David Wiley's Introduction to Open Education course, which was offered as an open wiki [later called the Wiley Wiki—see https://sites.google.com/site/themooguide/cck08---mooc-basies] and Alec Couros's open course ECI183—Social Media and Open Education (see https://sites.google.com/site/themooguide/social-media-and-open-education). These two courses were of course influenced by other work in the field—the concept of open education, in which Wiley was a pioneer, with a license preceding the Creative Commons licenses, the open wiki, which of course was made famous by Wikipedia, and more.11

However, it is the Stanford branch of MOOCs, also known as xMOOCs, that has garnered the most press. This branch started with Sebastian Thrun and Peter Norvig’s “Introduction to Artificial Intelligence” course in 2011. After the professors offered the course free to anyone in the world, 160,000 people worldwide enrolled. In this type of MOOCs, the educational technology is used to replicate a typical face-to-face classroom experience online, at scale. The Stanford branch of MOOCs includes a course web home, typically on a homegrown customized learning management system (LMS), hosting course lectures, homework, and assessments.

After the success of this course (CS221), Thrun resigned from Stanford and created Udacity (http://www.udacity.com/us), funded by venture capital. At about the same time, other Stanford professors involved in the new movement founded Coursera (https://www.coursera.org/). Soon afterward, MIT and Harvard announced their creation of, and $60 million investment in, edX (http://www.edxonline.org/). In the summer 2012 announcement that the University of California–Berkeley was joining the edX initiative, Chancellor Robert J. Birgeneau stated: “We are committed to excellence in online education with the dual goals of distributing higher education more broadly and enriching the quality of campus-based education. We share the vision of MIT and Harvard leadership and believe that collaborating with the not-for-profit model of edX is the best way to do this. Fiat Lux.”

Given the hype of national media coverage of MOOCs, it is refreshing to see more-recent analysis looking at important attributes such as revenue models, dropout rates, and instructional design. Steve Kolowich, at Inside Higher Ed, wrote two revealing articles looking at early demographic data from Udacity, Coursera, and edX. In an excellent article about Coursera's contract with the University of Michigan, Jeff Young, at the Chronicle of Higher Education, provided key insights into Coursera's and the university's motivations. Audrey Watters, in response to an article in The Atlantic, asked the tough question of whether we should care about the high dropout rates of current courses offered in this new model.15

The current generation of courses has proven the feasibility of massive online enrollments, but as Kolowich's article revealed, the result is based on a form of adult continuing education. The majority of students in the Udacity and Coursera courses he analyzed were professionals in the software industry—hardly the target audience for those seeking a change in how we
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educate postsecondary students. The current MOOCs provide a nice proof-of-concept, but they do not solve significant educational problems.

For MOOCs to become truly transformative for higher education, the concept must accomplish the following goals:

- Develop revenue models that will make the concept self-sustaining
- Deliver valuable signifiers of completion such as credentials, badges, or acceptance into accredited programs
- Provide an experience and perceived value that enables higher course-completion rates (in most MOOCs today, less than 10 percent of registered students actually complete the course)
- Authenticate students so that accrediting institutions or hiring companies are satisfied that a student's identity is known

Whether and how MOOCs or successor models can build on current scalability and openness while accomplishing these four goals will be key. For example, the University of Washington is not merely putting courses online with Coursera, it is also experimenting with changes that could lead to real credits. Tamar Lewin reported in the New York Times: “So far, MOOCs have offered no credit, just a ‘statement of accomplishment’ and a grade. But the University of Washington said it planned to offer credit for its Coursera offerings this fall, and other online ventures are also moving in that direction. David P. Szatmary, the university's vice provost, said that to earn credit, students would probably have to pay a fee, do extra assignments and work with an instructor.”

According to Steve Kolowich, however, this changes the model: “Apart from residing online and on the Coursera platform, these ‘enhanced’ and potentially credit-bearing courses will hardly qualify as MOOCs.”

In the ongoing analysis of the disruptive potential of MOOCs, it is easy to forget that the actual concept is just four or five years old. Furthermore, the definition of the concept itself has undergone a significant change in the past year. The two current branches of MOOCs are early prototypes. Despite their common name, they have different aims and methods. The potential of MOOCs will be based on further developing their techniques. The examples that attempt to tackle the four barriers of revenue, credentials, course-completion rates, and student authentication (see Figure 3) will likely determine the future generation of MOOCs.
Legitimacy of Online Educational Delivery Models

In early summer 2012, the president of the University of Virginia was forced to resign, at least partially due to the growing legitimacy of and new interest in online education as represented by MOOCs. Although the board’s decision process and communications were flawed and the president was eventually reinstated, Tamar Lewin’s commentary in the New York Times is telling:

In the end, it seems, the fundamental disagreement at the University of Virginia concerned the approach that the president should take—either incremental, with buy-in from each of the constituencies, or more radical, imposed from the top.

