



By James Hilton

The Future for Higher Education Sunrise or Perfect Storm?

In today's knowledge economy, the role of higher education is being redefined—not simply tweaked and fine-tuned but, rather, fundamentally redefined. From where I stand, there are at least two ways to frame this future for higher education. The first is to view it as a perfect storm, born from the convergence of numerous disruptive forces. The second is to view this time as the dawn of a new day, a sunrise rife with opportunities arising from these same disruptive forces. How we choose to respond to the disruptions that are coming will determine much of the higher education landscape during the coming decade.

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Disruptive Forces

In general, technology tends to disrupt information-intensive industries. Consider banks. Before the ATM was introduced, banks were hopping places with tellers at every window. After the ATM, they became empty caverns where customers are lucky to find a single teller. Technology fundamentally changed the way the banking industry operates and the ways we conceive of their mission. Similarly, think about the impact that technology has had on mass media. In the old days, there were three television networks, and life was simple. Shows were “pushed” to a passive audience. Then along came cable with the ability to provide content on demand, and audiences were suddenly able to “pull” content they wanted to see. This shift is perhaps most evident in the news

on higher education at this very moment: unbundling; demand pull; ubiquitous access; and the rise of the pure property view of ideas.

Unbundling

In the recording industry, a hit song just isn’t what it used to be. In the days of vinyl, hits drove the sales of albums. Since albums are bundles of songs, the move from phonograph records to eight-tracks to cassettes to CDs wasn’t really a big transition for the recording industry. The customer still bought an “album” of bundled songs. Then along came the Internet, file-sharing, and online music stores, and together, they rocked the underlying economics of the industry. It turns out that many (most?) people do not want to buy the entire album. They want to buy particular songs. This completely

you get your father to help you do the project in PowerPoint?” He, of course, thought this was a swell idea. Dad could help, and he could quit worrying about the oral part of his presentation because the whole thing would be prerecorded. All he would have to do when it came time to stand in front of the class was click a button. He pounced on the opportunity. As we worked together, the thing that surprised me was how deeply he connected with the project. He asked enthusiastically: “How can I find another picture? How can I find another fact? How can I say something more here?” He cheerfully went back and did revisions of his narration, facts, and images.

My favorite moment was when, in his narration, he said: “And then Leo...” Leonardo had become his buddy, his main man. He connected with Leo in ways that

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space, where Google News and RSS feeds provide highly customized information sources. We now can see (only) what we want to see and read (only) what we want to read with all the societal implications that go with that transition.

Currently, the industry that is probably most deeply in the throes of a technology-based transition is publishing. In the past, the ability to publish was tightly controlled. Though Gutenberg’s fifteenth-century printing press made published materials available for the masses, it was not until the advent of the Internet and the personal computer that every single person could become a publisher. Today, we are just beginning to see the effects of that capacity, particularly among the “born digital” crowd. Whereas I go to the Internet to pull down information to read and to figure out what is going on, my kids use the Internet primarily to publish. They post online, write blogs, and run their own Web sites. For them, the Internet is all about expression, and publishers are scrambling to keep up on several fronts. But of course, so are colleges and universities. Consider four disruptive forces that are bearing down

changes the way the content is priced, produced, and delivered.

Think about what unbundling means for higher education and the ways scholarship is evaluated and conceived. This is the era of “rip, mix, and burn.” Today’s students want to be able to take content from other people. They want to mix it, in new creative ways—to produce it, to publish it, and to distribute it. Technology allows them to do that. Let me give you an example. When my son was in the third grade, about ten years ago, if someone had told him that he had to write a report about Leonardo de Vinci, he would have said: “Hmm, there was this guy. He invented some things. He was real smart, and then he died.” That would have been it. It was unbelievably difficult to get him to revise things or to connect in any deep way with the subject.

At the same time, I was using a lot of technology in the classroom. One day, he came home with an assignment to do a project about whomever he wanted in whatever format he wanted. His mother—always clever—said to him: “Why don’t



had not happened before and in ways that too rarely happen in the college classes I teach. I am simply not finding ways to take advantage of “rip, mix, and burn,” nor are we in higher education embracing the potential for unbundling

the ways we think about scholarship—not just for student assignments but for all kinds of scholarship. Recently, I had the opportunity to see Lawrence Lessig give a stunning talk on originality and remix.¹ In the talk, he showcased numerous examples of creativity. All the examples were premised on copying and remixing. At the level of the individual frame, all of the sounds and images were copies. So although there was nothing “original” in the itemized works that he used, the Gestalt was completely original. Some would argue—Lessig being one of them—that the majority of what we think of as originality and creativity is in fact remix. Digital technologies are now bringing that fact into stark relief.