Ms. Dragas [Helen E. Dragas, board rector] has displayed a sense of urgency about pushing the university to find new revenue sources. She has been especially concerned about pushing ahead in online learning, to keep up with Stanford, M.I.T. and other universities that have, just in the last year, begun to offer “massive open online courses,” or MOOCs, free to anyone with an Internet connection, carving out new territory in an area that most universities are just beginning to explore.16

Perhaps the relevant issue to higher education leaders is not the existence of MOOCs or other forms of online education. Perhaps the relevant issue, undeserved or not, is the legitimacy of online delivery among elite institutions by the very public and financial support of MOOCs and open education in general. The presidents of M.I.T, Stanford, and Harvard have all publicly and forcefully declared the value and potential of online education. L. Rafael Reif, who became the president of M.I.T in June 2012, led the development of the MITx project. John Hennessy, the president of Stanford, has publicly supported the “flipped classroom.” Drew Faust, the president of Harvard, described how edX would enable the university “to increase access to education and to strengthen teaching and learning” in ways “we could not previously have imagined.”17

Before six months ago, the biggest and easiest argument against the power of online education was that it would never provide the quality of face-to-face education. This line of argument, self-reinforced by traditional institutions, kept many collegiate presidents and boards from even considering whether major changes were necessary or feasible in higher education. Yet now that elite institutions are publicly extolling the value and quality potential of online education, and are willing to invest tens of millions of dollars, this argument has been delegitimated. The easy fallback position is gone, and presidents and boards are being forced to encourage or lead a much faster pace of change.

Lessons for Traditional Institutions

The recent developments surrounding the growth in online education and the emergence of new educational delivery models lead to four key lessons for traditional higher education institutions.

1. Online Education Consists of Multiple Educational Delivery Models.

Each educational delivery model for online education has its own set of

![Figure 3. MOOCs](image-url)
characteristics and goals. It is easy to get caught up in the media hype and throw all models for online education into the same bucket. Although the Stanford branch of MOOCs has been receiving the most media interest lately, it is just one of the recent approaches to online education. In addition, online technology and its associated delivery models will continue to evolve at an accelerated pace, at least compared with the experience of the past decade.

The new interest in online education brings the added risk that decisions will be made by various groups without a deep understanding of the various models, the technologies, and pedagogical usage. A basic awareness of the potential of the models and the technology trends—not just for today but for the near future—is important for any real benefit to accrue to traditional institutions.

2. The New Legitimacy of Online Education Can Lead to New Pressures.

   The game has changed. Due primarily to the new legitimacy of online education, traditional college and university cabinets and boards are actively discussing the role of online education in a strategic sense. The past barriers to a wider impact for online education within traditional institutions are crumbling.

   As we have seen with the situation at the University of Virginia in June 2012, there may even be significant pressure from institutional boards to develop a cohesive strategy based on the online models. For many schools, it is no longer acceptable to leave it to individual faculty members or departments to decide what, how, and when online courses and programs should be developed. Most institutions will need to determine how online education does or does not serve their specific mission and needs. Online education should now be a considered part of any institution's strategic planning process, even if the decision is to not offer online education.

   3. Online Education Should Lower, Not Raise, Student Costs.

   Most of the new educational delivery models are targeted at increased access to education at reduced costs, even at elite institutions. Yet in a 2011 survey conducted by WCET and Campus Computing Project, nearly 93 percent of online programs at traditional institutions are priced at or above the tuition of face-to-face programs. Prior to the recent emergence of new online educational delivery models, traditional institutions felt no pressure to change pricing for these programs, since they were not being sufficiently pressured by a competitive marketplace setting. One of the far-reaching impacts of the new models is that there will be a growing awareness of the potential for online education to lower costs.

   This is a healthy change to the higher education system. Online education should create lower cost structures, and the new educational delivery models universally offer this opportunity. It will be increasingly difficult for traditional institutions to justify not having reduced tuition for online courses and programs. Even with no other change, there will be tremendous price pressure for online program costs to drop. In the long run, the higher-priced models could become untenable for all but the most selective universities.

   4. Online Education Will Increase Competition.

   Online education and the associated educational technologies have the potential to play an important role in many traditional institutions that have previously avoided this field. However, online education also increases the ability for institutions to compete with one another and can even help create new institutions.

   For example, the (http://www.minervaproject.com/) was funded in 2012 to create a new for-profit university. The concept is to use online education to provide an elite university for students who have the ability to enter Ivy League or comparable schools but who could not gain admission. As highlighted in an article in The Economist, in April 2012 Benchmark Capital announced that it would fund Minerva, “which plans to welcome its first class of students in September 2014, to the tune of $25m—one of the biggest seed investments of a leading Silicon Valley venture firm ever. What is more, the new university’s advisory board will be chaired by Larry Summers, a former president of Harvard University, and count among its members Bob Kerrey, a former senator and head of the New School in New York, and Pat Harker, president of the University of Delaware and a former dean of the Wharton School.”

   Although community colleges and other institutions have had competition for students from the for-profit sector, elite research universities and liberal arts colleges have not previously faced the same pressures. We should expect to see more, not fewer, examples of new institutions and new online programs that will increase competition for traditional higher education.

A Bumpy Ride Ahead

The coming five to ten years will be a bumpy ride for traditional institutions. The investment community, particularly venture capital and corporate mergers and acquisitions, have a built-in trial-and-error approach. There will be successes, and there will be failures. Failures are to be expected, and one attribute of investment-based new models is quick failure and quick adaptation.

As a system, higher education is not structured for rapid change, and there will be a battle of cultures as investment-backed educational technology intersects with slow-paced, conservative educational structures. Traditional institutions will likely see more
turmoil, failure, and even successes than they are used to in a short period of time. Is online education the answer to change in higher education? No. There is no single answer, and online education is not appropriate for all situations. But now that MOOCs have changed the assumptions and the discussions at the executive and board level, complacency or even gradual change is no longer acceptable. That is the real transformative power of the current generation of online educational delivery models.

Notes
4. E-mail correspondence with Molly Langstaff.

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Phil Hill (philhill@deltainitiative.com) is Executive Vice President at Delta Initiative (http://www.deltainitiative.com) and blogs at e-Literate (http://mfeldstein.com).
What We’re Hearing

Over the last few months, EDUCAUSE has been focusing on analytics. As we hear from experts, meet with association members, and watch the marketplace evolve, a number of common themes are emerging. Conversations have shifted from “What is analytics?” to “How do we get started, and how do we use analytics well?” What we are hearing from experienced implementers can benefit those who are getting started.

“Analytics requires a culture of inquiry, and inquiry creates an analytics culture.”
Analytics is a matter of culture—a culture of inquiry: asking questions, looking for supporting data, being honest about strengths and weaknesses that the data reveals, creating solutions, and then adapting as the results of those efforts come to fruition. Analytics not only relies on a culture of inquiry but can promote such a culture. Analytics, used well, is more like a flashlight than a hammer, illuminating where progress has been made and where improvements are needed. There’s a synergy between investing in analytics and developing a culture that embraces analytics.

“Ask good questions; use good data.”
Analytics is a problem-solving process: asking strategic questions, identifying relevant data, conducting analyses, exploring options, communicating results, and taking action. The more clarity there is around the problem statement, the higher will be the probability of success. The questions that analytics seeks to address are complex, the assets dispersed. Asking good questions requires understanding the context, which means that leaders must gather inputs from all sides to obtain the perspective needed to address strategic questions. Questions must drive analytics, not the data at hand. Analytics requires collaboration among different campus divisions such as academic affairs, student affairs, institutional research, information technology, and finance. Analytics, as a discovery and decision-making process, requires stakeholders to think strategically about the role of data: inventorying what is available, assessing what is needed, and considering how it will be used.

“Analytics is a journey from ownership to stewardship.”
“Data hawks” will advocate for control of their data, whereas “data doves” believe that “data just wants to be free.” Both approaches create difficulties. Shifting the conversation toward stewardship helps overcome polarization. Campus leaders should consider reframing ownership...
with the concept of “campus data custodians” whose role is protecting the longevity, quality, and relevance of data. Data governance can challenge political, technical, and organizational assumptions. Establishing data governance is a complex but necessary undertaking. It is likely to be a multiyear project, whether at a large or small institution.

“Communication is essential to any analytics effort.”
Experts are clear that analytics demands “culture change.” Culture change requires communication and a shift of beliefs. Even so, few institutions have a comprehensive communication and training program in place to help their campus community understand analytics. Ongoing training, engagement, and communication are also essential aspects of rolling out new dashboards and other visualization tools.

“Analytics requires new skill sets.”
One of the biggest barriers to analytics can be the shortage of necessary skills. Recent research suggests that by 2018, the United States could lack 140,000 to 190,000 workers with “deep analytical” expertise. Additionally, the U.S. talent gap will require retooling or hiring 1.5 million data-literate managers. A new field may be in the process of being defined—data science—which reflects the centrality of data as a resource. Data science blends multiple fields such as statistics, applied mathematics, and computer science. It blends not only disciplines but also other skill areas such as technical skill, teamwork skills, communication skills, and tool mastery. Other segments will compete for these skills—not just higher education.

“Risks are inherent in any decision—even in no decision.”
Risks are inherent in making any decision. Not adopting analytics does not avoid risk—it risks missed opportunities. When decisions are made with insufficient information, risks increase. Analytics adopters must accept the risk of exposing institutional weaknesses, perhaps obligating action based on new knowledge. Carefully selected questions, quality data, sound practices, and prudent processes mitigate risks. Thoughtful analytics yields better processes and decisions. Risk management is important; risk avoidance is not a solution.

“The IT organization should neither drive nor own analytics.”
Analytics must be a shared responsibility across all parts of the higher education institution, with high-level executive ownership of the analytics agenda. The CIO is the executive most directly charged with developing infrastructure and increasing capacity for analytics. CIOs are most likely to have knowledge of where data resides and how business practices work across the institution. CIOs are accountable for data security and integrity. Although the IT organization has an important role, strong partnerships across the institution are critical, especially for information technology and institutional research as they negotiate data governance and ownership. Finance, admissions, student services, and academic affairs must become effective partners in adoption as well. Even within the technical support realm, the responsibility for analytics should not lie with the IT organization alone.