There are, of course, challenges that come along with unbundling and remixing. One is digital divides. We often talk

about digital divides as economic divides. Though this is a valid concern, I do not encounter the economic digital divide very often at the University of Michigan. Virtually all of our students arrive on campus wired and unwired to the hilt. I do, however, see a digital divide between the faculty and the students—between the way students approach technology, assignments, and how they get things done and the way faculty members approach those same issues. For the faculty, the divide is due partly to fear and partly to a lack of familiarity or comfort with technology. But it is also due partly to a fundamentally different way of approaching problems. Today's students approach a problem by trying a solution. If something breaks, they reboot it. They work on the problem in collaboration with other people. They go to the Web to



Colleges and universities will surely have to rethink the current models and standards for promotion.

Still another challenge comes from the fact that technology frequently unbundles the price of a thing from the cost of producing that thing. Again, the recording industry provides an example from the bleeding edge of disruption. Record labels continue to wrestle with the question of how much to charge for online purchases of individual songs. The dominant price today is \$.99 per tune, but the labels would like to move to dynamic pricing in which the price of a song depends on its popularity. Usually, increased popularity (frequency) translates to a lower price. But the recording industry would like the popular songs to cost *more* than the not-so-popular songs. Why? Because the record labels' costs of producing an album

little bit of investment, I could probably design an online interactive version of my introductory psychology class—a version that would compete head-to-head on any dimension of quality—and I could then offer that class globally at an unbundled price that more accurately reflects the cost of developing that class. And if I can't, someone else surely can and will. So what happens when students start unbundling the curriculum? Will they start replacing the highly profitable lecture classes with online versions of those courses and enroll face-to-face only in the high-cost small labs and seminars? Put another way, the price of an undergraduate education today bundles a variety of separate costs. Technology, in the form of online education, will increasingly put pressure on colleges and universities to unbundle the costs associated with delivering their curricula. How they will respond to these pressures is unclear.

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find information. They spend more time doing and very little time planning.

Another challenge is that in this unbundled method of production, models of authorship begin to break down in some fairly important ways. One of my duties in the Provost's Office is to read and review tenure and promotion cases. A requirement is that the letter-writers for promotions and tenure be "at arm's length" from the candidate. Concretely, this means that letter-writers should not be former advisors or coauthors. In one case last year, I discovered that half the letter-writers for a particular candidate had published with him. My initial reaction was, "Here is a problem." But when I investigated further, I discovered that one of the candidate's papers was based on a large-scale collaboration involving more than fifty people, all of whom were listed as authors. Although that discovery clarified the context for the letters, it deeply complicates the more general and highly bundled notions of *authorship*. Traditional models of authorship are poorly suited for collaborative forms of scholarship.

have now been unbundled, and they are trying to find ways to recoup those costs. If they could charge \$2.99 for the popular songs, they would have to sell only four songs to recoup the album price.

What do the price wars in the recording industry have to do with higher education? Colleges and universities face the same challenge. If anything, they are even more "bundled" than the recording industry. They deliver education at a bundled price: that is, the price that an individual student pays may have little to do with the cost of delivering that education. For example, it costs students the same amount of money to take my introductory psychology class, which has 1,200 students, as it does to take an advanced seminar with only 8 students. In the economy of the institution, the department will "make money" on introductory psychology classes and "lose money" on advanced seminars. As long as things stay bundled, none of this is a problem. The fact that I teach a class to 1,200 students allows the department to offer small seminars, and all the books balance. But with just a

Demand Pull

A second disruptive force is the move from "producer push" to "demand pull." In the days of the mainframe, the motto of many technologists was, "If we build it, they will come"—a classic statement of producer-push philosophy. But today, with distributed computing and the Web, the world is much more demand-pull oriented. In demand pull, users determine for themselves which products, services, and information they are interested in using.

Nowhere is the shift from producer push to demand pull more evident than in the rising popularity of RSS feeds and the changing browsing habits of students. On my campus, students are more likely than not to take a minimalist approach to browsing. They turn off the bells and whistles that are built into most sites and simply subscribe to the RSS feed. They want to see the headlines first, and if those are intriguing enough, they will turn the bells and whistles back on to experience the full effect. But most of the time, they simply access the information and then move on.

In the very near future, it will be as easy to search the printed word as it is to search Web pages. Any information that one could desire will be but a click away.