“Analytics is an investment.”
Analytics is an investment for the future. The ultimate goal of analytics is to make more-intelligent decisions. Those decisions provide the ROI. For example, analytics efforts to improve student outcomes often begin by identifying barriers. Approaches are tested; results are compiled; improvements are made. Improving pass rates and reducing course re-takes save resources—for students and the institution. Plus, the documented benefits of such analysis and decisions help convince others. When it becomes clear that the resulting redesigns are leading to success, the investment rationale is clear. Dashboards track progress toward strategic objectives. From a financial perspective, building and using a data warehouse may be a much better investment than designing custom reports and transactional reporting. Analytics can be an investment in building the quality and effectiveness of the institution.

Finally, in getting started with analytics, IT and institutional leaders may want to heed the following words of wisdom:

- Transitioning an institution from a culture of anecdote to a culture of evidence is a proactive process. Leaders must build structures—both technical and governance—and develop data sources, data flows, and data accessibility to support the initiatives.
- When people are in control, have ownership of quality data, and can trust the data, everything changes.
- Technology makes education more personal, not less. Systems don’t replace people; they empower people—both advisors and students—to make better decisions.

Analytics is a powerful tool, one that we are just beginning to understand.

Notes

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PeerJ: An Open-Access Experiment

June 2012 marked the launch of a new open-access (OA) publisher of scholarly content: PeerJ (https://peerj.com), which I co-founded with Jason Hoyt, the former Chief Scientist and Vice President for R&D at Mendeley. The intent of PeerJ is to provide a professional, high-quality, innovative scholarly publication venue for the 21st century, and the launch was greeted with considerable interest.1 But does the world really need another OA publisher?

At PeerJ, we firmly believe that OA publication (in which academic articles are made freely available under a distribution license that allows full reuse) is a net benefit to the world and that the sooner all articles are published as OA, the better.

There are approximately 2,000 journal publishing companies in the world, publishing some 25,000 academic journals with an output of approximately 1.5 million articles per year.2 But even though there have been some great examples of successful and rapidly growing OA programs,3 the academic publishing industry remains dominated by closed-access, subscription journals, with just 14 percent of the literature (in 2009) being published under an OA license.4 Despite this apparently small market share, we could actually be as few as five years away from a rapid transition of this industry. Specifically, it has been estimated that as much as 50 percent of all content could be published in an OA venue by 2017, with the market share accelerating rapidly thereafter.5

Therefore, the OA movement (a child of the Internet era) appears poised to become the journal distribution model of the future. With this “dramatic growth,” one might be forgiven for thinking that there is little need to push the envelope any further. But to not push would be to ignore the positive change that yet more innovation can bring to this space. My co-founder and I feel, therefore, that there is a considerable need to continue to experiment in order to help improve and accelerate the movement toward universal OA for all content.

Perhaps the most visible thing that we have done at PeerJ is to innovate around the dominant business model in use in the OA world. OA is a distribution model, not a business model (a fact that is often overlooked in the OA debate). With this in mind, although there are several ways to finance a “gold” OA publication, the business model that has seen the widest, most successful adoption is the one in which authors pay an Article Processing Charge (APC) per article published, with fees ranging from $1,000 to $5,000. It seemed to us that even at this early stage of OA development, there was very little in the way of viable experimentation with new or innovative business models—hence our development of a “membership model.”

Unlike the “traditional” APC business model, PeerJ provides authors with a lifetime membership that gives them the right to publish future articles without further charge. The basic membership fee is $99, which allows someone to publish one article a year; and $299 buys the rights to publish unlimited articles. The only “catch” is that all co-authors on a paper must be paying members in good standing. This model will provide a new and interesting alternative to the APC model, and if we can lead by example, then perhaps various other OA business models could be developed in this space.

Several other innovative aspects of PeerJ are based around the “delivery modes” (i.e., the products) that are being offered. For example, like PLoS ONE (http://www.plosone.org), we will not be judging submissions on perceived impact but only on their technical and scientific soundness; in addition, we will be encouraging open peer review (specifically, we will encourage reviewers to sign their reviews, and we will give authors the ability to post their reviews alongside their published paper); and we are also launching a “preprint server” (PeerJ PrePrints), which we expect to closely integrate with the PeerJ journal and therefore gain more adoption for a preprint venue than has so far been the case in the biosciences. Since announcing the launch in June, we have recruited a prestigious Editorial Board of Academic Editors consisting of almost 700 world-class academics (https://peerj.com/academic-boards/editors/), including several Nobel Laureates, and we will open for submissions before the end of 2012.

How do we feel that these innovations will affect the way we will do business? In an era in which much of the industry is still coming to terms with the transition from “librarian as customer” to “author as customer,” our focus on authors as “members” will further extend this thinking. When an article is published using an APC model, it is very much transactional in nature: a group of authors come to a publisher, expecting good service, and one of them is charged an APC fee for that spe-
specific service (the publication of their article). However, when all authors are members (and their membership fee does not guarantee them a publication), we have to think about them differently: we have to provide reasons for them to become members; we want them to recommend PeerJ membership to their colleagues; and we want them to receive membership benefits that they genuinely value. In addition, this new way of thinking forces us to regard each member (and hence, each author on a paper) as a unique individual, with contributions that may come from being an author to being a referee or a reader or a commenter. Because we know (and care) who our members are, we can collate and present all of their interactions with us, and we can build site navigation based around individuals (instead of the more traditional navigation based around subject area). We do not yet know how this new way of thinking will play out, but we are pretty sure that it will represent a significant evolution in how to think about the scholarly publication process.

Finally, we believe that there is significant room to improve on the technical functionality that surrounds all phases of the manuscript life-cycle in a scholarly journal. From the basic addition of a pre-print server through a focus on individuals to the ultimate presentation of the published article, there are many ways in which the process can be improved. We will be taking the best aspects of the scholarly publication process that has been developed over several centuries and combining them with the best aspects of modern database and web design standards.

So, yes there is a need for more OA publications. And yes, there is a need to push the transition to OA as hard as possible. Just as science is an experimental discipline that aims to improve the base of knowledge, PeerJ is an exciting experiment that will move the field forward and hopefully expand and accelerate the transition toward a more efficient and effective method of scholarly publishing.

Notes

Peter Binfield is Co-founder and Publisher of PeerJ. He has held positions at the Institute of Physics, Kluwer Academic Publishers, Springer, SAGE, and the Public Library of Science (PLOS).
A Job Is Like a Fish

“I was on my own path, my own journey, an American journey where I could think for myself, decide for myself, define happiness for myself. That’s what we do in this country. That’s the American Dream.”

—Paul Ryan, vice-presidential nominee
Speech at the Republican National Convention August 29, 2012

Politics aside, I have something in common with Congressman Ryan: I believe in the goal of a self-directed life. I believe that this is a fundamental human capacity and desire. Ryan and I apparently agree that people can, through effort and opportunity, make something of themselves.

I suspect Ryan would also agree with me that our society should foster this capacity, because more self-direction is good for both individuals and societies. He may even agree with me that this is exactly the central role of education: fostering the human capacity for thoughtful self-direction.

Education intended to achieve this goal is known as “liberal education.” Ryan’s own first-rate liberal education presumably had a role in fostering his capacity for independent thinking. And though it might be politically unwise for Ryan to use the L-word in a positive light today, the phrase has nothing to do with political ideology. Rather, it describes the kind of education designed to develop a citizen (a free person, more or less) in classical antiquity—as opposed to the vocational training that might have been provided to a slave. The word liberal here signifies that such education is necessary to liberty.

No reader of EDUCAUSE Review needs a primer on the upheavals that threaten higher education today: student debt, unemployed graduates, cumbersome government regulations, disruptive innovations like MOOCs—the list goes on. It often feels as if the sky is falling, and we ask: what can we do to save our colleges and universities? That’s a reasonable question, but I’d rather ask it differently. Given the present climate, how can we use our institutions to best serve society?

Give someone a fish, and you feed them for a day, the old saw goes. Teach someone to fish, and you feed them for as long as there are fish around. Once upon a time, knowing how to fish or farm might have set someone up for life. The Industrial Revolution and urbanization changed that by creating a market for skilled labor, where “knowing how to fish” meant having job skills that provided similar security in the new economy. Factory, mill, and office workers could “fish” for themselves, and only a small fraction of society needed the capacities nurtured at elite colleges.

Now, rapid change and global competition have changed job-specific skills from a lifelong to a short-term solution. What will it mean, in the future, to “know how to fish”? What will it take to thrive in times of rapid change, and how can we equip students to succeed in an economy that we cannot yet understand? I am skeptical about the staying power of an education focused purely on being able to quickly land a job. This is not to downplay the importance of a job but, rather, to note that these days, landing a job is more like landing a fish than it is like learning how to fish. One job—or one skill set—will not feed someone for life.

The middle class is eroding, and in the United States the working class is faring even worse. As more people are cast adrift from reasonably predictable economic futures, the capacities of mind that they will need to prosper are exactly those that we have historically considered the prerogative of just a few. They will need to work with ambiguity, complexity, difference, and change. They will need habits of inquiry and reflection. Most important, they will need a facility for lifelong learning. In short, they will need exactly those capacities that we seek to develop through a liberal education.

It may seem that the sky is falling on higher education. Yet in spite of all the headlines and the battle lines, in spite of MOOCs and badges and the many other products of this tumultuous time, the most important question we should ask about the future of higher education is not whether it is free or expensive, online or face-to-face, for-profit or not, done in small or large classes, uses accredited or experimental approaches. Each of these models has merit, and many will have places in the future ecosystem of higher education. The critical question concerns the role of education that merely imparts the skills necessary to land a fish/job, versus education that also develops the capacities of mind necessary to support the lifelong mastery of fishing—economically, culturally, politically—in changing seas.