At some level, push and pull forces are always operating. Online search, which is all about demand pull, has not eliminated mass marketing, which is all about push. But the emergence of demand pull has tended to disrupt endeavors dominated by producer push. Just consider how much the nightly news and entertainment fare have changed in the face of “on demand” news and movie services. In that light, it is hard to imagine a more producer-push approach than the “sage on the stage” lecture model that dominates undergraduate education. Can higher education move the curriculum in ways that take advantage of demand pull, and will colleges and universities design their infrastructures to support that approach?

Ubiquitous Access

A third disruptive force is the arrival of ubiquitous access. We do not yet live in a world where all information is free.

Actually, we may never live in a world where all information is free, but all information *will* be accessible in a way that the user will not realize a transaction cost every time the information is accessed. In fact, we are already very close to living in that world. People today expect to be able to get access to information anytime, anywhere, anyway. As one example, the Google Book Search Library Project will result in the scanning and indexing of millions of printed volumes. Think about that. We are on the cusp of a world in which everyone will have access not only to online information but also to information that traditionally was accessible only by going into a library or archive stack or by asking somebody to bring the information to you. In the very near future, it will be as easy to search the printed word as it is to search Web pages. Any information that one could desire will be but a click away.

Do colleges and universities understand the importance of this change? I often find it informative to ask people what they remember from their undergraduate days. At Michigan, they remember football. They remember the residence halls. They remember the library. And they usually remember a professor’s lecture from a particular class. Football is football and dorm life is dorm life. But the library and the professor’s lecture are both remembered primarily for their value as information gateways. The students gained access to information through the library or the words of the professor. The problem is that if someone asks me what I want to achieve in my classes, it is not to provide access to information. I want to provide access to knowledge. The difference between information and knowledge is subtle but important. Knowledge is what you do with information. Knowledge is how you make meaning out of information. And, usually, you gain knowledge through an interactive process—by interacting with someone or by doing some critical analysis or further exploration of the information. Achieving knowledge requires a much richer and more complicated environment than that required for accessing information.

To be clear, colleges and universities have always been in the business of providing access to knowledge. Higher education seeks to nurture critical thinking and to provide opportunities to develop those skills across multiple domains. But colleges and universities have also profited enormously from the fact that they have been seen as gateways to information as well, and that function is—or will soon be—gone. If higher education remains synonymous with access to information in the eyes of the public, then it has a huge problem. There are many more efficient ways to get information than attending classes for four years.

The Rise of the Pure Property View of Ideas

Finally, a fourth disruptive force—and the one that I worry about more than all the others combined—is the fact that we live in a culture and society that increasingly views the world of ideas as pure property.

At a macro level, copyright law is moving aggressively in the direction of protecting owners and away from promoting access and learning.

We should be skeptical of this view. After all, think about the difference between your car and your idea. As John Perry Barlow notes, if somebody steals your car, you can no longer use your car. But if somebody steals your idea, you can still use your idea. There are property-like parts to an idea, but an idea is clearly not pure property.²

So where did the notion that ideas are property originate? I think it has a lot to do with the way copyright law is presented. Most people think that the primary purpose of copyright law is to protect an author's intellectual property or idea. In fact, the primary purpose of copyright law is to promote learning through the spread of ideas. It does that by giving authors *limited* property rights over the way they express their ideas. Thus authors/creators can profit from the sale of their expressions (i.e., the way their idea is manifested in their creative

works), and the world is better by virtue of having access to the underlying idea. In the words of Thomas Jefferson: "If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of every one, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me."³ If ever there were a win-win situation, this is it.

As originally enacted, copyright was designed to balance the limited property rights of the author/creator with the long-

term rights of the public. The problem is that over the years, copyright has changed in ways that have consistently increased the protection granted to authors without providing increased benefit to the public. In 1790, it was the rare work that was protected by copyright. Only published works were eligible for protection, they were protected for a limited time (i.e., fourteen years), and most important, the author had to actively seek protection. Today, copyright protection is automatic, and that protection lasts for an eternity. Virtually all creative works are now protected for the life of the author plus seventy years, and that protection begins from the moment of creation. Publication and registration are no longer required. Concretely, this means that every Web page, every PowerPoint presentation, every manuscript, and every e-mail is protected by copyright.

At a macro level, copyright law (as well as patent law, for that matter) is moving aggressively in the direction of protecting owners and away from promoting access and learning. Even more important, our understanding of the nature of ideas is shifting, even within the academy. Consider just a few examples:

- In 2001, the *Chronicle of Higher Education* reported a case in which a professor and a graduate student conducted an experiment together but arrived at different interpretations of the data.⁴ After they parted ways, the graduate student wrote an article based on the data and submitted it to a journal, where it was accepted for publication. When the professor became aware of the paper, he successfully blocked its publication on the grounds that he owned the data.
- Versity.com, an Internet start-up company, sought to sell students' lecture notes online without seeking the permission of the class instructors. When the company began operations at the University of Michigan, the service created quite a brouhaha. Although students tended to see it as a great service, the faculty tended to see

it as a violation of their intellectual property.