How do we serve the multitudes with the kind of education that was once reserved for the elite? How do we bring liberal education to learners whose lives and responsibilities preclude a massive investment of time and treasure? As technologists in higher education, we are key players: technology represents...
our best hope to remove the barriers of exclusivity, residency, and dollars. The revolution of the interactive web was enabled by technology. The societal meaning of this revolution is still manifesting. When the mist clears, I hope we will find that it has little to do with “big data” and everything to do with individual empowerment. Details will vary, but we can identify principles to consider as we select, deploy, promote, and teach technologies. Here is my current list of principles:

- Choose empowerment over control. Tasked with limiting costs and increasing scale, we are often tempted to focus on efficiency and standardization. But learning—particularly learning that leads to the development of higher-order skills like critical thinking—is a personal and messy business that suffers in a box. To help learners in what Randy Bass calls the “post-course era,” we need to choose technologies that focus on learning, rather than on teaching and management.

- Be open. Open source, open standards, and open educational resources have advantages that are reasonably translatable to the bottom line, but openness can mean much more. Consider analytics. Conceived as “big data,” analytics can give an institution the tools to predict and improve student success. This is good. But why shouldn’t the learner own the analytics—or at the very least have access to them? Analytics, reconceived as personal data, could give learners the tools to predict or improve success by themselves. Is education something we do to students, or is it something we help students do for themselves?

- Enable connections. Part of the magic of a great teacher is nurturing engagement. Technology can help or hinder. Today, even two courses taken concurrently in the same department may be experienced by a learner as being in very separate technological silos. That’s a far cry from helping students connect their learning experiences to the rest of their world. Much value occurs in building connections between courses and between courses and the rest of life.

- Promote reflection. Lifelong learning is not just a capacity; it is a habit. A learning environment that supports and promotes reflection can help learners develop capacities that go far beyond content mastery. Darren Cambridge, writing about e-portfolios, noted that we have a choice to use them in ways that are sustaining or disruptive. I’m voting for disruptive.

- Make it safe to fail. Humans learn very effectively through experimentation. Want to promote the use of a technology? Make playing around with the technology simple and safe. Even better, make it fun.

- Support rich and meaningful collaboration. It is the age of the team—of collaboration and co-creation. United we stand! (Divided is how we are graded.) Tools that support rich and free-flowing collaboration, that are available on demand through self-service, and that are free from control bring into the academy communication and collaboration patterns that are already valued in the social network and the workplace.

These principles are not easy to enact. They do not come with guarantees. If some of them look like lessons from our rapidly proliferating competitors, that is no coincidence. Environmental threats are challenging us to rethink old habits, to let go and leap forward. Something is falling on us, but I don’t think it’s the sky. I think it is the frail, makeshift wall of a lean-to in which we have huddled for too long. We can see the sky of our future through the cracks, and it is beautiful. So grab a chunk of the revolution and help reveal some more sky. It is time to leap forward. Something is falling on us, but I don’t think it’s the sky. I think it is the frail, makeshift wall of a lean-to in which we have huddled for too long. We can see the sky of our future through the cracks, and it is beautiful. So grab a chunk of the revolution and help reveal some more sky. It is time to leap forward. Something is falling on us, but I don’t think it’s the sky. I think it is the frail, makeshift wall of a lean-to in which we have huddled for too long. We can see the sky of our future through the cracks, and it is beautiful. So grab a chunk of the revolution and help reveal some more sky. It is time to leap forward.

Notes

1. Ryan’s alma mater, Miami University of Ohio, placed great emphasis on liberal education during the time when he attended and still does today. See “Liberal Education at Miami,” http://www.miami.muohio.edu/liberal-educ/.


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The Copyright Conundrum

“May you live in interesting times”—a saying of perhaps dubious origins—is alternately viewed as either a curse or a positive wish. To be working in the copyright space on a campus today is to be living in interesting times. Copyright, once the yawn of subjects that garnered enthusiasm only in esoteric circles, is increasingly a hot topic covered both in the mainstream and by social media. Why this change, and why does it matter to higher education?

Copyright and Its Tensions
Copyright law in the United States has its origins in Great Britain’s 18th-century Statute of Anne and is grounded in the U.S. Constitution. Copyright law conceives and promotes “progress,” as described in the Constitution, in two distinct but related ways. First, it seeks to increase both the quantity and the quality of creative output. Second, it seeks to broaden public access to creative works. The two “progress” goals exist in substantial tension with one another. The incentives granted to authors allow them to restrict access to and use of their works for a limited time so that they can benefit from their creations and also have the incentive to create additional intellectual products. This delicate equation is complicated by many factors, and public policy seeks to find the balance of copyright scope and duration, limitations and exceptions like fair use, and appropriate remedies in case of infringement.

Although digital technologies provide new opportunities for authors and producers to create interesting enhancements based on existing works, these technologies also make it harder to determine the boundaries between true derivative works and mere copies. Therefore, the detection of infringement and the subsequent enforcement of rights become increasingly difficult and costly. Rights holders, in this disrupted environment, gravitate toward building technological and contractual barriers around their “property” because monetizing copyrightable “products” is very profitable today. Fair uses of protected works (an important sphere in which education and scholarship operate) can also be constrained in this environment, since technology permits creators and producers to more perfectly control access to their works and to dictate how these are used.