- Anecdotally, MBA students around the country are beginning to ask their professors to sign nondisclosure forms before they turn in their class projects. They are worried that their professors will steal and patent their ideas.
- Conversely, some professors are hesitant to work with students because they fear that the collaboration means they will lose control of their intellectual property. When I first started working on these issues for the provost, we received a phone call from a student who said: "I'm doing a multimedia video thesis, and I have a question. Who owns the copyright to a student thesis?" The student had worked on the project in partnership with a faculty member. The student was the author, but from a copyright perspective, the student, the university (which paid the videographers), and the faculty member were all owners. So we organized a meet-

ing—consisting of three attorneys, the faculty member, two administrators, the student's advisor, the student, and me—in order to negotiate terms to give everyone what they wanted. And at the end of this very expensive meeting, that is exactly what everyone got. My reaction to the meeting was "Happy day!" But on the way out, the faculty member who had worked with the student said: "I will tell you what I've learned from this. I will never work with another student again. I'll just hire it out and save myself grief."

In the world of ideas, the battle lines are drawn between the technology that is predisposed to liberate information and the business models that seek to lock it down. As the societal view shifts from "sharing ideas" to "protecting intellectual property," the challenge for the academy is to find ways to preserve sharing and collaboration in a world that views ideas as pure property.

Opportunities

Although disruption frequently causes pain and confusion, it also brings opportunity. Consider the following five opportunities created by technology-driven disruption.

Exploring New Models of Scholarly Communication

The typical university press is on life-support these days. In large part, this is because libraries, their largest customers, find themselves hard-pressed to keep pace with the escalating costs of maintaining their collections. Part of that pressure comes from inflation, part comes from the explosion of titles that are available (especially in the natural and social sciences), and part comes from the fact that electronic access usually supplements rather than replaces print subscription. There simply is not enough money in the collection budgets to buy everything that is available, and this situation is going to get only worse.

Higher education institutions and their presses have been slow to react to this crisis. The dominant response from the presses has been to try to make do with smaller press runs. (Press runs of several hundred copies are now fairly common.) The dominant response from colleges and universities has been to move presses to an auxiliary status and insist that they sink or swim on their own. I do not think that either of these responses has much potential. Presses will either lose their academic focus in an attempt to find a broader market or raise the price of their titles in an attempt to get by on smaller press runs. Instead, I would like to see some large-scale experiments that take advantage of unbundling. Consider, for example, distribution costs. In the print world, real costs are added each time a book is printed and shipped, and all of the costs get bundled into the price of the book. In the digital world, however, copies and distribution are essentially free, offering an opportunity to unbundle production and distribution costs. Rather

than forcing the presses to turn a profit in the analog world, perhaps colleges and universities should move to a pure digital environment—explicitly subsidizing the editing and production costs and then allowing the presses to give the digital copies away at their marginal cost (which should approach zero). Such a move could reduce the total cost of supporting a university press while, at the same time, significantly increasing the impact of the press outside the academy.

More generally, we need to explore financial models that do not bundle all of the publication costs with the delivery of the final product. We also need to invest in supporting new forms of scholarship and publishing. To give just one example, the challenge of archiving digital works is enormous even with the emergence of repository software like DSpace and Fedora.

Using Copyright in the Service of Sharing

Though it might not appear that way, I am actually a big fan of copyright. I believe that people need incentives to

produce and share their ideas, and I think that the balance the framers of the U.S. Constitution struck between the rights of the author and the rights of the public was nothing short of brilliant. My problem with copyright lies not in its existence but in how it has expanded over time. Driven in no small part by the fear that publishers have of the Internet, copyright protection today is too broad and too automatic.

Enter the Creative Commons (<http://creativecommons.org>). The Creative Commons is dedicated to the notion of using the licensing power that comes with copyright to encourage sharing. It offers a menu of licenses from which authors and creators can choose the ones that best suit their purposes. It replaces the notion of “all rights reserved” with the notion of “some rights reserved.” An author can, for example, choose a license that reserves for-profit uses for the author but that allows the work to be used by others in non-profit ways. In short, the Creative Commons provides a mechanism for sharpening the blunt instrument of copyright.