Technological advances have made copying easier, but at the same time, they have caused tensions in the copyright system. Digital technologies exacerbate this tension by also making distribution easier, faster, and cheaper. Under real and perceived threats of “piracy,” some copyright owners agitate for expanded protection, since they fear that their market will be undercut because of the speed and ease with which digital content can be copied and disseminated, thereby negating the limited-time advantage of their monopoly.

Likewise, licensing is replacing the sale of digital content, and this shift carries with it more control by content owners. The licensing model enables copyright holders to determine which uses are the most productive and then licenses these accordingly. Technological constraints on the use and reuse of content give copyright owners the ability to control the aftermarket use of all their digital content, which is especially problematic in higher education, where sharing and building on the knowledge of others is fundamental.

Digital technologies enable new forms of communication, interaction, and presentation in unimaginable ways that can enrich teaching and learning. Yet these technologies also bring the higher education community face-to-face with the tangled web of copyright issues. As Kenny Crews writes: “Research and education seem to be routinely reinvented with the creation of new software and technological devices.” This of course creates more tensions on the copyright system.

The Public Policy Environment
The central question of copyright public policy is obvious: How do we optimize the incentive to create new works while minimizing the constraints to innovate? Copyright policy should serve the constitutional purpose of promoting “the progress of science and the useful arts” while maintaining the balance between public and private interests. In today’s copyright policy atmosphere, the balance favors the incentives and rewards for rights holders more than is necessary to maximize creative production. However, proposals backed by the entertainment industry do worse than skew the balance in the other direction; they aim to negate any kind of balance at all, abolishing rights already granted in the law, usually without a corresponding increase in the incentive to create new works.

SOPA, in particular, had unprecedented provisions that sought to make network providers more responsible for infringement. EDUCAUSE, which had long argued that copy-
right infringement is an issue between consumers and producers of copyrighted material (not network providers), found SOPA and also PIPA to be excessive. In opposing these bills, higher education had important allies including Google, Verizon, and other network providers. SOPA and PIPA threatened not only higher education but also websites such as YouTube and Wikipedia. The social media industry became engaged, opposition to SOPA and PIPA spread, and the bills were withdrawn.

These skewed pieces of legislation were not new. SOPA and PIPA were revisions of an earlier bill: COICA. Congress has passed one-sided copyright laws since 1976: the Copyright Term Extension Act kept covered works from entering the public domain; the No Electronic Theft Act established criminal prosecution of individuals who engage in copyright infringement, even when there is no monetary profit or commercial gain from the infringement; the Digital Millennium Copyright Act provided a safe harbor for online service providers but created new obligations on them as well, and it prevented circumvention of technological protection measures.

The Campus Environment

So, creative works and information goods are being squeezed by legal, market, and technology forces, as well as by users who want to mix, repurpose, and build on the original ideas. In a perfect world, these four forces would work in harmony. Today, however, these forces are at odds. The copyright law has not been comprehensively revised since 1976 (long before the advent of digital technologies). Digital content is cheap to produce and reproduce, without any degradation of quality, and is easy to distribute and redistribute. Content owners are desperately trying to hold on to markets that have been fundamentally changed by digital technologies. And, very important, users are creating content and have become accustomed to easy access to and use of content. Where does this leave those who are dealing with copyright issues in teaching and learning, research, and network operations on a daily basis?

The campus community, as both a copyright producer and a consumer, is right in the swirl of the copyright battles. To date, without comprehensive copyright legislation revision, we are left with a crazy quilt of laws that fail to provide clarity. The courts, including the Supreme Court, have issued contradictory decisions: the Georgia State University fair-use case had a positive outcome for higher education, unlike Eldred v. Ashcroft, which failed to overturn the Copyright Term Extension Act. As Crews points out: “This mix of change and inactivity has motivated private parties to take the lead in shaping some implications of copyright law.”

Digital technologies facilitate creative uses of content, with many of these uses serving as legitimate cornerstones of the academic enterprise. This dynamic and inconclusive situation raises complex questions about copyright management and leaves faculty, students, librarians, curriculum designers, academic technologists, and network administrators with a murky minefield to navigate, especially in the online environment.

What to Do?

In August 2012, EDUCAUSE convened a small group of stakeholders from various sectors of higher education to discuss copyright issues and the corresponding challenges and opportunities in the context of e-learning. The group explored the legal and policy issues associated with educational uses of copyrighted materials, the implications of licensing digital content, and ways to work together to proactively shape the future of federal and international law while simultaneously providing guidance to help campuses deal with the murkiness of the current environment as they strive to fulfill their teaching, learning, and research missions. Among the myriad issues discussed, two broad themes emerged. The first is the need to establish and pursue an approach to rights management throughout higher education. The second is the need to develop policy engagement strategies at both the domestic and the international levels so that higher education interests are well positioned and well represented in the public policy sphere.

Yes, we do indeed live in interesting times. Is this a negative or a positive situation? In today’s copyright conundrum, it is often both.