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Embracing Mass Digitization

A third opportunity is to join mass digitization projects. The University of Michigan is one of five institutions (along with Harvard, the New York Public Library, Oxford, and Stanford) involved in the Google Book Search Library Project. The University of Michigan is committed to allowing Google to digitize the seven million bound volumes of our print collection. Those works will then be indexed and searchable through Google. If a user finds a public-domain work, he or she will be able to access the entire work. If the work is under copyright, the user will see what Google calls a *snippet*—three or four lines of text. The user will then get links on where to find the book, either from a publisher or from a library.

Although there will be much legal wrangling in the coming months, I believe the Google announcement changed the world because it shifted the conversation around digitization away from “whether” to “when.” If Google vanished tomorrow, digitization would continue. The French are committed to digitizing their books. So also are the Germans. The Open Content Alliance is committed to digitizing works that are in the public domain. Even publishers are now announcing plans to put digital copies of their books online. What all of this activity means is that in the very near future, if a work is not online, it will not be read. This does not mean that all works will be read online, but if they cannot be found online, they will lose relevance and disappear.

The promise of ubiquitous access has transforming implications. In the world of ubiquitous access, the pace of scholarship not only increases but also changes fundamentally as scholars find new ways to link analysis with data. In the world of ubiquitous access, the differences between the “haves” and the “have-nots” lessen a little, at least for those with Internet connections. In the world of ubiquitous access, mass digitization becomes a driver for rationalizing intellectual property and copyright policies, for creating more cooperative universal

libraries, for speeding up the question about libraries as place and, by extension, colleges/universities as place, and for freeing up scarce resources.

Leveraging Cost Curves

A fourth opportunity is to figure out how to manage to abundance. When I think about how we price technology services at the University of Michigan, I am struck by how often we treat technology as a scarce and precious resource. We carefully meter and limit bandwidth. We impose strict quotas on storage and ration out access to our high-performance clusters. And yet, the cost structures that underlie many of these services mean that we actually live in a world of abundance. Consider storage costs. Although implementing an enterprise-wide storage system is often hideously expensive, once the system has been installed, using it a little or using it a lot costs the same. Similarly, with the move to fiber, many campuses find themselves with bandwidth to spare, though their rate structures continue to discourage the use of that bandwidth. Even high-performance computing is going down this path. At the computer science conventions, vendors now give away clusters as door prizes. It is time to figure out how to price use in ways that take full advantage of low marginal costs.

Participating in the Open Source Movement

Though not a panacea, participating in the development of open source software provides colleges and universities that are committed to the free exchange of ideas with another opportunity to put their money where their mouths are. Consider the Sakai Project (<http://www.sakaiproject.org>). The Sakai Project is a multi-institutional attempt to build an open source collaborative learning environment (a.k.a., course management system). The University of Michigan went down the Sakai path for many reasons. We saw market consolidation and the rise of monopolistic practices in the commercial sector. We saw an opportunity to tap core competencies within our institution around teaching

and learning. We saw an opportunity to initiate a cycle in which the development process feeds the classroom and the laboratory and they, in turn, feed the development cycle. But most important, we saw an opportunity to collaborate with like-minded institutions to build *and implement* systems that rely on open standards and interchangeable components. From the beginning, our business model has been to find like-minded collaborators who are committed to giving away the jointly developed software in the service of building a self-sustaining community that can go head-to-head with commercial interests. Though it is still too soon to tell, the early success of Sakai (as I write, there are currently more than one hundred institutions participating) and similar “community source” projects (e.g., the Quali Project and uPortal) bodes well for institutional sharing.



What is the role of higher education in the knowledge economy? Though the perfect storm always looms, I am placing my bet on the sunrise. The technology-driven disruptions of the knowledge economy offer higher education an enormous opportunity to remake ourselves—this time around collaboration, exploration, and engagement with the wider world. *e*

Notes

1. For example, listen to “Re: Mix Me,” Lawrence Lessig’s presentation on the *IT Conversations* Web site, March 17, 2005, <<http://www.itconversations.com/shows/detail474.html>>.
2. John Perry Barlow, speaker, “The DotCommunist Manifesto: The Practical Economics of Abolishing Virtual ‘Property,’” Copyright Dilemmas in the Information Age Symposium, Ann Arbor, Michigan, December 5, 2000.
3. Thomas Jefferson to Isaac McPherson, August 13, 1813, quoted in Philip B. Kurland and Ralph Lerner, eds., *The Founders’ Constitution*, vol. 3, article 1, section 8, clause 8, document 12 (Chicago: University of Chicago Press, 1987), <http://press-pubs.uchicago.edu/founders/documents/a1_8_8s12.html>.
4. Dan Curry, “Chemistry Journal Shelves Article after the Author’s Former Mentor Raises Objections,” *Chronicle of Higher Education*, June 4, 2001.