Notes

1. 8 Anne 19 (1710); U.S. Constitution, art. I, sec. 8, cl. 8.

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The Trust Equation

From 2006 through the summer of 2012, I had the privilege of leading a highly talented and complex IT organization at Harvard Business School (HBS). Through a dedicated focus on communication and sound management, we cultivated a high-functioning, high-quality, innovative team.

Throughout my time leading the IT Group (ITG) at HBS, we had a tremendous amount of success, but with the imperfect nature of technology, we still faced unexpected failures. Though we understood this was sometimes inevitable, in our environment—where we strive for “five 9s” (99.999%) of uptime—it bothered us nonetheless. This concern grew exponentially when we considered how central technology had become to the process of delivering education. There is no room for in-class technology failures. Interruptions of this kind can prove highly detrimental to the teaching and learning experience.

The right processes and structures play a role in minimizing these types of interruptions. For example, embracing an ITIL (IT Infrastructure Library) framework, adopting software-development models like Agile (http://www.agilemanifesto.org/), and hiring smart, adaptable staff are all necessary and important. But they are not always sufficient to protect against the unknown. This becomes even more evident when an organization operates very different businesses across an institution. A one-size-fits-all approach does not always work. HBS ITG offers software development, user support, web and intranet services, IT operations, and educational technology services to our campus partners. These functions have various needs and cannot always be supported by the same standards.

With this in mind, we sought to identify ways to work against these unexpected factors and come together to combat them before they caused roadblocks for us as an organization and for our partners across campus. In doing so, we were able to identify a common language that ITG now uses as a guiding principle for its internal and external interactions.

A Case Dissection

In the spirit of HBS, we brought the 130-plus members of the team together to dissect this issue in a case review of our recent successes and failures. Our goal was to take an outstanding organization and make it even better. Through this lively discussion, we identified key factors that made us successful and those that contributed to our challenges.

It became clear that although our goal was to drive quality within our service delivery, the enabling mechanism was built on active trust. As we explored this notion further, we began to see that true trust is the result of many interactions over time. In essence, it is the sum of our interactions with each other (and our campus partners) that either builds or degrades trust. Diving deeper into this concept, we identified three core tenets that enable us to build trust:

- **How we communicate.** This piece of the equation is measured by the ways in which people communicate with each other. For optimum trust, communications must be accurate, crisp, and timely. This is critical to ensure that we relay the right information efficiently and in a time frame that allows all interested parties to react to and process it effectively. As individuals, we also must listen to our teammates and partners so that we truly hear and correctly interpret what it is they are asking of us.

- **How we commit.** As members of an IT organization, we constantly make commitments to ourselves, our teams, and our partners. Honoring these commitments is a crucial factor in achieving high levels of trust. We must deliver on our commitments when we say we will, and we must deliver what we have agreed to accomplish. Even more important, we must deliver a final product that reflects the fit and finish our community expects. Delivering on time is critical, but not sufficient. We must also make sure that the delivery meets the desired business need in a way that helps the users do their jobs. In crafting the delivery we must, first, negotiate features and concentrate on those most valued by the requestor.

- **How we approach honesty.** Honesty is essential and plays across all the core tenets. As we collaborate with one another to achieve our goals and fulfill commitments, we must do so directly and reliably, showing we are accountable for the work being delivered. We must make sure that we are upfront about roadblocks. We must own up to our mistakes and commit to correcting them. And we must have the courage to stop the delivery if there is a possibility that quality is being sacrificed.

Through this discussion, the organization arrived at what we call the ITG Trust Equation (see below), which ties together all of these critical factors.

\[
\text{Trust} = \sum_{t=0}^{\infty} \text{(Communication } \times \text{ Commitment } \times \text{ Honesty)}
\]
Why Is This Powerful?

This shared concept and supporting language gave ITG members a vocabulary through which we could govern our interactions and from which we could hold each other accountable. The Trust Equation also offered a non-threatening mechanism to guide conversations when members were not living up to the organization’s standards of quality. In essence, it provided a more friendly and constructive backdrop for ITG to monitor and correct our own behavior.

Having everyone involved in the creation of the Trust Equation contributed to its adoption because the concept belonged to everyone. As a result, it grew organically with support from across all ITG teams. In the months following its conception, teams began to use the equation as a measurement of their actions. They sought to live up to the equation and to use it to make the best decisions for HBS. Often an individual would point to the Trust Equation and ask other team members if the decisions being made fulfilled the equation in a way that honored our promises. As I reflect back on my time at ITG, I can see that the Trust Equation allowed an already high-performing organization to take itself to the next level in a constructive, fun, and powerful manner.

I’m not saying that every organization should use this formula, but having gone through this experience, I do believe that all organizations need to have an honest conversation to identify their strengths and weaknesses. Without this knowledge, it is impossible to proactively address challenges and effectively overcome roadblocks. Through this discussion, establishing a shared language and framework—one by which the organization makes itself accountable for successes and failures—can have a tremendous impact. Embracing these concepts across the organization will help everyone move forward.

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